

Total No. of Questions : 4]

SEAT No. :

PE-5118

[Total No. of Pages : 2

[6501]-601

S.Y. B.Sc. (Regular)

CHEMISTRY

CHE-201-T IKS : Ancient Indian Chemistry

(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Use of scientific calculator and log table is allowed where applicable.
- 3) Figures to the right indicate full marks.
- 4) Illustrate your answers with neat diagrams wherever necessary.

Q1) Solve any five of the following:

[5]

- i) State any one use of dyes in ancient Indian Society.
- ii) What combination of three herbs forms Triphala.
- iii) What is chemical name of Kasisa used in Ayurveda?
- iv) What is Sanskrit term for silver?
- v) Which metal alloyed with copper to make bronze?
- vi) Who is traditionally consider the author of Arthshatra?
- vii) Name the Ayurvedic texts written by Vagbhata.

Q2) A) Solve any two of the following:

[6]

- i) Discuss the references to alcoholic beverages in vedic texts and their role in ancient Indian Society.
- ii) Describe Charaka's Gold preparation.
- iii) Explain main metallurgical topics found in Nagarjuna.

P.T.O.

B) Solve the following (Any Two): [4]

- i) Explain position of Rasayana in Indian Medicine.
- ii) Give name and chemical formula of iron ore resources in India.
- iii) Explain scientific contribution of Shanti Swarup Bhatnagar.

Q3) A) Solve any two of the following: [6]

- i) Explain Harbal Rasayana according to ancient Indian Chemistry.
- ii) Explain pharmaco-therapeutic properties of copper.
- iii) Write short note on Acharya Ramchandra.

B) Solve the following: [4]

- i) Explain how paper making and ink making in ancient India.
- ii) Give major Zinc ore source used in ancient India.

Q4) Solve any FOUR of the following. [10]

- i) Write a short note on archaeological evidences.
- ii) Write a note on Indian alchemy 1000 (A.D.)
- iii) Write a note on traditional method of gold extraction.
- iv) Write a short note on Naga or Shisha (lead).
- v) Explain major works of Vaghbhatta.
- vi) Describe contribution in Indian chemistry by Sir Har Gobind Khorana.



Total No. of Questions : 4]

SEAT No. :

PE-5523

[Total No. of Pages : 2

[6501]-602

S.Y. B.Sc.

DEFENCE AND STRATAGIC STUDIES
DEF-201-IKS : DECISIVE BATTLES OF INDIAN
MILITARY HISTORY
(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicate full marks.*

Q1) Answer the following question (any Five) :

[5 × 2 = 10]

- a) Write the Significance of Third Battle of Panipat in Indian Context
- b) Write the Indo-Afghan art of war
- c) Explain the Military System in Ancient India
- d) State the causes of First Battle of Tarain.
- e) Write the Mughal art of war.
- f) Analysis of Causes of Defeat of Prithviraj Chauhan.

Q2) Answer the following question (any Two) :

[2 × 4 = 8]

- a) State the Turk art of war with Special reference to the Battle of Tarain.
- b) Explain in detail Indo-Greek art of war with special reference to the Battle of Jhelum (326 B.C.)
- c) State the causes of Defeat of Porus.

Q3) Answer the following question (any One) :

[1 × 7 = 7]

- a) Analysis of causes of Defeat of Sultan
- b) Explain in detail Third Battle of Panipat

P.T.O.

Q4) Write short notes (any Two) :

[2 × 5 = 10]

- a) King Porus
- b) Alexander the Great Sikandar
- c) Ahmad Shah Abdali



Total No. of Questions : 3]

SEAT No. :

PE-5119

[Total No. of Pages : 2

[6501]-603

S.Y. B.Sc. (Regular)

GEOGRAPHY

GEO(S)201 - IKS : Development of Indian Geographical
Knowledge

(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) Attempt all questions.
- 2) Figures to the right indicate full marks.
- 3) Draw neat diagrams whenever necessary.
- 4) Use of map stencils is allowed.

Q1) Answer the following questions in 20 words (Any Five):

[10]

- i) Write the aim of Indian geographical knowledge study.
- ii) Write the concept of the saptadvipa in Buddhist traditions.
- iii) Which region is referred to as Madhyadesha (central land)?
- iv) Name the six seasons in order from the ancient Indian seasonal cycle.
- v) On which ghat in Varanasi is the Jantar Mantar located?
- vi) Which is the purpose of the 'Gram Swaraj Scheme'?
- vii) Define Indian Geographical Knowledge.

Q2) Answer the following questions in 50 words (Any Two):

[10]

- i) Write the significance of Indian geographical knowledge.
- ii) Describe the points mentioned in the Puranas about the disappearance of the Saraswati River.
- iii) What was Gandhiji's perspectives towards natural resources?

P.T.O.

Q3) Answer the following questions in 100 words (Any Two):

[15]

- i) How was the development journey of Indian geography from ancient to medieval times?
- ii) Explain the role and importance of mountain ranges, rivers, seasons in Puranic geographical literature.
- iii) According to Gandhian perspective, explain agriculture and its characteristics.



Total No. of Questions : 4]

SEAT No. :

PE-5120

[Total No. of Pages : 2

[6501]-604

S.Y. B.Sc. (Regular)

GEOLOGY

**IKS 201 GL T : Ancient Knowledge System in Geosciences
(2024 Pattern) (Semester - III)**

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Neat diagram must be drawn whenever necessary.*

Q1) Answer the following question in 2-3 lines (Any Five): **[5]**

- a) What are ancient lakes?
- b) Explain the term “Kund”.
- c) Give any two ancient Indian names of water.
- d) What are the traditional methods of water storage?
- e) Explain the term “step wells”.
- f) What is Pyne?

Q2) A) Answer any one of the following: **[6]**

- i) Explain the Eri system of water management.
- ii) What are the significance of Ancient Canal Structures?

B) Answer any one of the following: **[4]**

- i) Impact of droughts on the crop management.
- ii) Describe the Tanks and Step wells system.

P.T.O.

Q3) A) Answer any one of the following: **[6]**

- i) Describe the Indus civilization water system.
- ii) Enlist the hydraulic structures used in Ancient India. Write note on its importance.

B) Answer any one of the following: **[4]**

- i) Role of Topography in Ancient Water System.
- ii) Role of Geology in Ancient Water System.

Q4) Write short notes on any five of the following : **[10]**

- a) Baolis
- b) Talabs
- c) Ancient artificial lakes
- d) Traditional water systems
- e) Importance of Ancient Water Storage System
- f) Pyne and Ahars.



Total No. of Questions : 4]

SEAT No. :

PE3392

[Total No. of Pages : 2

[6501]-605

S.Y.B.Sc. (Regular)

ENVIRONMENTAL SCIENCE

IKS 201-T EVS : Indian Culture and Environment

(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Use of scientific calculator and log table is allowed where applicable.*
- 3) *Figure to the right indicate full marks.*
- 4) *Illustrate your answers with neat diagrams wherever necessary.*

Q1) Answer any five of the following in one sentence.

[5]

- a) What is sacred grove?
- b) Name any two sacred rivers in India.
- c) What is Ahimsa?
- d) Which festival is related to tree plantation?
- e) Give one example of traditional water conservation.
- f) What is the meaning of “Vasudhaiva Kutumbakam”?

Q2) a) Write any one of the following.

[6]

- i) Explain the Indian world view on nature. (Harmony and inter connectedness).
- ii) Write about sacred groves and their role in biodiversity conservation.

b) Write any one of the following.

[4]

- i) Give any four examples of reverence for nature in Hinduism.
- ii) What is the importance of Tulsi plant in the Indian culture?

P.T.O.

Q3) a) Write any one of the following. **[6]**

- i) Explain environmental teachings in Jainism.
- ii) Describe how Indian festivals promote environmental awareness (any three festivals).

b) Write any one of the following. **[4]**

- i) What is the role of sacred rivers in Indian culture?
- ii) Explain two eco-friendly practices in traditional Indian lifestyle.

Q4) Write notes on (any four) **[10]**

- a) Sacred groves
- b) Ahimsa in Buddhism
- c) Tree plantation during festivals
- d) Traditional rainwater harvesting methods
- e) Vasudhaiva kutumbakam
- f) Role of indigenous communities in forest protection



Total No. of Questions : 4]

SEAT No. :

PE-5121

[Total No. of Pages : 2

[6501]-606

S.Y. B.Sc. (Regular)

ELECTRONIC SCIENCE

IKS-200-T : Development of Electronic Communication in
India

(NEP 2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Q.No.2 to Q.No.4 carry equal marks.

Q1) Answer the following questions (Any Five):

[5]

- a) Write the name of the device used to connect a user to the telephone network.
- b) Write the full form of OLED.
- c) What is communication system?
- d) Which modern television type integrates internet connectivity and smart features.
- e) State any two advantages of mobile communication.
- f) Write the full form of IoT.
- g) Enlist any two online chat applications.

Q2) A) Answer the following questions (Any Two):

[6]

- i) Compare LED, LCD and Plasma television based on their working principle and picture quality.
- ii) Draw and explain block diagram of mobile communication in brief.
- iii) Explain the working and uses of pager.

P.T.O.

B) Answer the following questions (Any One): [4]

- i) Explain the concept of radio communication.
- ii) Explain the concept, working and advantages of internet radio.

Q3) A) Answer the following questions. (Any Two): [6]

- i) Explain the working of color television with block diagram.
- ii) Explain the significance of 4G in mobile internet and multimedia services.
- iii) Explain the role of Doordarshan in educational broadcasting.

B) Answer the following questions (Any One): [4]

- i) What is internet telephony? Explain how voice and video calls are made using internet?
- ii) What is internet radio? Write benefits of internet radio in modern broadcasting.

Q4) Write short notes (Any Four): [10]

- a) Facebook
- b) IoT
- c) Smart TV
- d) Telegram system in India
- e) Pocket Radio
- f) Artificial Intelligence
- g) Instagram



Total No. of Questions : 4]

SEAT No. :

PE-5122

[Total No. of Pages : 2

[6501]-607

S.Y. B.Sc. (Regular)

MATHEMATICS

IKS 201-MTS : Indian Knowledge System - Mathematics
(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Figures to the right indicate full marks.

Q1) Attempt any five of the following: [5]

- a) Write any two Sanskrit number names for numbers between 1 to 9.
- b) What is cyclic quadrilateral?
- c) Who translated Brahmagupta's work into Arabic in 8th Century?
- d) What is Bhutsankhyā number system?
- e) Why Sulbasūtra is also called as Rajjusātra ?
- f) Whether Katapayādi system reads numbers from Right to left in its earlier usage?
- g) Write first 4-terms of Hemachandra-Fibonacci sequence.

Q2) A) Attempt any one of the following: [5]

- i) Mention any two mathematicians with their contributions from Kerala School of Mathematics.
- ii) Mention any two key features of the Indian Numeral System.

B) Attempt any one of the following: [5]

- i) What is the significance of the Adhika Masa in the Indian Calendar System?

P.T.O.

- ii) Three merchants have some items. The combined number of items of the first and second merchants are 13, of the second and third are 14 and of the first and third are 15. Find the number of items each merchant has.

Q3) A) Attempt any one of the following: [5]

- i) Write any two differences between Bhutasankhya number system and katapayadi number system.
- ii) Write any two differences between “abacists” and “algorists”.

B) Attempt any one of the following: [5]

- i) Explain how Sushruta used combinations to calculate the number of possible tastes from six basic tastes.
- ii) Explain Sridhara’s rule to solve the quadratic equation $ax^2 + bx = c$. Hence, solve $2x^2 + x = 1$ using Sridhara’s rule.

Q4) A) Attempt any one of the following : [5]

- i) Explain the Decimal Number System were spread beyond India.
- ii) Explain briefly the role of Aryabhata in the development of place-value system without zero.

B) Attempt any one of the following : [5]

- i) Explain the Nikhilam method to find quotient and remainder when divided by 9. Hence Find $\frac{14}{9}$.
- ii) A person pays for a house in the following way:
1 coin on the first day, 3 on second day, 5 on the third day and so on, increasing the payment by 2 coins each day. In how many days will the full price of 100 coins be paid?



Total No. of Questions : 4]

SEAT No. :

PE-5123

[Total No. of Pages : 2

[6501]-608

S.Y. B.Sc. (Regular)

MICROBIOLOGY

**IKS-201-MB : Indian Knowledge System and Microbiology
(2024 Pattern) (Semester - III)**

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicate full marks.*
- 3) *Draw neat labelled diagrams wherever necessary.*

Q1) Answer any Five of the following: [5]

- a) Define ojas.
- b) Define Kaphaja Krimi.
- c) State true or false : Dantadhavana is referred as brushing of teeth.
- d) Enlist two herbs used for bathing in Ayurveda.
- e) What is Panchgavya?
- f) Write full form of CBD.
- g) To treat wound infection _____ plant extract is used.

Q2) A) Write any one of the following: [6]

- i) Explain methodology and traditional importance of preparation of Idali.
- ii) Explain key components of Dinacharya.

B) Write any one of the following: [4]

- i) Describe in brief Basamati Rice Patent Case.
- ii) Explain use of herbs in environmental and household cleaning.

P.T.O.

Q3) A) Write any one of the following: [6]

- i) What is Panchamruta? Explain its ingredients and methodology.
- ii) Describe role of plant based methods of water purification.

B) Write any one of the following: [4]

- i) What is Biopiracy? Explain key features of biopiracy.
- ii) Comment on gomaya (cowdung) in traditional cleaning.

Q4) Write short notes on any four of the following : [10]

- i) Ritucharya
- ii) Sattvic diet
- iii) Kanji
- iv) Herbal cleansers in personal hygiene
- v) TKDL



Total No. of Questions : 4]

SEAT No. :

PE-5124

[Total No. of Pages : 2

[6501]-609

S.Y. B.Sc. (Regular)

BOTANY

**IKS-BOT-T/IKS-ST-T : Indian Knowledge System
Medicinal Plants in Traditional Systems of Medicine
(2024 Pattern) (Semester - III)**

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicate full marks.*
- 3) *Draw neat labelled diagrams wherever necessary.*

Q1) Answer any five of the following in one sentence :

[5]

- a) Write any one importance of IKS.
- b) Define Pitta.
- c) Give full form of AYUSH.
- d) Define Health.
- e) Write any one ethnic society in Maharashtra.
- f) What is WHO?

Q2) A) Write any one of the following:

[6]

- i) Explain Kayachikitsa and Kumarbritya.
- ii) Define Siddha system of medicine and give an account of medicines used in it.

B) Write any one of the following:

[4]

- i) Write importance of Ethnomedicine.
- ii) Comment on importance of Panchakarma in human life.

P.T.O.

Q3) A) Write any one of the following: **[6]**

- i) What is Tridosha? Comment on Kapha characters.
- ii) Write about the diagnosis in Unani medicine.

B) Write any one of the following: **[4]**

- i) Explain any two sources of knowledge in Ayurveda.
- ii) Explain the opportunities in Integrating Traditional and Modern Medicine.

Q4) Write notes on (Any Four): **[10]**

- a) Objectives of IKS
- b) Therapeutic uses of Yoga
- c) Tridosha
- d) Yoga and Ayurveda
- e) Gond Tribe
- f) Approaches of IKS



Total No. of Questions : 5]

SEAT No. :

PE-5125

[Total No. of Pages : 2

[6501]-610

S.Y. B.Sc. (Regular)

NANOSCIENCE

NS-201-IKS : Nano Science and Nanotechnology
(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) Question No.1 is compulsory.
- 2) Solve any three of questions from Q.No.2 to Q.No.5.
- 3) Question No.2 to Q.No.5 carry equal marks.
- 4) Draw neat and labelled diagram whenever necessary.
- 5) Figures to the right indicate full marks.

Q1) Attempt any five of the following:

[5]

- a) What does the prefix “nano” mean?
- b) What is Nanotechnology?
- c) Define atomic scale.
- d) Who is known as the “Father of Nanotechnology”?
- e) Give one example of natural nanomaterials.
- f) Define nanomaterials.

Q2) a) Explain role of Nanotechnology in robotics and automation.

[6]

OR

Describe the development and use of Nanomedicine in disease treatment.

- b) Explain the challenges faced in implementing nanotechnology safely.[4]

Q3) a) Describe importance of Nanotechnology in field of engineering.

[6]

P.T.O.

OR

Discuss in detail the fundamental principles of Nanoscience.

- b) Write short note on the discovery and development of nanoscience. [4]

Q4) Attempt any two of the following: [10]

- a) What is effect of nanoscale on different properties of materials.
- b) Explain Sociatal and Ethical aspects of nanotechnology.
- c) Explain medical application of Nanotechnology.

Q5) Write short note on any four of the following: [10]

- a) Nanobiotechnology.
- b) Nanoelectronics.
- c) Nanoenergy.
- d) Uniqueness of Atomic Scale.
- e) Design and development of Nanodevices.
- f) Synthesis of Nanomaterials.



Total No. of Questions : 4]

SEAT No. :

PE-5126

[Total No. of Pages : 2

[6501]-611

S.Y. B.Sc. (Regular)

PHYSICS

**PHY 201 IKS : India's Contribution to Physics
(2024 Pattern) (Semester - III)**

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicate full marks.*

Q1) Answer the following questions (any 5 out of 7): **[5]**

- a) How does the Nyaya School define valid knowledge.
- b) Why was Meghnad Saha's discovery special for Indian Science?
- c) Define Astrosat and mention its scientific utility.
- d) What is aim of India's National Quantum Mission?
- e) What are the uses of Raman spectroscopy in Modern Science.
- f) Mention two key contributions of TIFR.
- g) What is the Crescograph?

Q2) A) Answer the following questions. **[6]**

- i) How did Bose Mix Science with Indian Philosophy in his work?
- ii) Explain the atomic theory of matter as presented by the Vaisesika School.

B) Answer the following questions: **[4]**

- i) Explain India's contribution to the CERN project.
- ii) What is the importance of Vedanga Jyotisha.

P.T.O.

Q3) A) Answer the following questions: [6]

- i) Explain in detail the role and achievements of ISRO.
- ii) Describe the structure, instrument and key discovery of Astrosat.

B) Answer the following questions: [4]

- i) Explain Harish-Chandras shift from Physics to Mathematics.
- ii) Describe applications of Bose-Einstein condensates in India.

Q4) Write a short note on following (any 4 out of 6) : [10]

- a) Indian Space Research Organisation (ISRO)
- b) Tata Institute of Fundamental Research (TIFR)
- c) Raman Spectroscopy
- d) Concept of gravity
- e) Satyendra Nath Bose
- f) Nyaya and Vaisesika Schools.



Total No. of Questions : 4]

SEAT No. :

PE-5183

[Total No. of Pages : 2

[6501]-612

S.Y. B.Sc. (Regular)

PSYCHOLOGY

PSY-201-IKS : Indian Roots of Psychology

(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicate full marks.*

Q1) Solve any five of the following:

[5]

- a) Define Manas.
- b) What is perception of Buddhism.
- c) Define mindfulness.
- d) Role of self awareness in mental health.
- e) Impact of craving in suffering.
- f) What is Ahamkara.
- g) Define Buddhi.

Q2) A) Solve any two of the following:

[6]

- a) Write history of psychology in India.
- b) Explain concept of Four Noble truths.
- c) Write a note on Sufism.

B) Solve the following (compulsory):

[4]

Explain the efficiency of yoga in mental wellbeing.

P.T.O.

Q3) A) Solve any two of the following: **[6]**

- a) Differentiate between Manas and Ahamkara.
- b) Role of meditation in emotional control.
- c) Explain why Indian psychology values inner experience.

B) Solve the following (compulsory): **[4]**

Explain the relevance of Indian psychological concepts in psychological counselling.

Q4) Solve any four of the following: **[10]**

- a) Role of mindfulness in reducing exam stress.
- b) Use of meditation in anger control.
- c) Use of Buddhist philosophy for moral behavior.
- d) Jain philosophy in self discipline.
- e) Understandings of Vedic philosophy for personal growth.



Total No. of Questions : 5]

SEAT No. :

PE-5127

[Total No. of Pages : 3

[6501]-613

S.Y. B.Sc. (Regular)

STATISTICS

STS - 201 - IKS : Development of Statistics in India
(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Figures to the right indicate full marks.
- 3) Symbols and abbreviations have their usual meanings.

Q1) Choose the correct alternative for each of the following:

[7×1=7]

- a) The first person who appointed as statistical adviser to the cabinet of India was :
 - i) C. R. Rao
 - ii) P. C. Mahalanobis
 - iii) P. V. Sukhatme
 - iv) K. R. Nair
- b) The institute which declared as Institute of National Importance in 1959 is _____.
 - i) Indian Institute of Statistics
 - ii) Indian Statistical Institute
 - iii) Statistical Institute of India
 - iv) Institute of Statistics in India
- c) The Bhadrabahu was a _____ who gave the statistical concept in Ancient India.
 - i) Jain Scholar
 - ii) Buddha Scholar
 - iii) Hindu Scholar
 - iv) Sikh Scholar
- d) The book written the Kautilya was _____.
 - i) Econometric
 - ii) Susutras
 - iii) Lilavati
 - iv) Arthshastra

P.T.O.

- e) The first Statistical Committee was constituted by British Government in the year _____ .
- i) 1860 ii) 1884
iii) 1862 iv) 1850
- f) The concept of probability was given by _____ in his book Chandahsutra.
- i) Pingala ii) Bhaskara I
iii) Kautilya iv) Bhadrabahu
- g) _____ devoting more of his efforts at this time to the measurement of malnutrition and poverty in the world in the period 1952-70.
- i) V. S. Huzurbazar ii) Debabrata Basu
iii) P. V. Sukhatme iv) C. R. Rao

Q2) Fill in the blanks for each of the following: **[6×1=6]**

- The year in which Ministry of Statistics and Programme Implementation (MOSPI) came into existence is _____ .
- _____ applied modern statistical methods to forestry research.
- A measure of comparison between two data sets that is known as _____.
- _____ attaches considerable importance to coverage and quality aspects of statistics released in the country.
- The first Head of Department of Statistics of Savitribai Phule Pune University is _____ .
- The responsibility of Director General of Commercial Intelligence and statistics till 1914 in British government is _____.

Q3) State whether the following statements are True or False: [6×1=6]

- P. C. Mahalanobis founded the journal *paninee*.
- The NSSO was established by British Government in 1860.
- K. R. Nair joined Statistical laboratory at ISI as research worker.
- The CSO collects the information related to socio-economic aspects.
- King Nalawas the precedent of Yudhistira.
- The MOSPI has two wings - Statistics and Programme Implementation.

Q4) Match the following pairs :

[6×1=6]

Group A	Group B
a) Vahuka	i) Established Bengaluru campus of ISI
b) Sankhya	ii) First HOD of Statistics at SPPU
c) NSO	iii) Weighted Arithmetic Mean
d) Kallianpur	iv) Charitor
e) V. S. Huzurbazar	v) Journal of Statistics
f) Samarajju means	vi) 2019

Q5) Attempt each of the following:

[10×1=10]

- State the location of headquarter of National Statistical Office.
- Give the responsibility of Central Statistics Office.
- Name the popular text of Bhaskara II.
- Give the date on which National Statistics Day is celebrated every year.
- Write the name of a person who established Bengaluru campus of ISI.
- Who gave much more contribution in the Indian Council for Agricultural Research?
- Tell the subject of Ph.D. research of V. S. Huzurbazar.
- Write any one responsibility of Programme Implementation wing of MOSPI.
- What is the meaning of Vikalpa, the concept given by ancient Jain scholars.
- Whose birthday is celebrated as National Statistics Day?



Total No. of Questions : 4]

SEAT No. :

PE-5128

[Total No. of Pages : 2

[6501]-614

S.Y. B.Sc. (Regular)

ZOOLOGY

ZOO-201-IKS : Treasures of Animal Kingdom (T)
(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicate full marks.*

Q1) Answer ANY FIVE of the following in one sentence : **[5]**

- a) Who is Shalihotra?
- b) What is prehistoric Fauna?
- c) Mention any two examples of Himalayan Fauna.
- d) Who is the bird man of India?
- e) Write full form of ZSI.
- f) What is animal conservation?

Q2) A) Attempt any one of the following: **[6]**

- i) Describe in details Indian desert ecosystem.
- ii) Explain environmental degradation and decline caused by hunting during colonial India.

B) Attempt any one of the following: **[4]**

- i) Give branches of Zoological Survey of India and it's role.
- ii) Write a note on Hamsadev.

P.T.O.

Q3) A) Solve any one of the following: [6]

- i) Explain Wildlife Protection Act in India.
- ii) Describe the Deccan Plateau ecosystem of India.

B) Solve any one of the following: [4]

- i) Describe Flora and Fauna of Western Ghat of India.
- ii) Explain how animal killing was practiced as a major sports during the colonial period.

Q4) Write notes on (Any Four) : [10]

- a) Kinds of birds and animals during Vedic period.
- b) Andaman and Nicobar Islands ecosystem.
- c) Indian Natural History Museums.
- d) Indus Valley civilization.
- e) Wildlife Institute of India.
- f) National Fauna History of India.



Total No. of Questions : 4]

SEAT No. :

PE-5129

[Total No. of Pages : 2

[6501]-615

S.Y. B.Sc. (Regular)

CHEMISTRY

CHE-221-T-VSC : Industrial Chemistry - I

(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Figures to the right indicate full marks.
- 3) Use of scientific calculator and log tables are allowed wherever applicable.
- 4) Illustrate answers with neat, labelled diagrams wherever necessary.

Q1) Solve any Five of the following: [5]

- a) Define Industrial Chemistry.
- b) Give one example each of renewable and non-renewable raw materials.
- c) What is the function of an Electrostatic Precipitator.
- d) State the purpose of crystallization in chemical industries.
- e) Define drying and give name one type of industrial dryer.
- f) Name one antibiotic whose API is made using fine chemicals.
- g) Write the chemical equation for the manufacture of ammonia in the Haber process.

Q2) A) Solve any two of the following: [6]

- i) Explain the scope and significance of Industrial Chemistry.
- ii) Describe the Effluent Treatment Plant (ETP) in water pollution control.
- iii) Write a note on the manufacture of sodium carbonate by the Solvay process.

B) Solve the following: [4]

- i) Describe physico-chemical principles for contact process.

P.T.O.

Q3) A) Solve any two of the following: **[6]**

- i) Differentiate between Unit Operations and Unit Processes.
- ii) Give reasons and important for industrial process by green chemistry approaches.
- iii) Differentiate between heavy and fine chemicals.

B) Solve the following: **[4]**

- i) What is Polymerisation? Discuss addition and condensation polymerisation with suitable example.

Q4) Solve any four of the following : **[10]**

- a) Justify the importance of the industrial chemistry in environmental management.
- b) Discuss Zero Liquid Discharge as a sustainable waste water management strategy.
- c) Explain the application of Rotary dryer in the chemical industries.
- d) Discuss catalytic roles in sulfuric acid and ammonia production for energy-efficient processes.
- e) Explain the concept of supersaturation and its importance in industrial crystallization.



Total No. of Questions : 4]

SEAT No. :

[Total No. of Pages : 2

PE5524

[6501]-616

S.Y.B.Sc. (Regular)

DEFENCE AND STRATEGIC STUDIES

**DEF-221-VSC : Conceptual Aspects of National Security-I
(2024 Pattern) (NEP) (Semester-III)**

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) All questions are compulsory.*
- 2) Figures to the right indicate full marks.*

Q1) Answer the following questions (any Five).

[5×2=10]

- a) Write the full form of CSTO.
- b) What is Global Security?
- c) State the Defence Preparedness.
- d) Write the difference between National Security and National Defence.
- e) Write the Significance of Military Alliances.
- f) What is Regional Security?

Q2) Answer the following questions (any Two).

[2×4=8]

- a) Explain the Nature and Scope of National Security.
- b) Write the Threats Perception.
- c) Explain the challenges of Indias National Security.

P.T.O.

Q3) Answer the following question (any One).

[7]

- a) Explain in detail Military Alliances and their role in the 21st century.
- b) Explain in detail, Meaning, Concept, Nature and Scope of national security.

Q4) Write short notes (any Two).

[2×5=10]

- a) Threats Perception
- b) CSTO
- c) NATO



Total No. of Questions : 4]

SEAT No. :

PE3393

[Total No. of Pages : 2

[6501]-617

S.Y. B.Sc. (Regular)

ENVIRONMENTAL SCIENCE

EVS-221 VSC : WATER QUALITY ANALYSIS

(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Use of scientific calculator and log table is allowed where applicable.*
- 3) *Figures to the right indicate full marks.*
- 4) *Illustrate your answers with neat diagrams wherever necessary.*

Q1) Answer any five of the following in one sentence :

[5]

- a) What is water quality?
- b) Name one point source of water pollution.
- c) What is the full form of BOD?
- d) Name the instrument used to measure turbidity.
- e) What is MPN?
- f) Give the WHO limit for orsenic in drinking water.

Q2) a) Write any one of the following :

[6]

- i) Explain physical parameters of water quality (temperature, turbidity, colour, odour)
- ii) Describe sampling techniques for surface water with diagram.

b) Write any one of the following :

[4]

- i) Write a note on chain of custody in water sampling.
- ii) Explain importance of sample preservation.

P.T.O.

Q3) a) Write any one of the following : **[6]**

- i) Explain DO and BOD-their significance and measurements methods.
- ii) Describe PH, Alkalinity and Hardness of water with effects.

b) Write any one of the following : **[4]**

- i) Write short note on heavy metals in water (sources and health effects).
- ii) Explain MPN coliform test with diagram.

Q4) Write notes on (any four) : **[10]**

- a) Point source vs non-point source.
- b) Grab sampling.
- c) WHO drinking water standards.
- d) Biological indicators of water pollution.
- e) Preservation of water samples for microbial analysis.
- f) Jackson's Turbidity Test.

x x x

Total No. of Questions : 4]

SEAT No. :

PE3394

[Total No. of Pages : 2

[6501]-618

S.Y. B.Sc. (Regular)

ENVIRONMENTAL SCIENCE

EVS-222 VSC : SOIL QUALITY ANALYSIS

(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicates full marks.*
- 3) *Draw neat and labelled diagram wherever necessary.*
- 4) *Write answers in a systematic and logical manner.*

Q1) Answer any five of the following in one sentence : **[5]**

- a) Why soil quality is important for plant growth?
- b) Define systematic soil sampling.
- c) What is bulk density of soil?
- d) What are the main causes of increased soil salinity?
- e) What are the common methods used to measure soil microbial diversity?
- f) What is soil degradation?

Q2) a) Write any one of the following : **[6]**

- i) Explain the importance of soil biodiversity and how it influences ecosystem functioning.
- ii) What are the major sources of heavy metal contamination in soil? Explain their ecological and health impacts.

b) Write any one of the following : **[4]**

- i) Describe sustainable soil management practices?
- ii) How soil texture and structure influence soil porosity and plant growth?

P.T.O.

Q3) a) Solve any one of the following : **[6]**

- i) Explain the step by step procedure for collecting a representative soil sample.
- ii) Explain the concept of integrated soil quality assessment and its need in sustainable land management?

b) Write any one of the following : **[4]**

- i) Explain why soil enzyme activities are considered sensitive indicators of soil health.
- ii) What is soil compaction and its impact on soil structure and plant root development?

Q4) Write notes on (any 4) : **[10]**

- a) Soil sampling for specific analyzes.
- b) Soil sample preparation.
- c) Water holding capacity of soil.
- d) Biological indicators of soil health.
- e) Micronutrients.
- f) Microbial biomass

x x x

Total No. of Questions : 3]

SEAT No. :

PE-5130

[Total No. of Pages : 2

[6501]-619

S.Y. B.Sc. (Regular)

GEOGRAPHY

GEO(S)-221- VSC : Water Analysis
(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) Attempt all questions.*
- 2) Figures to the right indicate full marks.*
- 3) Draw neat diagrams whenever necessary.*
- 4) Use of map stencils is allowed.*

Q1) Answer the following questions in 20 words (Any Five):

[10]

- a) Define water pollution.
- b) What is water quality?
- c) Write the full form of BIS.
- d) Write the chemical parameters of water quality.
- e) What is Water Quality Index (WQI)?
- f) What is the acceptable pH for drinking water?
- g) What is water management?

Q2) Answer the following questions in 50 words (Any Two):

[10]

- a) Explain Residual Sodium Carbonate (RSC) given by Eaton.
- b) Explain the major physical parameters of water quality.
- c) Distinguish between surface and ground water.

P.T.O.

Q3) Answer the following questions in 100 words (Any Two):

[15]

- a) Explain the importance of water with examples.
- b) Write details about Kelly's ratio and Sodium percentage of Wilcox.
- c) Explain the significance of water analysis.



Total No. of Questions : 3]

SEAT No. :

PE-5131

[Total No. of Pages : 2

[6501]-620

S.Y. B.Sc. (Regular)

GEOGRAPHY

GEO(S)-222- VSC : Land Measurement and Surveying
(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicate full marks.*
- 3) *Draw neat diagrams wherever necessary.*
- 4) *Use of the map stencils is allowed.*

Q1) Answer the following questions in 20 words (Any Five):

[10]

- a) Write the meaning of land measurement.
- b) Define surveying.
- c) Write any two merits of Dumpy Level Survey instrument.
- d) Write any two applications of land measurement in Geography.
- e) Define Plane Surveying.
- f) Write the full form of GPS.
- g) Write any two merits of Total Station.

Q2) Answer the following questions in 50 words (Any Two):

[10]

- a) Importance of land measurement.
- b) Geodetic Surveying.
- c) Applications of surveying in Geography.

P.T.O.

Q3) Answer the following questions in 100 words (Any Two):

[15]

- a) Differentiate between linear and areal method of land measurement.
- b) Classify survey on the basis of area.
- c) Describe structure and function of Plane Table Survey instruments.



Total No. of Questions : 4]

SEAT No. :

PE-5132

[Total No. of Pages : 2

[6501]-621

S.Y. B.Sc. (Regular)

MICROBIOLOGY

MB-221-VSC : Dairy Technology

(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicate full marks.*
- 3) *Draw neat labelled diagrams wherever necessary.*

Q1) Answer any Five :

[5]

- i) Define milk.
- ii) State True/False : Somatic cell count is used for mastitis detection.
- iii) _____ is used as started culture in dairy product.
 - a) Listeria sp.
 - b) E-coli
 - c) Salmonella sp
 - d) Lactobacillus
- iv) _____ enzyme is present in milk.
- v) Write full form of HTST.
- vi) What are mesophilic bacteria?
- vii) Enlist any 2 color defects in milk.

Q2) A) Answer any one :

[6]

- i) Describe in detail milk pasteurization.
- ii) Explain the testing of milk adulterants sugars and Hydrogen peroxide.

B) Answer any one :

[4]

- i) Describe the factors affecting milk spoilage.
- ii) Explain phosphatase test.

P.T.O.

Q3) A) Answer any one : [6]

- i) Describe in detail the chemical composition and nutritive value of cow and buffalo milk.
- ii) Explain flavour and texture defects in milk.

B) Answer any one : [4]

- i) Resazurin test
- ii) Write about the market potential of milk and milk products.

Q4) Answer any Four in short : [10]

- a) Vitamins in milk.
- b) National scenario of dairy technology.
- c) Testing of ammonium sulfate in milk.
- d) Milk spoilage by fungi.
- e) Preservation by UHT.



Total No. of Questions : 4]

SEAT No. :

PE-5133

[Total No. of Pages : 2

[6501]-622

S.Y. B.A./B.Sc. (Regular)

MATHEMATICS

MTS-221-VSC : Foundation of Mathematics

(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Figures to the right indicate full marks.

Q1) Attempt any five of the following :

[5]

- a) Write the order and degree of the differential equation $\frac{dy}{dx} + xy = x^3$.
- b) Define : Linear differential equation.
- c) Find the Modulus of Complex Number $z = -1 - i$.
- d) Write the value of $\int \frac{L}{(ax+b)^r} dx$
- e) Calculate : $\int_0^{\pi/2} \cos^7 x dx$
- f) Evaluate : $\int \frac{dx}{(3-2x)^4}$
- g) Evaluate : $\int \sin^2 x dx$

Q2) A) Attempt any one of the following :

[5]

- i) If $y = (ax+b)^m$, $m > n$, $m > 0$, calculate y_n
- ii) Determine reduction formula for $\int_0^{\pi/2} \sin^n x dx$

P.T.O.

B) Attempt any one of the following: [5]

i) If $y = \frac{x+1}{x^2-4}$ find y_n

ii) Evaluate : $\int_0^{\infty} \operatorname{sech} x \, dx$

Q3) A) Attempt any one of the following: [5]

i) Find an integrating factor for $2xy^3 dx + (3x^2 y^2 + x^2 y^3 + 1) dy = 0$ and solve the equation.

ii) If P is continuous on (a, b) then prove that the general solution of the differential equation $y' + p(x) \cdot y = 0$ on (a, b) is $y = ce^{-P(x)}$ where $P(x) = \int p(x) dx$.

B) Attempt any one of the following : [5]

i) Find the general solution of $y' + 2y = x^3 e^{-x}$.

ii) Show that the equation $(4x^3 y^3 + 3x^2) dx + (3x^4 y^2 + 6y^2) dy = 0$ is exact and find the general solution.

Q4) A) Attempt any one of the following : [5]

i) For any $z_1, z_2 \in \mathbb{C}$, prove that $|z_1 + z_2| \leq |z_1| + |z_2|$.

ii) State and prove De-Moivre's theorem for any $n > 0$.

B) Attempt any one of the following : [5]

i) Evaluate $\int_0^{\infty} \frac{dx}{(x^2 + 1)^2}$

ii) If $|z_1| = |z_2| = |z_3| = 5$ and $z_1 + z_2 + z_3 = 0$ then prove that

$$\frac{1}{z_1} + \frac{1}{z_2} + \frac{1}{z_3} = 0.$$



Total No. of Questions : 5]

SEAT No. :

PE-5134

[Total No. of Pages : 2

[6501]-623

S.Y. B.Sc. (Regular)

NANOSCIENCE AND NANOTECHNOLOGY

**NS-221-VSC : Data Analysis and Computer Applications
(2024 Pattern) (Semester - III)**

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *Question No. 1 is compulsory.*
- 2) *Solve any three questions from Q.No.2 to Q.No.5.*
- 3) *Draw neat labelled diagrams wherever necessary.*
- 4) *Figure to the right indicate full marks.*

Q1) Attempt any five of the following :

[5]

- a) Define Mean.
- b) Define Median.
- c) Define Mode.
- d) Explain the example of Mean with graph.
- e) Explain the example of Median with graph.
- f) Define variance.

Q2) A) Attempt any one of the following :

[6]

- i) The Mean weight of 150 students is 60 Kg. The mean weight of boys is 70 Kg. with standard deviation of 10 Kg. for girls the mean weight is 35 Kg. with standard deviation of 15 Kg. Find the number of boys and combined standard deviation.
- ii) What is the measurement of central tendency? Give expression for all the measures in case of grouped frequency distributions.

B) Compute standard deviation and coefficient of variation for the following data: 36, 15, 25, 10, 14.

[4]

P.T.O.

Q3) A) Attempt any one of the following : [6]

i) Calculate mode income from the following income distribution:

Daily income (Rs.)	30 and below	31-60	61-90	91-120	121-150	Above 150
No. of person	22	198	110	95	42	33

ii) Write the explain the properties of Arithmetic Mean.

B) The mean and standard deviation of 10 observations were 9.5 and 2.5 respectively. If one more observation with value 15 is included in the group. Obtain the mean and standard deviation of these 11 observations. [4]

Q4) A) Attempt any one of the following: [6]

i) Calculate Median for the following distribution:

Marks	Below 20	21-40	41-60	61-80	81-100
No. of students	1	9	32	16	7

ii) Determine mode of the data given below :

35, 38, 40, 39, 35, 36, 37.

a) Using formula

b) Using MS-Excel

B) Arithmetic mean of 50 items is 104. While checking it was noticed that observation 98 was misread as 89. Find the correct value of mean. [4]

Q5) Attempt any Four of the following: [10]

- Find the arithmetic mean given that $\Sigma(x - 10) = 230$ and $n = 50$.
- Write the merits and demerits of Median.
- Write the merits and demerits of Mode.
- Following are the temperature recorded in a certain city observed in a certain week 35, 38, 40, 39, 35, 36, 37. Obtain the median temperature.
- Write the application of range.
- Explain the uses of variance and standard deviation.



Total No. of Questions : 4]

SEAT No. :

PE-5184

[Total No. of Pages : 2

[6501]-624

S.Y. B.Sc. (Regular)

PSYCHOLOGY

PSY-225-VSC : Human Growth and Development

(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Figures to the right indicate full marks.
- 3) Illustrate your answer with diagrams wherever necessary.

Q1) Solve any five of the following :

[5]

- a) Define human development.
- b) State Piaget's four stages of cognitive development.
- c) Define prenatal development.
- d) State the two genetic principles.
- e) State the characteristics of childhood.
- f) Define language development.
- g) Define infancy.

Q2) A) Solve any two of the following :

[6]

- i) Discuss the factors influencing personality development.
- ii) Describe the significance of infancy for later development.
- iii) Explain the concept of collaborative genes with example.

B) Solve the following :

[4]

- i) Elaborate the psychoanalytical theory of growth and development.

P.T.O.

Q3) A) Solve any two of the following: **[6]**

- i) Differentiate between the concepts of nature versus nurture.
- ii) Critically analyse the physical development of adolescent.
- iii) Judge the effectiveness of moral development.

B) Solve the following : **[4]**

- i) Critically evaluate the contribution of Piaget's theory.

Q4) Solve any four of the following : **[10]**

- a) Behavioral theory.
- b) Emotional development of adulthood.
- c) Vygotsky theory.
- d) Nature of human development.
- e) Physical development of childhood.



Total No. of Questions : 5]

SEAT No. :

PE-5135

[Total No. of Pages : 2

[6501]-625

S.Y. B.Sc. (Regular)

GEOLOGY

VSC-201-GL-T : Hydrogeology
(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Neat diagram must be drawn wherever necessary.*

Q1) Answer any five of the following in one sentence :

[5]

- a) What is Hydrogeology?
- b) What is specific yield?
- c) What is Aquiclude?
- d) Enlist types of wells.
- e) Name two isotopes used for dating groundwater.
- f) What is TDS?

Q2) A) Answer any one of the following:

[6]

- i) Explain in detail vertical distribution of groundwater with the help of diagram.
- ii) Write a detailed account of saline water intrusion in coastal aquifers with the help of diagram.

B) Answer any one of the following:

[4]

- i) What is well inventory?
- ii) What is laminar and turbulent ground water flow?

P.T.O.

Q3) A) Attempt any one of the following : **[6]**

- i) What is unconfined and confined aquifer? Explain with the help of diagram.
- ii) Write a detailed account of groundwater quality hotspots in India (F and U).

B) Answer any one of the following: **[4]**

- i) What is groundwater contamination? Explain natural and anthropogenic contaminants.
- ii) Explain groundwater flow rate and flow direction.

Q4) Answer any four of the following: **[10]**

- a) Perched aquifer
- b) Darcy's law and its validity
- c) Pumping test and its types
- d) Chemical tracers in groundwater
- e) Transmissivity and Storativity
- f) Chemical standards for drinking water



Total No. of Questions : 5]

SEAT No. :

PE-5136

[Total No. of Pages : 2

[6501]-626

S.Y. B.Sc. (Regular)

BOTANY / SEED TECH.

VSC-222-BOT-T/VSC-221-ST-T : Digital Herbaria

(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Figure to the right indicate full marks.
- 3) Draw neat labelled diagrams wherever necessary.

Q1) Answer any five of the following in one sentence :

[5]

- a) Give any one traditional herbarium practice.
- b) What is cataloging?
- c) Define digital herbarium.
- d) What is GIS?
- e) What is taxonomic identification?
- f) Name of any one software for herbarium management.

Q2) A) Write any one of the following:

[6]

- i) Describe standards and practice of digital preservation.
- ii) Explain role of digital herbaria in taxonomic and ecological research.

B) Write any one of the following:

[4]

- i) Describe any one software tool for digital annotation.
- ii) Explain contribution of digital herbaria in research and conservation.

P.T.O.

Q3) A) Solve any one of the following : **[6]**

- i) Define georeferencing? Give its role in herbarium specimens.
- ii) Explain editing and enhancing specimen image in herbarium.

B) Solve any one of the following: **[4]**

- i) Describe handling and preserving physical specimen for digitization.
- ii) Compare traditional and digital herbarium practices.

Q4) Write notes on (Any Four): **[10]**

- a) Plant identification using digital keys.
- b) Plant specimen imaging.
- c) Importance of documentation and labelling in data collection.
- d) Role of GIS in mapping plant distribution.
- e) Cataloging specimens.
- f) Role of ecological data in metadata.



Total No. of Questions : 5]

SEAT No. :

PE-5137

[Total No. of Pages : 2

[6501]-627

S.Y. B.Sc. (Regular)

SEED TECHNOLOGY

VSC-222-ST-T : Modern Irrigation Techniques

(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *Question No.1 is compulsory.*
- 2) *Attempt any three questions from Q.No.2 to Q.No.5.*
- 3) *Question No.2 and Q.No.5 carry equal marks.*
- 4) *Draw neat labelled diagrams wherever necessary.*

Q1) Attempt any five of the following :

[5]

- a) What do you mean by water quality?
- b) What is sprinkler irrigation?
- c) Give any one disadvantage of drip irrigation.
- d) Write any one disadvantage of sprinkler irrigation.
- e) Write any one benefit of precision irrigation.
- f) Give any one strategy to create awareness regarding water conservation.

Q2) a) Define irrigation. Comment on water sources.

[6]

b) Comment on drip irrigation and write its benefits.

[4]

Q3) a) What are the components of drip irrigation.

[6]

b) Comment on the government schemes for sprinkler irrigation.

[4]

P.T.O.

Q4) a) Write the concept of precision irrigation and comment on soil moisture sensor. **[6]**

b) Comment on any two strategies for awareness programs regarding modern irrigation system. **[4]**

Q4) Write notes on (Any Four): **[10]**

- a) Water quality
- b) Rain gun irrigation
- c) Components of drip irrigation
- d) Components of sprinkler irrigation
- e) Concept of precision irrigation



Total No. of Questions : 5]

SEAT No. :

PE-5138

[Total No. of Pages : 2

[6501]-628

S.Y. B.Sc. (Regular)

SEED TECHNOLOGY

VCS-223-ST-T : Weed and its Management

(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *Question No.1 is compulsory.*
- 2) *Attempt any three question from Q.2 to Q.5.*
- 3) *Questions Q.2 to Q.5 equal marks.*
- 4) *Draw neat labelled diagram wherever necessary.*

Q1) Attempt Any Five of the following : **[5]**

- a) What is weed?
- b) Write botanical name of any one common weed.
- c) What is germination.
- d) What is hoeing?
- e) What is a Weedicide?
- f) Write name of any one insect used in weed control.

Q2) a) Explain annual, biannual and perennial weeds with example. **[6]**

b) Describe reproduction and multiplication w.r.t. weed biology. **[4]**

Q3) a) Explain how weeds compete with crops w.r.t. nutrients, water, light and space. **[6]**

b) Comment on eradication of weeds. **[4]**

P.T.O.

- Q4)** a) Define physical weed control comment on hoeing and tillage. [6]
b) What is chemical weed control comment on the types of herbicides used and its impact on nature. [4]

Q5) Write a short notes on any four of the following: [10]

- a) Beneficial effect of weeds.
- b) Crop weed interference
- c) Tools for weed control
- d) Integrated weed management
- e) Bioherbicides



Total No. of Questions : 4]

SEAT No. :

PE-5139

[Total No. of Pages : 2

[6501]-629

S.Y. B.Sc. (Regular)

BOTANY

BOT-201-MJ : Taxonomy of Angiosperms

(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicate full marks.*
- 3) *Draw neat labelled diagrams wherever necessary.*

Q1) Answer any five of the following in one sentence: **[5]**

- i) What is systematics?
- ii) Define flora.
- iii) What is full form of ICN.
- iv) Write any one botanical name of plant belong to family Rubiaceae.
- v) Define cytology.
- vi) What is phylogenetic system of classification.

Q2) a) Write any one of the following: **[6]**

- i) Give distinguishing characters, floral formula, floral diagram and economic importance of family solanaceae.
- ii) What is botanical garden? Describe the role of botanical gardens in the conservation.

b) Write any one of the following: **[4]**

- i) Explain contribution of H.Santapau in taxonomy.
- ii) Describe principle of priority.

Q3) a) Solve any one of the following: **[6]**

- i) Give broad outline of plant classification by Bentham and Hooker.
- ii) Explain in detail typification.

P.T.O.

- b) Solve any one of the following: [4]
- i) Give economic importance of family annonaceae.
 - ii) Write contribution of S.R Yadav in taxonomy.

Q4) Write notes on (Any Four): [10]

- a) National Botanical Research Institute (NBRI), Lucknow.
- b) Distinguishing features of family Euphorbiaceae
- c) Revisions
- d) Morphology as a source of data for systematics
- e) Binomial Nomenclature
- f) Importance of taxonomy



Total No. of Questions : 4]

SEAT No. :

PE-5140

[Total No. of Pages : 2

[6501]-630

S.Y. B.Sc. (Regular)

CHEMISTRY

CHE-201-TMJ : Physical Chemistry - I

(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Figures to the right indicate full marks.
- 3) Use of scientific calculator and log tables are allowed wherever applicable.
- 4) Illustrate answers with neat, labelled diagram wherever necessary.

Q1) Solve any five of the following: [5]

- i) Define order of Reaction.
- ii) What is heat capacity?
- iii) States ohms law.
- iv) Define component.
- v) What is temperature coefficient?
- vi) What is irreversible process?
- vii) Estimate degree of freedom for the following one component system
$$\text{Fe(s)} + \text{H}_2\text{O(g)} \rightleftharpoons \text{FeO(s)} + \text{H}_2\text{O(g)}.$$

Q2) a) Solve any two of the following: [6]

- i) Describe half life method for determination of order of reaction.
- ii) Derive an expression for entropy change during mixing of ideal gases.
- iii) Explain the different types of phase equilibrium.

b) Solve the following: [4]

- i) 0.5 N solution of a salt surrounding two plates of electrode 2.2 cm apart and 3.33 cm² in area was found to offer resistance of 510 ohms. Calculate the equivalent conductance of the solution.

P.T.O.

Q3) a) Solve any two of the following: **[6]**

- i) Explain the phase diagram of water system.
- ii) Derive differential form of Arrhenius equation.
- iii) Define enthalpy of a system. Derive an expression for enthalpy change at constant pressure.

b) Solve the following: **[4]**

- i) The rate constant of a certain reaction are $4.3 \times 10^{-5} \text{ s}^{-1}$ and $6.97 \times 10^{-2} \text{ s}^{-1}$ at 200 K and 600 K respectively. Calculate the energy of activation of the reaction. ($R = 8.314 \text{ J K}^{-1} \text{ mol}^{-1}$)

Q4) Solve any four of the following: **[10]**

- i) Degree of Dissociation of Weak Acid.
- ii) Workdone in an isothermal reversible process.
- iii) Monovariant, bivariant and non-variant system.
- iv) Spontaneous and non-spontaneous process.
- v) Hittorf's method.



Total No. of Questions :4]

SEAT No. :

PE5525

[Total No. of Pages : 2

[6501]-631

S.Y.B.Sc. (Regular)

DEFENCE AND STRATEGIC STUDIES

DEF-201 MJT : India's Land And Maritime Boundaries (Paper-I)
(2024 NEP Pattern) (Semester-III)

Time : 2 Hours]

[Max. Marks :35

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicate full marks.*

Q1) Answer the following questions (any Five)

[5×2=10]

- a) Explain the Transportation and Communication of the Border Area.
- b) Write the concepts of Line of Actual Control.
- c) Explain the Security Problems of India's Western Border.
- d) Explain the Security Problems of India's Northern Border.
- e) Write the Definition of Boundaries.
- f) Write the Definition of Frontiers.

Q2) Answer the following questions (any two)

[2×4=8]

- a) State the nature and scope of India's Western Land Boundary.
- b) State the nature and scope of India's Northern Land Boundary.
- c) Explain in detail Socio-Cultural Scenario of India's Western Land Boundary.

P.T.O.

Q3) Answer the following questions (any one)

[1×7=7]

- a) Explain in detail the Nature of India's Security disputes with Pakistan and its status.
- b) Explain in detail Nature of India's Security disputes with China and its Status.

Q4) Write short notes (any two)

[2×5=10]

- a) Frontiers
- b) Border
- c) Boundaries



Total No. of Questions : 4]

SEAT No. :

PE-5141

[Total No. of Pages : 2

[6501]-632

S.Y. B.Sc. (Regular)

ELECTRONICS - SCIENCE

ELS-201-MJ : Analog Circuit Design
(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Q.No.2 to Q.No.4 carry equal marks.

Q1) Answer the following questions (any 5): **[5]**

- a) State types of multistage amplifier.
- b) State the names of an amplifier classified according to input signal amplitude.
- c) What is positive feedback?
- d) Write the output equation for differentiator.
- e) What are the advantages of negative feedback?
- f) State Barkhausen criteria for oscillator.
- g) What do you mean by multivibrator circuit?

Q2) a) Answer the following questions (any 2): **[6]**

- i) Explain the term related to amplifier.
 - a) Gain
 - b) Bandwidth
- ii) Discuss multistage amplifier with block diagram.
- iii) Explain summing amplifier using op-amp.

b) Answer any one of the following: **[4]**

- i) Design active high pass filter having cutoff frequency of 500 Hz and pass band gain of 2.
- ii) Explain how DC load line analysis is performed for class A CE amplifier. What is its significance?

P.T.O.

Q3) a) Answer any two of the following questions: [6]

- i) Explain any three ideal characteristics of an op-amp.
- ii) Explain non-inverting amplifier using op-amp with circuit diagram.
- iii) Explain phase shift oscillator using op-amp.

b) Solve any one of the following: [4]

- i) Explain Wien bridge oscillator using op-amp.
- ii) A three stage multistage amplifier having individual stage gains of 2, 5, 4 and 10 respectively; find the effective overall gain.

Q4) Write short note on following (any 4): [10]

- i) Two stage transformer coupled amplifier.
- ii) Integrator circuit using op-amp.
- iii) Differential amplifier using op-amp.
- iv) Inverting comparator using op-amp
- v) Monostable multivibrator using IC555.
- vi) Classification of oscillators.



Total No. of Questions : 4]

SEAT No. :

PE3395

[Total No. of Pages : 2

[6501]-633

S.Y.B.Sc. (Regular)

ENVIRONMENTAL SCIENCE

EVS201MJ : (Ecology and Ecosystem)

(2024 Pattern) (Semester - III)

Time : 2Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Figure to the right indicate full marks.*
- 3) *Draw neat and labelled diagrams wherever necessary.*
- 4) *Write answer in a systematic and logical manner.*

Q1) Answer any five of the following in one sentence

[5]

- a) What is ecosystem structure?
- b) Define energy flow
- c) What are macro nutrients? Give two examples.
- d) Define natality and mortality.
- e) What is species diversity?
- f) Define primary succession.

Q2) a) Write any one of the following

[6]

- i) Explain the interdisciplinary nature of ecology.
- ii) Describe the ecological hierarchy given by Barrett et al.

b) Write any one of the following

[4]

- i) Describe energy flow models in ecosystem (single-channel and Y-shaped)
- ii) Explain the concept of ecological energetics.

P.T.O.

Q3) a) Solve any one of the following **[6]**

- i) Describe the hydrological cycle with suitable diagram.
- ii) Explain sedimentary cycles in detail.

b) Solve any one of the following **[4]**

- i) Describe types of population dispersion.
- ii) What is life table? Explain its importance.

Q4) Write note on (Any 4) **[10]**

- a) Ecological spectrum
- b) Food web and ecosystem stability
- c) Carbon cycle
- d) Fecundity and survivorship curves
- e) Community characteristics
- f) Mechanism of succession



Total No. of Questions : 4]

SEAT No. :

PE-5142

[Total No. of Pages : 2

[6501]-634

S.Y. B.Sc. (Regular)

GEOGRAPHY

GEO(S)-201-MJ : Geomorphology

(2024 Pattern) (Semester - III)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Attempt all questions.*
- 2) *Figures to the right indicate full marks.*
- 3) *Draw neat diagrams whenever necessary.*
- 4) *Use of map stencils is allowed.*

Q1) Answer the following questions in 20 words (Any Eight):

[16]

- a) Write the definition of geography.
- b) Write the any two names of branches of geomorphology.
- c) Who presented the theory of 'seafloor spreading'?
- d) Write the definition of volcano.
- e) Write the definition of physical weathering.
- f) What is carbonation?
- g) Write the definition of 'river load'.
- h) Write the any two names of depositional landforms of sea waves.
- i) Write the definition of applied geomorphology.
- j) Define the tsunami.

Q2) Answer the following questions in 50 words (Any Four):

[16]

- a) Importance of geomorphology.
- b) Explain the process of faulting.
- c) Types of volcanos.
- d) Describe the biological weathering.
- e) Explain about landslides.

P.T.O.

Q3) Answer the following questions in 100 words (Any Two): **[18]**

- a) Explain the concept of plate Tectonics.
- b) Describe the process and types of chemical weathering.
- c) Write the causes of soil erosion.

Q4) Answer the following questions in 300 words (Any One): **[20]**

- a) Describe the definition, nature and scope of geomorphology in detail.
- b) Explain the erosional and depositional landforms created by the river with diagram.



Total No. of Questions : 4]

SEAT No. :

PE-5143

[Total No. of Pages : 2

[6501]-635

S.Y. B.Sc. (Regular)

GEOLOGY

GL-201-T : Introduction to Stratigraphy
(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Draw neat diagrams wherever necessary.

Q1) Answer the following (Any Five): [5]

- a) Define stratigraphy.
- b) Which period is known as 'Age of fishes'?
- c) Enlist cratons of India.
- d) Define varves.
- e) Define stratification.
- f) Cuddapah basin belongs to which craton?

Q2) a) Answer the following (Any One): [6]

- i) Describe and explain principles of stratigraphy.
- ii) What are subsurface methods of stratigraphic data collection.

b) Answer the following (Any One): [4]

- i) Explain the concept of cyclic sedimentation.
- ii) Define lithostratigraphy. Elaborate litho stratigraphic units.

Q3) a) Answer the following (Any One): [6]

- i) Define and explain physiographic divisions of India.
- ii) Explain tectonic elements of ocean.

b) Answer the following (Any One): [4]

- i) Differentiate Cratons, Shields and Folded Mountain belts.
- ii) Write an overview of world precambrian history.

P.T.O.

Q4) Write a short note (Any Four):

[10]

- a) Chronostratigraphy
- b) Significance of P-C boundary
- c) Carboniferous period
- d) Periods of Precambrian era
- e) Stratigraphic correlation
- f) Enlist the surface methods of stratigraphic data collection.



Total No. of Questions : 4]

SEAT No. :

PE-5144

[Total No. of Pages : 2

[6501]-636

S.Y. B.Sc. (Regular)

MICROBIOLOGY

**MB-201-MJ : Medical Microbiology and Immunology
(2024 Pattern) (Semester - III)**

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicate full marks.*
- 3) *Draw neat and labelled diagrams wherever necessary.*

Q1) Answer any five of the following:

[5]

- a) Define Pathogenicity.
- b) State True or False : All immunogens are Antigens.
- c) Enlist two media for cultivation of S. Aureus.
- d) Vaccines comes under _____ immunity.
 - i) Natural Active
 - ii) Artificial Active
 - iii) Natural Passive
 - iv) Artificial Passive
- e) What is Endemic diseases.
- f) _____ cells are involved in Allergic Reaction and release Histamine.
- g) Enlist the cells of Lymphoid Linage.

Q2) a) Write any one of the following:

[6]

- i) Write cultural and biochemical characters of S-Aureus.
- ii) Define Natural and Acquired Immunity and differentiate between the same.

b) Write any one of the following:

[4]

- i) Write lab diagnosis of plasmodium species.
- ii) Explain structure and function of Thymus.

P.T.O.

Q3) a) Write any one of the following: [6]

- i) Explain structure and function of Ig M and Ig4.
- ii) Explain Pathogenesis and Lab Diagnosis of Candida albicans.

b) Write any one of the following: [4]

- i) Describe principle and application of ouchterlony technique.
- ii) Diagrammatically explain life cycle of plasmodium in Mosquito.

Q4) Write short notes on any four of the following: [10]

- a) Antigenic structure of Rabies Virus
- b) Treatment of Aspergillus Fumigatus
- c) Lab Diagnosis of Hepatitis B infection.
- d) GALT
- e) Passive Agglutination
- f) Characteristics of Immunogens



Total No. of Questions : 4]

SEAT No. :

PE-5145

[Total No. of Pages : 3

[6501]-637

S.Y. B.A./B.Sc. (Regular)

MATHEMATICS

MTS-201-MJ : Calculus of Several Variables (T)

(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Figures to the right indicate full marks.

Q1) Attempt any five of the following:

[5]

- a) Find the domain of the function $f(x, y) = \sqrt{9 - x^2 - y^2}$.
- b) Show that $\lim_{(x,y) \rightarrow (0,0)} \frac{x^4 - 4y^2}{x^2 + 2y^2}$ does not exist.
- c) Find $\frac{\partial f}{\partial x}$ if $f(x, y) = x^4 y^3 + 8x^2 y$.
- d) State clairaut's theorem.
- e) Find critical points of the function $f(x, y) = x^2 + y^2 - 2x - 6y + 14$.
- f) Evaluate $\int_{\pi/6}^{\pi/2} \int_{-1}^5 \cos y \, dx dy$
- g) Write relation between rectangular co-ordinates (x, y, z) and cylindrical co-ordinates (γ, θ, z) .

Q2) a) Attempt any one of the following:

[5]

- i) Define level curve of a function of two variables. Find the level curves of the function $f(x, y) = 16 - x^2 - y^2$ for the values $c = 0, 7, 12, 15$.

P.T.O.

ii) Define wave function. Show that the function

$u(x, t) = \sin(x - at) + \log(x + at)$ is a solution of the wave function.

b) Attempt any one of the following: [5]

i) Discuss the continuity of the function at $(0, 0)$ where

$$f(x, y) = \begin{cases} \frac{xy}{x^2 + xy + y^2} & , (x, y) \neq (0, 0) \\ 0 & , (x, y) = (0, 0) \end{cases}$$

ii) Verify that $u_{xy} = u_{yx}$ if $u(x, y) = e^{xy} \sin y$.

Q3) a) Attempt any one of the following: [5]

i) Suppose that $z = f(x, y)$ is a differentiable function of x and y where $x = g(t)$ and $y = h(t)$ are both differentiable functions of t then show

that z is a differentiable function of t and $\frac{dz}{dt} = \frac{\partial z}{\partial x} \frac{dx}{dt} + \frac{\partial z}{\partial y} \frac{dy}{dt}$.

ii) If $f(x, y)$ is a homogeneous function of degree n and $f(x, y)$ has continuous second order partial derivatives then prove that

$$x \frac{\partial f}{\partial x} + y \frac{\partial f}{\partial y} = n f(x, y).$$

b) Attempt any one of the following: [5]

i) Find the extreme values of the function $f(x, y) = x^2 + 2y^2$ on the circle $x^2 + y^2 = 1$, using Lagrange multipliers.

ii) Using differentials find the approximate value of $(2.01)(3.02)^2$.

Q4) a) Attempt any one of the following: [5]

i) Define the Jacobian of $x = x(u, v, w)$, $y = y(u, v, w)$, $z = z(u, v, w)$. Hence find the Jacobian if $x = 2u - 1$, $y = 3v - 4$, $z = \frac{1}{2}(w - 4)$.

ii) State the formula to change the rectangular co-ordinates to polar

co-ordinates and evaluate $\int_{-1}^1 \int_{-\sqrt{1-x^2}}^{\sqrt{1-x^2}} (x^2 + y^2) dy dx$.

b) Attempt any one of the following:

[5]

i) Evaluate: $\int_{-1}^1 \int_0^2 \int_0^1 (x^2 + y^2 + z^2) dx dy dz$

ii) Find the area of the region R enclosed by the parabolas $y = x^2$ and $y^2 = x$.



Total No. of Questions : 5]

SEAT No. :

PE-5146

[Total No. of Pages : 2

[6501]-638

S.Y. B.Sc. (Regular)

NANOSCIENCE & NANOTECHNOLOGY

NS-201-MJ : Physical Techniques for Synthesis of
Nanomaterial

(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) Question No. 1 is compulsory.
- 2) Solve any three questions from Q.No.2 to Q.No.5.
- 3) Draw neat and labelled diagram whenever necessary.
- 4) Figure to the right indicate full marks.

Q1) Attempt any five of the following: [5]

- a) What is sputter deposition?
- b) Give the two physical vapour deposition techniques.
- c) Which major nanoparticles are synthesized by using plant extract.
- d) What is ultrasonic foliation?
- e) Write the any two application of Nanoparticles.
- f) Draw the neat diagram of Ball Milling technique.

Q2) a) Attempt any one of the following: [6]

- i) Explain in detail mechanical exfoliation using scotch tape.
- ii) Explain factors affecting Biological synthesis of Nanomaterials.
- b) Explain in detail ball milling techniques. [4]

Q3) a) Attempt any one of the following: [6]

- i) Explain in detail electric arc deposition.
- ii) Explain laser irradiation in liquids.
- b) Explain Ion-beam deposition. [4]

P.T.O.

- Q4)** a) Attempt any one of the following: [6]
- i) Explain synthesis of Gold and Silver nanoparticles by using plant extract.
 - ii) Explain synthesis of copper and copper oxide nano-particles by using plant extract.
- b) Explain vacuum evaporation technique. [4]

- Q5)** Attempt any four of the following: [6]
- a) Molecular beam epitaxy-short note.
 - b) Explain ultrasonic foliation.
 - c) Explain Laser Assisted exfoliation
 - d) Explain Metal organic chemical vapour deposition.
 - e) Explain plasma enhanced chemical vapour deposition.
 - f) Explain R-F sputtering.



Total No. of Questions : 4]

SEAT No. :

PE-5147

[Total No. of Pages : 2

[6501]-639

S.Y. B.Sc. (Regular)

PHYSICS - I

PHY-201-MJ : Mathematical Physics - I

(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Q.No.2 to Q.No.4 carry equal marks.
- 3) Figures to the right indicates full marks.
- 4) Use of calculator and logtables is allowed.

Q1) Solve any Five of the following:

[5]

- i) State De-Moivre's theorem.
- ii) Define vector product of two vectors.
- iii) What is ordinary differential equation?
- iv) If $F = 2x^3y^2 + y^3$ find F_x and F_y .
- v) Show that $\cosh(i\theta) = \cos\theta$.
- vi) Define concurrent and co-planer vectors.
- vii) Write the necessary condition for exact differential.

Q2) a) Attempt any one of the following:

[6]

- i) Explain polar and exponential form of complex number.
- ii) If $F = a\sqrt{n(x^2 + y^2)}$, show that $F_{xy} = F_{yx}$ and $F_{xx} + F_{yy} = 0$.

b) Attempt any one of the following:

[4]

- i) Find the workdone in moving an object along a vector $\vec{\gamma} = 6\vec{i} + 3\vec{j} + 4\vec{k}$ if applied force is $\vec{F} = 4\vec{i} + 3\vec{j} - 3\vec{k}$.
- ii) Determine the modulus and argument of $\frac{1+2i}{1-2i}$.

P.T.O.

Q3) a) Attempt any one of the following: **[6]**

i) Define the gradient of a Scalar Field, Explain the physical significance of a gradient.

ii) Determine the values of x and y if $x + iy = (1 + i\sqrt{3})^4$.

b) Attempt any one of the following: **[4]**

i) The equation of state for one mole of perfect gas is $PV = RT$.

Show that $T \left(\frac{\partial P}{\partial T} \right)_V \left(\frac{\partial V}{\partial T} \right)_P = R$.

ii) Show that $\vec{\nabla} \times \vec{\nabla} \phi = 0$.

Q4) Attempt any four of the following: **[10]**

a) Obtain the quadratic equation whose roots are $(1 + i)$ and $(1 - i)$.

b) If $4 = (x^2 + y^2)$ where $x = at^2$, $y = 2at$ find $\frac{dy}{dt}$ using chain rule.

c) A sphere of radius of 10 cm is heated. Find increase in volume, if the radius has increased by 0.1 cm.

d) Explain the term Divergence of vector field.

e) If $\sqrt{x + iy} = a - ib$, show that $x = a^2 - b^2$ and $y = -2ab$.

f) Determine the value of P so that

$\vec{A} = 3\vec{i} + p\vec{j} + \vec{k}$ and $\vec{B} = 4\vec{i} - 2\vec{j} - 2\vec{k}$ are perpendicular.



Total No. of Questions : 4]

SEAT No. :

PE-5185

[Total No. of Pages : 2

[6501]-640

S.Y. B.Sc. (Regular)

PSYCHOLOGY

PSY-205-MJT : Physiological Psychology
(2024 Pattern) (Semester - III)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Figures to the right indicates full marks.
- 3) Illustrate your answers with neat diagram.

Q1) Attempt any 4 out of 6 in 100 words:

[20]

- a) Explain the scope of physiological psychology.
- b) Describe structure of neuron with functions of main parts.
- c) What is neuroplasticity? State any two factors that influence it.
- d) Explain the structure and functions of adrenal gland.
- e) Define epilepsy and mention its main types.
- f) Discuss any two methods used to study physiological psychology.

Q2) Attempt any 2 out of 4 in 200 words:

[20]

- a) Analyse the role of limbic system in emotion, memory and motivation.
- b) Elaborate the structure and functions of central nervous system and peripheral nervous system.
- c) Explain the process of synaptic transmission and discuss importance of neurotransmitter balance in mental health.
- d) Discuss major endocrine glands in physiological psychology and analyse their influence on behavior.

P.T.O.

Q3) Attempt any 1 out of 2 in 400 words: **[15]**

- a) Evaluate the importance of physiological psychology in Alzheimer's Disease for understanding brain-behavior relationship.
- b) Create a detailed explanatory essay on how brain imaging techniques are used to understand brain structures, functions, disorders.

Q4) Write any 3 out of 5 in 100 words: **[15]**

- a) Areas of physiological psychology
- b) Neurotransmitters
- c) Types of seizures
- d) Saltatory conduction
- e) PET Scan



Total No. of Questions : 5]

SEAT No. :

PE-5148

[Total No. of Pages : 2

[6501]-641

S.Y. B.Sc. (Regular)

SEED TECHNOLOGY

ST-201-MJ-T : Morphology and Seed Development

(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) Question No. 1 is compulsory.
- 2) Solve any three questions from Q.No.2 to Q.No.5.
- 3) Q.No.2 to 5 carry equal marks.

Q1) Solve any five of the following: [5]

- a) Define seed health.
- b) Define seed morphology.
- c) What is Genetic Purity?
- d) What is seed development?
- e) What is Apogamy?
- f) Definition of Embryo.

Q2) a) Write morphology of maize crop w.r.t. stem, leaf, flower, fruit and seed for varietal identification. [6]

b) Comment on seed as a basic input in agriculture. [4]

Q3) a) What is Parthenogenesis? Comment on natural and induced parthenogenesis. [6]

b) What is Anthesis? Explain environmental factors affecting on Anthesis.[4]

Q4) a) What is Apomixis? Write its advantages and application. [6]

b) Comment on seed coat types. [4]

P.T.O.

Q5) Write short notes on any Four of the following:

[10]

- a) Synthetic Seed Technology
- b) Functions of endosperm
- c) Embryo abortion in seed
- d) Polyembryony
- e) Scope of seed morphology
- f) Development of embryo



Total No. of Questions : 4]

SEAT No. :

PE-5149

[Total No. of Pages : 3

[6501]-642

S.Y. B.A./B.Sc. (Regular)

STATISTICS

STS-201-MJ : Discrete Probability Distributions

(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Figures to the right side indicate full marks.
- 3) Use of Scientific calculator and statistical table is allowed.
- 4) Symbols and abbreviations have their usual meanings.

Q1) Attempt each of the following:

- a) Choose the correct alternative of the following: **[1 each]**
 - i) An experiment having probability of success as p and that of failure as $1-p$. Let X denotes the number of failures before getting first success and Y denotes number of trials required to get success for the first time. Then relationship between X and Y is
 - A) $X = Y + 1$
 - B) $X = Y - 2$
 - C) $X = Y$
 - D) $X = Y - 1$
 - ii) Suppose $\bar{X} = (X_1, X_2, X_3) \rightarrow MD\left(4, \frac{1}{2}, \frac{1}{4}, \frac{1}{4}\right)$ then $E(X_1)$
 - A) 2
 - B) 3
 - C) 1
 - D) $\frac{3}{2}$
 - iii) Let $X \rightarrow P(m)$ then the value of second central moment μ_2 is
 - A) $\sqrt{m}$
 - B) m
 - C) m^2
 - D) $m(m - 1)$
- b) State whether the following statement is True or False. **[1 each]**
 - i) Negative Binomial distribution is negatively skewed.
 - ii) $\bar{X} = (X_1, X_2, X_3, X_4, X_5)$ follows multinomial distribution then number of parameters is 7.

P.T.O.

Q2) Attempt any two of the following:

[5 each]

- a) Let $X \rightarrow N B(k, p)$. Find moment generating function of X . Hence find first raw moment μ_1 .
- b) $\bar{X} = (X_1, X_2, \dots, X_n) \rightarrow MD(n, p_1, p_2, \dots, p_n)$. Find the marginal distribution of $X_i + X_j$.
- c) Let X and Y be two discrete random variables with joint probability distribution (x_i, y_j, p_{ij}) , $i = 1, 2, \dots, m$; $j = 1, 2, \dots, n$. Prove that, if X and Y are independent then

$$E(XY) = E(X)E(Y)$$

Q3) Attempt any two of the following:

[5 each]

- a) State and prove additive property of negative binomial distribution.
- b) If X and Y are independent Poisson random variables with mean m_1 and m_2 respectively. Find the probability distribution of $P(X|X + Y = n)$.
- c) Suppose that X and Y are two discrete random variables. Prove that $Var(aX - bY) = a^2Var(X) + b^2Var(Y) - 2abCov(X, Y)$.

Q4) Attempt any one of the following:

- a) i) A regular die is rolled 12 times, find the probability that each face will appear twice. **[5]**
ii) Show that mean and variance of Poisson distribution are same. **[5]**
- b) i) Let X be a discrete random variable with p.m.f. **[5]**

$$P(X = x) = pq^x \quad x = 0, 1, 2, 3, \dots; 0 < p < 1, q = 1 - p$$
$$= 0 \quad o.w.$$

Find cumulant generating function of X hence find its variance.

- ii) Let (X, Y) denotes the bivariate discrete random variables with joint p.m.f. given by [5]

$\begin{array}{c} Y \rightarrow \\ X \rightarrow \end{array}$	-1	0	1
-1	$\frac{1}{12}$	$\frac{3}{12}$	$\frac{2}{12}$
1	$\frac{3}{12}$	$\frac{2}{12}$	$\frac{1}{12}$

Find:

- i) $E(X|Y=0)$
 ii) $Var(X|Y=0)$



Total No. of Questions : 4]

SEAT No. :

PE-5150

[Total No. of Pages : 2

[6501]-643

S.Y. B.Sc. (Regular)

ZOOLOGY

ZOO-201-MJ : Public Health and Hygiene (T)

(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

1) *All questions are compulsory.*

Q1) Answer any five of the following in one sentence :

[5]

- a) Define Public Health.
- b) What is Cancer?
- c) What is family planning?
- d) What is Diarrhea?
- e) Give one cause of foodborne illness.
- f) Why regular hand washing is important?

Q2) a) Attempt any one of the following:

[6]

- i) Write the causative organism, symptoms and prevention of Malaria.
- ii) Describe the harmful effects of junk food and street food on health.

b) Attempt any one of the following:

[4]

- i) Describe any two core principles of public health.
- ii) Describe hypertension and hypotension.

Q3) a) Solve any one of the following:

[6]

- i) Describe causes, symptoms and prevention of Rabies.
- ii) Explain the structure and management of health service in India.

P.T.O.

- b) Solve any one of the following: [4]
- i) What is Health education? Describe its role in prevention of diseases.
 - ii) Discuss the importance of community hygiene and public sanitation in preventing diseases.

Q4) Write note on (Any Four): [10]

- a) COVID-19; Testing and Diagnosis
- b) Hygiene practices in schools
- c) Menstrual hygiene
- d) Food poisoning
- e) Methods of health education
- f) Preventive measures during COVID-19.



Total No. of Questions : 4]

SEAT No. :

PE-5151

[Total No. of Pages : 2

[6501]-644

S.Y.B.Sc. (Regular)

BOTANY

**BOT-202-MJ : Plant Physiology and Metabolism
(2024 Pattern) (Semester - III)**

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicate full marks.*
- 3) *Draw neat labelled diagrams wherever necessary.*

Q1) Answer any five of the following in one sentence: **[5]**

- i) What are antitranspirants?
- ii) Enlist any two external factors affecting rate of water absorption.
- iii) Name any two examples of micronutrients.
- iv) Define transpiration.
- v) What is photoperiodism.
- vi) Define plant physiology.

Q2) a) Write any one of the following: **[6]**

- i) What is plasmolysis? Describe concept and significance of plasmolysis.
 - ii) What is ascent of sap? Explain it's path through various plant tissues.
- b) Write any one of the following: **[4]**
- i) Describe mechanism of vernalization.
 - ii) Explain physico-chemical properties of water.

Q3) a) Solve any one of the following: **[6]**

- i) Explain active K^+ transport mechanism of opening and closing of stomata.
- ii) Describe symbiotic nitrogen fixation by Rhizobia.

P.T.O.

- b) Solve any one of the following: [4]
- i) Explain the physiological role of cytokinins in plants.
 - ii) Describe scope and importance of plant physiology.

Q4) Write notes on (Any Four): [10]

- a) Imbibition
- b) Factors affecting ascent of sap.
- c) Properties of Auxin
- d) Structure of stomata
- e) Short Day Plants
- f) Deficiency symptoms of phosphorus in plants.



Total No. of Questions : 4]

SEAT No. :

PE-5152

[Total No. of Pages : 2

[6501]-645

S.Y.B.Sc. (Regular)

CHEMISTRY

CHE-202-T-MJ : Inorganic Chemistry - I

(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Use of scientific calculator and log table is allowed.
- 3) Figures to the right indicate full marks.
- 4) Illustrate your answer with neat diagram, wherever necessary.

Q1) Solve any five of the following:

[5]

- i) Define Ligand.
- ii) What is hydrate isomerism?
- iii) What is CFSE?
- iv) What is geometry or shape of d^2sp^3 hybridisation?
- v) Define electron pairing energy.
- vi) Draw cis-isomer of $[Pt(NH_3)_2(Cl)(Br)]$ complex.
- vii) What is Δ_o or $10 D_q$?

Q2) a) Solve any two of the following:

[6]

- i) Distinguish between metal complex and metal chelate.
- ii) Explain geometrical isomerism in square planar complexes with suitable examples.
- iii) State the assumptions of crystal field theory.

b) Solve the following:

[4]

A tetrahedral complex absorbs at 545 nm. What is the octahedral crystal field splitting Δ_o of the complex.

[Given: $h = 6.026 \times 10^{-34}$ js, $c = 3 \times 10^{10}$ cm/s]

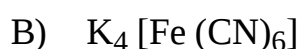
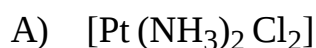
P.T.O.

Q3) a) Solve any two of the following: **[6]**

- i) Give the assumptions of VBT.
- ii) Distinguish between primary and secondary valency of central metal ion in coordination complex.
- iii) Draw neat diagram with splitting of d-orbital in octahedral complex.

b) Solve the following questions: **[4]**

- i) Calculate CFSE for d^5 system in strong and weak field ligand environment (octahedral).
- ii) Give IUPAC names of following complexes.



Q4) Solve any four of the following: **[10]**

- i) Write short note on spectrochemical series.
- ii) Explain bonding in $[\text{Ni}(\text{CN})_4]^{2-}$ according to VBT.
- iii) What are the drawbacks of CFT?
- iv) Give assumptions of Werners theory.
- v) Explain various factors affecting on magnitude of Δ_0 value.



Total No. of Questions : 4]

SEAT No. :

PE5526

[Total No. of Pages : 1

[6501]-646

S.Y. B.Sc. (Regular)

DEFENCE AND STRATEGIC STUDIES

DEF-202 MJT : Introduction to Paramilitary Forces of India
(2019 NEP Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Figures to the right indicate full marks.

Q1) Answer the following questions. (any Five). **[5×2=10]**

- a) State the Ranks of the Indian Army.
- b) State the Commands of the Indian Army.
- c) State the Ranks of the Indian Air force.
- d) State the Commands of the Indian Air force.
- e) State the Ranks of the Indian Navy.
- f) State the Commands of the Indian Navy.

Q2) Answer the following questions. (any Two). **[2×4=8]**

- a) Explain in detail Special Forces of the Indian Navy.
- b) State the Ranks and Commands of the Indian Navy.
- c) State the Ranks and Commands of the Indian Air force.

Q3) Answer the following question (any One). **[1×7=7]**

- a) Explain in detail Defence and Security Policies: Concept, Formulation and Objective.
- b) Explain in detail Special Forces of the Indian Air Force.

Q4) Write short notes (any Two). **[2×5=10]**

- a) Historical background of the Indian Army.
- b) Historical background of the Indian Navy.
- c) Historical background of the Indian Air Force.



Total No. of Questions : 4]

SEAT No. :

PE-5153

[Total No. of Pages : 2

[6501]-647

S.Y.B.Sc. (Regular)

ELECTRONIC SCIENCE

ELS-202-MJ : Digital Circuit Design

(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicate full marks.*
- 3) *Illustrate your answer with neat diagram, wherever necessary.*

Q1) Answer the following questions (Any 5):

[5]

- a) What do you mean by even parity?
- b) Define decoder.
- c) Define excitation table.
- d) Write full form of PLA & GAL.
- e) Give name of IC 7490.
- f) What is the role of magnitude comparator?
- g) Define fan out.

Q2) a) Answer the following questions (Any Two):

[6]

- i) For BCD code '1000', '1001' and '0000' which segments of SSD are ON?
- ii) Write short note on parity checker.
- iii) Write excitation table of JK flip flop.

b) Answer the following questions (Any One):

[4]

- i) Write names of ICs: 7447, 7483, 7485 & 74148.
- ii) Explain SR flip flop using logic diagram and truth table.

P.T.O.

Q3) a) Answer the following questions (Any Two): **[6]**

- i) Explain 3-bit binary to gray code converter.
- ii) Write a note on synchronous counter.
- iii) Write a note on mod 2 counter using IC 7490.

b) Answer the following questions (Any One): **[4]**

- i) Explain 4-bit parallel adder.
- ii) Draw and explain diagram of 3-bit synchronous counter using T flip flop.

Q4) Write short notes on the following (Any 4): **[10]**

- a) CMOS logic family
- b) Fan in and propagation delay
- c) Priority Encoder
- d) Interfacing of LED's
- e) K-map
- f) PAL
- g) PLD



Total No. of Questions :4]

SEAT No. :

PE3396

[Total No. of Pages : 2

[6501]-648

S.Y.B.Sc. (Regular)

ENVIRONMENTAL SCIENCE

EVS202 MJ : Natural Resource Conservation

(2024 Pattern) (Semester-III)

Time :2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) All questions are compulsory.*
- 2) Use of scientific calculator and log table is allowed where applicable.*
- 3) Figures to the right indicate full marks.*
- 4) Illustrate your answers with neat diagrams wherever necessary.*

Q1) Answer any FIVE of the following in one sentence

[5]

- a) What is natural resources ?
- b) Name two abiotic resources.
- c) What is IFM?
- d) Define watershed management.
- e) What is Food security?
- f) Give two examples of soil conservation methods.

Q2) a) Write any one of the following

[6]

- i) Write importance and scope of natural resources.
- ii) Explain causes and effects of deforestation.

b) Write any one of the following

[4]

- i) What is Floodplain management?
- ii) Effects of modern Agriculture.

P.T.O.

Q3) a) Write any one of the following [6]

- i) Explain rainwater harvesting and its benefits.
- ii) What is Green Revolution ? Write its advantages and disadvantages.

b) Write any one of the following [4]

- i) What are genetically modified crops?
- ii) Reasons for water conflicts in India.

Q4) Write notes on (any four) [10]

- a) Biotic and Abiotic resources.
- b) Forest management in India
- c) Fertilizer -pesticide problems
- d) Consequences of soil erosion
- e) Conservation of mineral resources.
- f) Regenerative capacity of Earth.



Total No. of Questions : 4]

SEAT No. :

PE-5154

[Total No. of Pages : 2

[6501]-649

S.Y.B.Sc. (Regular)

GEOLOGY

GL-202 T : Structural Geology

(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Neat diagrams must be drawn wherever necessary.*

Q1) Answer any five of the following in one-two sentences: **[5]**

- i) Define plunge.
- ii) Draw diagram of reverse fault.
- iii) Define stress.
- iv) Give the uses of GPS in structural Geology.
- v) Define structural Geology.
- vi) Define fold.

Q2) a) Answer any one of the following: **[6]**

- i) Define fault. Explain genetic classification of fault.
- ii) Define plastic deformation. Explain Reckie's principle.

b) Answer any one of the following: **[4]**

- i) Explain plunging and non-plunging folds. Draw neat labelled diagrams.
- ii) Define and explain the concept of stress and strain.

Q3) a) Answer any one of the following: **[6]**

- i) Define joints. Give genetic classification of joints.
- ii) Define unconformity. Give the importance of unconformity. Explain with neat diagram any two types of unconformities.

P.T.O.

- b) Answer any one of the following: [4]
- i) Explain with the help of neat diagrams, the two basic types of folds.
 - ii) Explain with the help of neat diagram, the working of clinometer compass.

Q4) Answer any four of the following: [10]

- i) Brinton Compass
- ii) Strike and dip
- iii) Recognition criteria of unconformities.
- iv) Columnar joints
- v) Objectives of structural Geology
- vi) Parts of fold



Total No. of Questions : 4]

SEAT No. :

PE-5155

[Total No. of Pages : 2

[6501]-650

S.Y.B.Sc. (Regular)

MICROBIOLOGY

MB-202-MJ : Bacterial Physiology and Fermentation
(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Figures to the right indicate full marks.
- 3) Draw neat labelled diagrams wherever necessary.

Q1) Answer the following (any 5): **[5]**

- a) Define inoculum.
- b) Oils are used as antifoam agent - state True/False.
- c) Write two methods in primary screening.
- d) Holoenzymes is = _____ + _____
 - i) Coenzyme + Ribozyme
 - ii) Metal ion + Prosthetic group
 - iii) Coenzyme + Cofactor
 - iv) Apoenzyme + Coenzyme
- e) What is prosthetic group?
- f) Hexokinase belong to _____ class.
- g) What is biomass?

Q2) a) Attempt any one of the following: **[6]**

- i) Explain role of precursors and buffers in fermentation media.
- ii) Describe induced fit model and transition state theory.

b) Attempt any one of the following: **[4]**

- i) Schematically represent phosphoketolase pathway.
- ii) Explain consequences of contamination in industrial fermentation.

P.T.O.

Q3) a) Attempt any one of the following: **[6]**

- i) Explain significance of Glyconeogenesis.
- ii) Describe monitoring of foam and pH in fermentation.

b) Attempt any one of the following: **[4]**

- i) Sketch and label continuous stirred tank reactor.
- ii) Explain with structure ED pathway.

Q4) Write answers of any four of the following: **[10]**

- a) Glyoxylate bypass
- b) Effect of substance concentration on enzyme activity.
- c) Transferases
- d) Role of inhibitors in fermentation media
- e) Preservation of industrial important strain
- f) Pilot plant fermentation



Total No. of Questions : 4]

SEAT No. :

PE-5156

[Total No. of Pages : 3

[6501]-651

S.Y.B.A./B.Sc. (Regular)

MATHEMATICS

MTS-202-MJ : Laplace Transfrom and its Applications
(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Figures to the right indicate full marks.

Q1) Attempt any five of the following:

[5]

- a) Find $L(e^{2t})$.
- b) Discuss the jump discontinuity for the function $f(t) = \begin{cases} 0 & t < 0 \\ \cos \frac{1}{t} & t > 0 \end{cases}$
- c) Find $L^{-1}\left(\frac{s}{s^2 + 9}\right)$.
- d) Find $\Gamma(4)$.
- e) Find $B(1, 2)$.
- f) Find $L(t^2 e^t)$
- g) Find $L^{-1}\left(\frac{1}{s-2} + \frac{1}{s^2 + 4}\right)$

Q2) a) Attempt any one of the following:

[5]

- i) Show that $L(\cos hwt) = \frac{s}{s^2 - w^2}$

P.T.O.

- ii) If $L(f_1(t)) = F_1(s)$ and $L(f_2(t)) = F_2(s)$ and let c_1, c_2 be constants then show that

$$L(c_1 f_1(t) + c_2 f_2(t)) = c_1 F_1(s) + c_2 F_2(s)$$

Hence, find $L(4\sin ht + 2\cos t)$.

- b) Attempt any one of the following: [5]

- i) Using definition of Laplace transform find $L(\cos t)$.

- ii) Let $L_n(t) = \frac{e^t}{n!} \frac{d^n}{dt^n} (t^n e^{-t})$ $n = 0, 1, 2, 3, \dots$

be the Laguerre polynomials. Then show that $L(L_n(t)) = \frac{(s-1)^n}{s^{n+1}}$.

- Q3)** a) Solve any one of the following: [5]

- i) If f is piecewise continuous function on $[0, \infty)$ and of exponential

order and if $L(f(t)) = F(s)$, then show that $L\left(\frac{f(t)}{t}\right) = \int_s^\infty F(x) dx$.

- ii) If $L(f(t)) = F(s)$, then show that $L(u_a(t) f(t-a)) = e^{-as} F(s)$,

where $u_{a(t)}$ is the unit step function.

- b) Attempt any one of the following: [5]

- i) Find $L(t^2 \cos t)$.

- ii) Suppose that the current I in the electrical circuit satisfies

$L \frac{dI}{dt} + RI = E_0 \sin wt$, where L, R, E_0 and w are constants. Find the current $I = I(t)$ for $t > 0$ if $I(0) = 0$.

Q4) a) Attempt any one of the following: [5]

- i) Suppose that f is continuous on $(0, \infty)$ and of exponential order α and that f' is piecewise continuous on $[0, \infty)$. Then show that

$$L(f'(t)) = sL(f(t)) - f(0).$$

Also find $L(f''(t))$.

- ii) If $L(f(t)) = F(s)$ and $L(g(t)) = G(s)$, then show that

$$L((f * g)(t)) = F(s) \cdot G(s) \text{ where } * \text{ is a convolution operator.}$$

b) Attempt any one of the following: [5]

- i) Solve $\frac{dy}{dt} = -z, \frac{dz}{dt} = y, y(0) = 1, z(0) = 0$.

- ii) Find $L^{-1}\left(\frac{1}{s^2 + 2s + 5}\right)$.



Total No. of Questions : 5]

SEAT No. :

PE-5157

[Total No. of Pages : 2

[6501]-652

S.Y.B.Sc.

NANOSCIENCE & NANOTECHNOLOGY

NS-202-MJ : Properties of Nanomaterials

(Physical, Chemical, Optical & Magnetic)

(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *Question No.1 is compulsory.*
- 2) *Solve any Three questions from Q.No.2 to Q.No.5.*
- 3) *Q.No.2 to 5 carry equal marks.*
- 4) *Draw neat and labelled diagram wherever necessary.*
- 5) *Figures to the right indicate full marks.*

Q1) Attempt any five of the following:

[5]

- a) What is exciton?
- b) Define luminescence.
- c) What is elasticity?
- d) What is meant by blocking temperature?
- e) What is mean by hydrophilicity?
- f) What is surface area?

Q2) a) Attempt any one of the following:

[6]

- i) With block diagram explain photoluminescence spectroscopy.
- ii) Explain the Atomic Force Microscopy technique with block diagram.

b) Explain types of hardness test.

[4]

P.T.O.

- Q3)** a) Attempt any one of the following: [6]
- i) Explain giant magnetoresistance.
 - ii) What are the paramagnetic substances? Explain properties of paramagnetic substances.
- b) Explain oral respiratory tract. [4]
- Q4)** a) Attempt any one of the following: [6]
- i) With neat labelled diagram explain TEM.
 - ii) Explain the Neel relaxation in absence of magnetic field.
- b) What is ferromagnetism? Explain in brief. [4]
- Q5)** Write short note on any Four of the following: [10]
- a) Tribology
 - b) Quantum size effect
 - c) Colossal Magnetoresistance
 - d) Surface Plasmon resonance
 - e) Cathodoluminescence
 - f) Mechanical property of Nanomaterial.



Total No. of Questions : 4]

SEAT No. :

PE-5158

[Total No. of Pages : 2

[6501]-653

S.Y.B.Sc. (Regular)

PHYSICS

PHY-202(A)-MJ : Electronics

(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *Question No.1 is compulsory.*
- 2) *Q.No.2 to 4 carry equal marks.*
- 3) *Figures to the right indicate full marks.*
- 4) *Use of log table and calculator is allowed.*

Q1) Answer the following questions. (Any five)

[5]

- a) What is positive feedback?
- b) What is meant by Q-point (operating point)?
- c) Define Common Mode Rejection Ratio (CMRR).
- d) Find the values of β , if $\alpha = 0.9$ and 0.99 .
- e) State first and second De-Morgan's theorem.
- f) Give symbol and truth table of OR gate.

Q2) a) Answer the following questions (Any One):

[6]

- i) Explain the various parameters of ideal operational amplifier.
- ii) Describe working of a transistor as an amplifier.

b) Add the binary numbers.

[4]

- i) 111 and 101
- ii) 101 and 110

P.T.O.

- Q3)** a) Answer the following questions (Any One): **[6]**
- i) Explain with the circuit diagram, Op-amp as a subtractor.
 - ii) What is a logic gate? Explain basic (primary) gates with symbol and truth table.
- b) A change of 250 mV in base-emitter voltage causes a change of 125 μ A in the base current. Find the input resistance of the transistor. **[4]**

- Q4)** Answer the following questions (Any Four): **[10]**
- a) Describe DC load line using common-emitter amplifier circuit.
 - b) With suitable diagram, give the construction of BJT and its symbol.
 - c) What is feedback? Explain negative feedback circuits.
 - d) What is virtual ground concept in Op-amp?
 - e) Explain NOR and NAND gates with symbol and truth table.
 - f) Reduce the Boolean expression and draw the logic diagram for $AB + A(B + C) + B(B + C)$.



Total No. of Questions : 4]

SEAT No. :

PE-5159

[Total No. of Pages : 2

[6501]-654

S.Y.B.Sc. (Regular)

PHYSICS

PHY-202(B) MJ : Instrumentation

(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicate full marks.*
- 3) *Use of calculator is allowed.*

Q1) Answer the following questions (Any Five):

[5]

- a) Define Span.
- b) What is LVDT?
- c) Give the principle of strain gauge.
- d) Enlist two examples of first order system.
- e) Define gauge factor.
- f) What is Diaphragm?
- g) Define differential pressure.

Q2) a) Answer the following questions (Any One):

[6]

- i) Define errors in measurement. Explain different types of errors in detail.
- ii) What do you mean by cantilever beam? Explain how it is used for the measurement of force.

b) Answer the following questions (Any One):

[4]

- i) Describe construction and working principle of liquid filled thermometer.
- ii) The diameter of wire measured with vernier callipers with least count of 0.1 mm is 3.15 cm. Find the percentage error in the measurement.

P.T.O.

Q3) a) Answer the following questions (Any One): **[6]**

- i) Explain principle and working of bimetallic thermometer state their applications.
- ii) Define first order system. Explain thermal element as a first order system of measurement.

b) Answer the following questions (Any One): **[4]**

- i) State and explain various types of thermocouples.
- ii) The resistance of platinum wire at 0°C is 5.5Ω and at 1°C is 7.5Ω . Find the temperature of the wire.

[Given: temperature coefficient for $p/t = 0.0039/^{\circ}\text{C}$]

Q4) Write the short notes on the following (Any Four): **[10]**

- a) State and explain static characteristics of transducer.
- b) Explain the term sensitivity of an instrument.
- c) Give the applications of thermistors.
- d) Write a note on seebeck effect.
- e) Explain piezoelectric effect.
- f) Write a note on Hysteresis.



Total No. of Questions : 5]

SEAT No. :

PE-5160

[Total No. of Pages : 2

[6501]-655

S.Y.B.Sc. (Regular)

SEED TECHNOLOGY

ST-202-MJ : Principles of Seed Production

(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) Question No.1 is compulsory.
- 2) Attempt any three questions from Q.No.2 to Q.No.5.
- 3) Questions Q.2 to Q.5 carry equal marks.
- 4) Draw neat labelled diagram wherever necessary.

Q1) Attempt Any Five of the following:

[5]

- a) What is a certified seed?
- b) Define field inspection?
- c) What is transplanting?
- d) Define drainage.
- e) What is dis infection?
- f) What is seed conditioning? .

Q2) a) Define seed production. Comment on seed village concept and overview of different seed production systems. [6]

b) Describe seed quality concept w.r.t. seed health and vigour. [4]

Q3) a) What is sowing? Comment on the direct method of sowing with suitable example. [6]

b) Define irrigation and comment on importance of drainage. [4]

P.T.O.

- Q4)** a) Describe the steps in evaluation for release of a new variety. [6]
b) Comment on isolation distance and roughing. [4]

Q5) Write a short notes on any four of the following: [10]

- a) Seed treatment
- b) Seed storage
- c) Methods to avoid seed damage during storage.
- d) Seed marketing
- e) Importance of soil and water testing.



[6501]-656

S.Y.B.A/B.Sc. (Regular)

STATISTICS

**STS-202-MJ : Continuous Probability Distribution
(2024 Pattern) (Semester - III)****Time : 2 Hours]****[Max. Marks : 35****Instructions to the candidates:**

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicate full marks.*
- 3) *Use of Statistical tables and calculator is allowed.*
- 4) *Symbols and abbreviations have their usual meaning.*

Q1) a) Choose the correct alternative for each of the following: [1 each]

- i) A continuous random variable X has median M then which of the following statement is true Notation : $F_X(x)$ is distribution function of X .

A) $F_X(M) = \frac{1}{2}$

C) $P(X \geq M) = \frac{1}{4}$

B) $P(X = M) = \frac{1}{2}$

D) $P(X \leq M) = \frac{3}{4}$

- ii) If a two dimensional random variable (X, Y) has moment generating function $M_{(X,Y)}(t_1, t_2)$ then which of the following is not true?

A) $M_{X,Y}(0, 0) = 0$

C) $M_{X,Y}(t_1, 0) = M_X(t_1)$

B) $M_{X,Y}(0, 0) = 1$

D) $M_{X,Y}(0, t_2) = M_Y(t_2)$

- iii) Let $X \rightarrow N(0,1), P(a < X < b) = 0.7$ then which of the following is true for a and b .

A) $a > 0, b > 0$

C) $a < 0, b < 0$

B) $a < 0, b > 0$

D) $a > 0, b < 0$

- b) State whether the following statements are True or False: [1 each]
- Normal distribution is positively skewed.
 - Distribution function is non-decreasing in nature.

Q2) Attempt any two of the following: [5 each]

- a) The p.d.f. of a continuous random variable X is given by

$$f(x) = ce^{-mx} \quad x > 0, m > 0$$

$$= 0 \quad \text{o.w.}$$

Find:

- Find the value of constant c.
 - Variance of X.
- b) The joint p.d.f. of bivariate continuous random variable (X, Y) is given by

$$f(x, y) = 4x(1 - y); \quad 0 < x, y < 1$$

$$= 0 \quad \text{o.w.}$$

Find conditional expectation of X given Y = y.

- c) Let $X \sim N(\mu, \sigma^2)$. Find mode of X.

Q3) Attempt any two of the following: [5]

- a) The p.d.f. of a continuous random variable X is given by

$$f(x) = 3(1 - x)^2 \quad 0 < x < 1$$

$$= 0 \quad \text{o.w.}$$

Find p.d.f. of $Y = \frac{X}{1 - X}$.

- State and prove the lack of memory property of exponential distribution.
- If $X_1, X_2, \dots, X_n$ be a random sample from $N(\mu, \sigma^2)$ distribution then find the probability distribution of sample mean $\bar{X}$.

Q4) Attempt any one of the following: [7]

- a) i) The p.d.f. of two dimensional continuous random variable (X, Y) is given by

$$f(x, y) = 2 \quad x > 0, y > 0, x + y < 1$$
$$= 0 \quad \text{o.w.}$$

Find Covariance between X and Y.

- ii) Let $X \sim U(a, b)$. Find moment generating function of X. [3]
- b) i) Let $X \sim \text{Exp}(\alpha)$ then find the distribution function of X. Hence find its median. [4]

- ii) If X is continuous random variable with moment generating function,

$M_X(t) = e^{3t+8t^2}$ then identify the probability distribution of random variable X. Also find $P(4 < X < 6)$. [3]

- ii) The joint probability density function of a bivariate random variable (X, Y) is [3]

$$f(x, y) = e^{-(x+y)}; \quad x \geq 0, y \geq 0$$
$$= 0 \quad \text{o.w.}$$

Find $P(X + Y \leq 1)$



Total No. of Questions : 4]

SEAT No. :

PE-5162

[Total No. of Pages : 2

[6501]-657

S.Y.B.Sc. (Regular)

ZOOLOGY

ZOO-202-MJ : Invertebrate Zoology - I (T)

(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Figures to the right indicate full marks.

Q1) Attempt Any Five of the following in one sentence : **[5]**

- a) Mention the class of Dugesia.
- b) Give an example of Class Mastigophora.
- c) Euplectella belongs to which class?
- d) Mention any one parasitic adaptation in Platyhelminthes.
- e) Name the locomotory organ present in ciliates.
- f) Give an example of Class Scyphozoa.

Q2) a) Attempt any one of the following: **[6]**

- i) Describe the general features of Phylum Cnidaria.
- ii) Give the salient features of Phylum Porifera.

b) Attempt any one of the following: **[4]**

- i) Give general features of Class Cestoda.
- ii) Write the salient features of Class Sporozoa.

Q3) a) Solve any one of the following: **[6]**

- i) Write the general features of Phylum Platyhelminthes.
- ii) Give the general features of Phylum Protozoa.

P.T.O.

- b) Solve any one of the following: [4]
- i) Describe the uses of marine natural products of sponges.
 - ii) Give the salient features of Class Hydrozoa.

Q4) Write notes on (Any Four): [10]

- a) Any one principle of classification
- b) Useful Protozoa
- c) Describe the origin and importance of Metazoa
- d) Role of invertebrates in parasitism
- e) Polyp and Medusa in Cnidaria
- f) Enlist classes of Phylum Porifera with examples.



Total No. of Questions : 4]

SEAT No. :

PE-5163

[Total No. of Pages : 2

[6501]-658

S.Y. B.Sc. (Regular)

BOTANY

BOT-241-MN : Horticulture

(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Figures to the right indicate full marks.
- 3) Draw neat labelled diagrams wherever necessary.

Q1) Answer any five of the following in one sentence [5]

- a) What is cutting?
- b) Define pomology
- c) What is pruning?
- d) Name any two Government agencies in horticulture development.
- e) What is moss stick?
- f) Write any two plant growth regulators used in horticulture.

Q2) a) Write any one of the following [6]

- i) Define layering. Explain procedure of Air layering
- ii) Explain briefly centre of origin, soil, climatic condition & cultivation techniques of pomegranate.

b) Write any one of the following [4]

- i) Explain diseases, pest control, harvesting & packaging of tomato.
- ii) Explain role of MIDH in horticulture development.

Q3) a) Solve any one of the following [6]

- i) Describe common name, botanical name, family part used and importance of rose plant.
- ii) Explain the procedure of tomato ketchup.

b) Solve any one of the following [4]

- i) Explain the concept & importance of girdling.
- ii) Explain any two landscape gardening components.

P.T.O.

Q4) Write notes on (Any four)

[10]

- a) Greenhouse
- b) Notching
- c) Pergolas
- d) Branches of horticulture
- e) Soil & climatic conditions for cultivation of Gerbera
- f) Bonsai



Total No. of Questions : 4]

SEAT No. :

PE-5164

[Total No. of Pages : 2

[6501]-659

S.Y. B.Sc. (Regular)

BOTANY

BOT-242-MN: Tissue Culture Technology

(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Figures to the right indicate full marks.
- 3) Draw neat labelled diagrams wherever necessary.

Q1) Answer any five of the following in one sentence [5]

- a) Define plant tissue culture
- b) The name of any one gelling agent in nutrient medium.
- c) What is sterilization?
- d) Define micropropagation
- e) Enlist the types of cell suspension culture
- f) Define cryopreservation

Q2) a) Write any one of the following [6]

- i) Describe any two physical methods of sterilization
- ii) What is somatic embryogenesis? Describe the process in details.

b) Write any one of the following [4]

- i) Explain the inoculation and incubation.
- ii) Give the advantages and limitations of micropropagation.

Q3) a) Solve any one of the following [6]

- i) Describe the composition of Ms nutrient media.
- ii) Describe the stages of micropropagation.

b) Solve any one of the following [4]

- i) Explain the role of Auxins and cytokinins in PTC.
- ii) Explain the anther and pollen culture.

P.T.O.

Q4) Write notes on (Any four)

[10]

- a) Explant
- b) Autoclave
- c) Stock solution
- d) Synthetic seed production
- e) Protoplast fusion
- f) In-Situ germplasm conservation



Total No. of Questions : 4]

SEAT No. :

PE-5165

[Total No. of Pages : 2

[6501]-660

S.Y. B.Sc. (Regular)

BOTANY

**BOT-243-MN : Seed Technology
(2024 Pattern) (Semester - III)**

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicate full marks.*
- 3) *Draw neat labelled diagrams wherever necessary.*

Q1) Answer any five of the following in one sentence **[5]**

- a) What is moisture percentage?
- b) Write the types of seed based on structure
- c) What is drilling?
- d) What do you mean by seed testing?
- e) Define entomology
- f) What is seed grading?

Q2) a) Write any one of the following **[6]**

- i) What is seed? Give the types of seed based on life span.
- ii) What is seed certification? Describe the classes of seed.

b) Write any one of the following **[4]**

- i) Describe the steps for release of new variety.
- ii) Explain physical purity analysis and moisture testing.

Q3) a) Solve any one of the following **[6]**

- i) Describe the major seed industries in Maharashtra.
- ii) Describe the methods of seed treatment.

b) Solve any one of the following **[4]**

- i) Enlist cultivation practices of seed production and explain any two cultivation practices.
- ii) Explain factors affecting seed storage.

P.T.O.

Q4) Write notes on (Any four)

[10]

- a) Physical purity
- b) Seed testing laboratory
- c) Dibbling method
- d) Containers used in seed storage
- e) Components of seed marketing
- f) Seed storage fungi



Total No. of Questions : 5]

SEAT No. :

PE-5166

[Total No. of Pages : 2

[6501]-661

S.Y. B.Sc. (Regular)

CHEMISTRY

CHE-241-TMN : Physical and Inorganic Chemistry

(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Use of scientific calculator and log table is allowed.
- 3) Figures to the right side indicate full marks.
- 4) Illustrate your answers with neat diagrams.

Q1) Solve any five of the following:

[5]

- a) Define adiabatic process.
- b) What is equivalent conductance?
- c) What is extensive property?
- d) A steam engine operate between the temperatures 398 K and 298 K. Calculate the efficiency of engine.
- e) Define double salt.
- f) What is the shape of dsp^2 hybridized complex?
- g) What is the condition for paramagnetic behaviour of the complex?

Q2) a) Solve any two of the following:

[6]

- i) Explain the formation of $[Co(NH_3)_6]^{3+}$ complex ion on the basis of VBT.
- ii) Give the postulates of Werner's theory.
- iii) What is difference between strong and weak electrolyte?

b) Solve the following:

[4]

An ideal gas containing 10 moles expands isothermally and reversibly from $8dm^3$ to $80dm^3$ at $27^\circ C$. Estimate the entropy change of the gas.

(Given $R = 8.314 Jmol^{-1}K^{-1}$)

P.T.O.

Q3) a) Solve any two of the following: **[6]**

- i) Why C_p is greater than C_v ?
- ii) Explain Wheat-stones bridge method for the determination of unknown resistance of solution with suitable diagram.
- iii) Explain outer orbital complex with suitable example.

b) Solve the following: **[4]**

- i) Calculate EAN of $[\text{Ni}(\text{CN})_4]^{2-}$ complex.
- ii) Write the IUPAC name of the following complexes.
 - 1) $[\text{Co}(\text{NH}_3)_5\text{Cl}]\text{Cl}_2$
 - 2) $[\text{PtCl}_2(\text{NH}_3)_2]$

Q4) Solve any four of the following: **[10]**

- a) Explain spontaneous and nonspontaneous process with suitable examples.
- b) Explain transport number.
- c) What are the assumptions of VBT?
- d) Give difference between metal complex and metal chelate.
- e) Calculate magnetic moment of $[\text{MnCl}_4]^{2-}$ complex.



Total No. of Questions : 4]

SEAT No. :

PE5527

[Total No. of Pages : 1

[6501]-662

S.Y. B.Sc. (Regular)

DEFENCE AND STRATEGIC STUDIES

DEF-241-MNT : Maratha Military System - I

(2024 NEP Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Figures to the right indicate full marks.

Q1) Answer the following questions (any Five) [5×2=10]

- a) Write the difference between Defence and Security.
- b) Explain the strategic importance of forts.
- c) Describe the contemporary armies of the Mughal Empire.
- d) State the Characteristics of the fort system of Chhatrapati Shivaji Maharaj.
- e) Explain the Structure of infantry.
- f) State the Weapon system of Chhatrapati Shivaji Maharaj.

Q2) Answer the following questions (any Two). [2×4=8]

- a) State the Structure of Armed Forces of Chhatrapati Shivaji Maharaj.
- b) Explain the Role of Jijabai in the making of Chhatrapati Shivaji Maharaj.
- c) Explain the Role of Dadoji Kondadev in the making of Chhatrapati Shivaji Maharaj.

Q3) Answer the following question (any One). [1×7=7]

- a) Explain in detail Chhatrapati Shivaji as Master of Guerrilla Tactics.
- b) Explain in detail the origin of the idea of hindavi swarajya.

Q4) Write short notes (any Two). [2×5=10]

- a) Chhatrapati Shivaji Maharaj
- b) Oath at Raireshwar
- c) Security management of forts



Total No. of Questions : 4]

SEAT No. :

PE-5167

[Total No. of Pages : 2

[6501]-663

S.Y. B.Sc. (Regular)

ELECTRONIC SCIENCE

**ELE-241-MN : Instrumentation and Measurement Systems
(2024 Pattern) (Semester - III)**

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Q.2 to Q.4 carry equal marks.

Q1) Answer the following questions (Any 5) **[5]**

- a) What is full form of DAC?
- b) Define sensitivity.
- c) What are the advantages of LCD?
- d) Give any two applications of CRO.
- e) Define Linearity.
- f) What is full form of LVDT?
- g) What is function of ADC?

Q2) a) Answer the following (Any 2) **[6]**

- i) What is band pass filter? State its applications.
- ii) Draw a block diagram of regulated power supply and explain.
- iii) What is photoresistor? Explain its working

b) Answer the following (Any 1) **[4]**

- i) What is LVDT? Explain its working and give the application
- ii) Calculate the output voltage of 4 bit DAC for binary input 1100 and reference voltage = 5V

Q3) a) Answer the following (Any 2) **[6]**

- i) What will be the resolution in a meter? If the scale is marked with 20 division per centimeter?
- ii) Explain block diagram of instrumentation amplifier
- iii) What is thermocouple? Give their advantages & disadvantages

P.T.O.

- b) Answer the following (Any 1) [4]
- i) Explain the working principle of photodiode? What are its application?
 - ii) With neat labelled diagram explain working of regulated power supply

Q4) Write a note on following (Any 4) [10]

- a) CRO
- b) Ultrasonic sensor
- c) Strain Gauges
- d) Systematic errors
- e) Liquid crystal display
- f) Notch filter



Total No. of Questions : 4]

SEAT No. :

PE3397

[Total No. of Pages : 2

[6501]-664

S.Y.B.Sc. (Regular)

ENVIRONMENTAL SCIENCE

EVS-241-MN : Environmental Microbiology

(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicate full marks.*
- 3) *Draw neat and labelled diagrams wherever necessary.*
- 4) *Write answers in a systematic and logical manner.*

Q1) Answer any five of the following in one sentence-

[5]

- a) What is the role of micro organisms in decomposition.
- b) Which gas is released during sulfur reduction
- c) Write definition of In-situ bioremediation.
- d) What is a microbial fuel cell?
- e) What is mean by isolation of microorganisms?
- f) What are the microbial indicators of water quality?

Q2) a) Write any one of the following.

[6]

- i) What are the microbial habitats? Describe various environmental factors that influence microbial growth?
- ii) Describe the future trends in environmental microbiology?

b) Write any one of the following.

[4]

- i) Describe the type of microorganisms found in air and their effects on the environment?
- ii) Explain the microbial role in phosphorous mobilization?

P.T.O.

Q3) a) Solve any one of the following. **[6]**

- i) Describe how microorganisms contribute to solid waste management?
- ii) Describe the role of microorganisms in carbon cycle?

b) Solve any one of the following. **[4]**

- i) Write safety protocols in microbiological laboratories?
- ii) Explain the process of activated sludge treatment?

Q4) Write notes on (Any four) **[10]**

- a) Nitrogen fixation
- b) Waterborne diseases
- c) Microorganisms in waste water treatment.
- d) Sustainable energy production by using microbial processes.
- e) Microbial ecology
- f) Diversity of microorganisms in soil.



Total No. of Questions : 3]

SEAT No. :

PE-5168

[Total No. of Pages : 1

[6501]-665

S.Y. B.Sc. (Regular)

GEOGRAPHY

GEO(S)-241-MN: Geography of India
(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) Attempt all Questions.
- 2) Figures to the right indicate full marks.
- 3) Draw neat diagrams whenever necessary.
- 4) Use of map stencils is allowed.

Q1) Write answer of the questions in about 20 words each (any four) **[10]**

- a) What is the latitudinal and longitudinal extent of India?
- b) Write the names of the neighbouring countries of India.
- c) What is the significance of the northern mountains?
- d) Name any two plateaus of the Peninsular region.
- e) What are the characteristics of the summer seasons?
- f) Name any two major east-flowing rivers of India.
- g) Write any two methods of soil conservation.

Q2) Answer the following questions in about 50 words each (any two) **[10]**

- a) Write the summer season in India.
- b) Explain the characteristics of black soil.
- c) Explain the importance of forest resources.

Q3) Answer the following questions in about 100 words each (any two) **[15]**

- a) Discuss the causes of deforestation and suggest measures for forest conservation.
- b) What are the causes of soil erosion & suggest suitable soil conservation measures.
- c) Discuss India's political relations with its neighbouring countries.



Total No. of Questions : 4]

SEAT No. :

PE-5169

[Total No. of Pages : 2

[6501]-666

S.Y. B.Sc. (Regular)

MICROBIOLOGY

MB-241-MN : Avenues In Microbiology

(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Figure to right indicate full marks.
- 3) Draw neat labelled diagrams wherever necessary.

Q1) Answer any five of the following [5]

- a) Define Disease
- b) What are vaccines?
- c) B form of DNA is ____
 - i) Right Handed
 - ii) Left Handed
 - iii) Both
 - iv) Amphoteric
- d) Cholera is caused by ____
- e) State True/False: Pasteurization kill only vegetative cells
- f) Write full form of HACCP ____
- g) MFT (Write Full Form) ____

Q2) a) Answer any one of the following [6]

- i) Describe mode of Transmission of UTI and write its lab diagnosis.
- ii) Differentiate between inactivated and recombinant vaccines

b) Answer any one of the following [4]

- i) Draw flow chart for production of HPV subunit vaccine.
- ii) Explain the role of DNA polymerase.

Q3) a) Answer any one of the following [6]

- i) Explain primary waste water treatment.
- ii) Explain preservation of food by pasteurization

P.T.O.

- b) Answer any one of the following [4]
- i) Describe mode of action of Tetracycline.
 - ii) Write characteristics of B form of DNA

Q4) Write short note on any four of the following [10]

- a) Covid 19
- b) Semi conservative DNA replication
- c) HACCP
- d) Bioremediation
- e) Inactivated Rabies Vaccine
- f) Lab diagnosis of Gastroenteritis



Total No. of Questions : 4]

SEAT No. :

PE-5170

[Total No. of Pages : 2

[6501]-667

S.Y. B.Sc. (Regular)

GEOLOGY

MN-201-GL-T: Introduction to Structural Geology

(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Neat diagram must be drawn wherever necessary.

Q1) Answer any five of the following in one sentence: [5]

- a) What is strike?
- b) What are uses of GPS.
- c) What is brittle deformation?
- d) What is Riecke's principle?
- e) What is fracture?
- f) What are different types unconformity?

Q2) a) Answer any one of the following [6]

- i) Explain different stages of deformation with the help of stress-strain diagram.
- ii) What is fault? Explain geometric classification of faults.

b) Answer any one of the following [4]

- i) Explain Flutey's classification of folds.
- ii) What is unconformity? Explain their recognition in the field.

Q3) a) Answer any one of the following [6]

- i) Explain different factors controlling behaviour of the materials with the help of diagram.
- ii) What are joints? Explain genetic classification of joints?

b) Answer any one of the following [4]

- i) Explain concept of mechanism of folding.
- ii) Explain genetic types of fractures.

P.T.O.

Q4) Answer any four of the following

[10]

- a) Fore-bearing and back-bearing
- b) Plunging and Non-plunging folds
- c) Components of rock deformation
- d) Throw and heave
- e) Elements of Brunton compass
- f) Intergranular and Intragranular movements.



Total No. of Questions : 4]

SEAT No. :

PE-5171

[Total No. of Pages : 2

[6501]-668

S.Y. B.A/B.Sc. (Regular)

MATHEMATICS

MTS-241-MN(A) : Mathematics for Physcial Science - I
(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Figures to the right side indicate full marks.

Q1) Solve any five of the following: [5]

- a) Let $\bar{A} = (3, 4)$, $\bar{B} = (1, -2)$, find $\bar{A} + \bar{B}$ and $\bar{A} - \bar{B}$.
- b) Find first order partial derivatives of the function $f(x, y) = y^5 - 3xy$.
- c) If $f(x, y) = 2x^3 - 3xy^2$, then find $f_{xx}(1, 1)$.
- d) State necessary condition for the exactness of differential equation.
- e) Find velocity of a particle given by $\bar{r}(t) = t^2\bar{i} + (3t - 1)\bar{j} + (2t^2 + 1)\bar{k}$ at $t = 2$.
- f) Define curl of a vector.
- g) In what direction the directional derivative of a scalar function.

Q2) a) Attempt any one of the following: [5]

- i) Define two dimensional Laplace equation and Harmonic function. Give an example of a function that satisfies Laplace equation.
- ii) Define scalar triple product. Hence find volume of parallelopiped defined by the vectors $\bar{A} = 2\bar{i} - \bar{j} - \bar{k}$, $\bar{B} = \bar{i} + 2\bar{j} - 3\bar{k}$ and $\bar{C} = 3\bar{i} - 2\bar{j} + 5\bar{k}$.

b) Attempt any one of the following: [5]

- i) If $z = x^2y + 3xy^4$, where $x = \sin 2t$ and $y = \cos t$, then find $\frac{dz}{dt}$
- ii) Let $\phi(x, y, z) = e^{xyz}$, then find gradient of ϕ at point $(1, 0, 2)$.

P.T.O.

Q3) a) Attempt any one of the following: [5]

- i) Suppose that $z = f(x, y)$ is a differentiable function of x and y , where $x = g(t)$ and $y = h(t)$ are both differentiable functions of t , then show that z is also differentiable function of t , and

$$\frac{dz}{dt} = \frac{\partial z}{\partial x} \cdot \frac{dx}{dt} + \frac{\partial z}{\partial y} \cdot \frac{dy}{dt}.$$

- ii) If ϕ and ψ are scalar point functions possess first order partial derivatives, then $\text{grad}(\phi\psi) = \phi(\text{grad}\psi) + \psi(\text{grad}\phi)$.

b) Attempt any one of the following. [5]

- i) Let $P = (2, 1, 3)$ and $Q = (5, 4, 7)$ be two points in the space then,

1) Find the vector $\overline{PQ}$ and its magnitude.

2) Find the angle between $\overline{PQ}$ and the vector $i + j + k$.

- ii) Find the vector triple product $\overline{a} \times (\overline{b} \times \overline{c})$ for

$$\overline{a} = (1, 2, 3), \overline{b} = (4, 5, 6), \overline{c} = (7, 8, 9).$$

Q4) a) Attempt any one of the following: [5]

- i) Prove that divergence of the curl of any vector field is zero.

- ii) Define differential of $u = f(x, y, z)$. Hence find total differential df in terms of dx, dy, dz for $f(x, y, z) = xye^z$.

b) Attempt any one of the following: [5]

- i) If $u = \log(\tan x + \tan y + \tan z)$, prove that

$$\sin 2x \frac{\partial u}{\partial x} + \sin 2y \frac{\partial u}{\partial y} + \sin 2z \frac{\partial u}{\partial z} = z.$$

- ii) A particle has a position vector given by

$$\overline{r}(t) = (t^3 - t)i + 2t^2j + (t^2 + 3t)k.$$

Find:

- 1) The velocity and acceleration vector.
- 2) The speed at $t = 1$.



[6501]-669

S.Y. B.A./B.Sc. (Regular)

MATHEMATICS

MTS-241-MN(B) : Mathematics for the Life Sciences - I
(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Figures to the right side indicate full marks.

Q1) Attempt any five of the following:

[5×1=5]

- a) Solve the following inequality for the variable x .
 $1 - x \geq x - 7$
- b) Find the equation of line with slope -2 and y intercept 3 .
- c) Find the domain of $f(x) = \sqrt{(x-2)(x-3)}$.
- d) For what exponent n is $3^n = 10$.
- e) Find the value of $\frac{\log_a 32}{\log_a 4}$.
- f) Find $\frac{dy}{dx}$ if $y = \ln(x + c)$, where c is constant.
- g) Find the component of $A = 2i - 3j$ in the direction of $B = 5i + 2j$.

Q2) a) Attempt any one of the following:

[5]

- i) Give $f(x) = 3x^2 - 7x + 2$. Find $f(a)$, $f(-3)$ and $f\left(\frac{-2}{3}\right)$.

- ii) Solve the following equation for x .
 $\log(10x + 5) - \log(x + 4) = \log 2$.

b) Attempt any one of the following:

[5]

- i) Find the equation of the straight line passing through the points $(1, -2)$ and $(5, 6)$
- ii) Sketch the graphs of the following inequalities in the xy -plane
 - 1) $x + y > 1$
 - 2) $2x - y \leq 4$

P.T.O.

Q3) a) Attempt any one of the following: [5]

i) Find $\frac{dy}{dx}$ for each of the following function

1) $y = \ln(x^2)$

2) $y = \frac{e\sqrt{x}}{e^x}$

ii) The amount of radioactive carbon in a certain piece of human bone is measured to be 58% of the amount that occurs naturally in the atmosphere. How old is the bone?

b) Attempt any one of the following. [5]

i) Evaluate the following limit

$$\lim_{x \rightarrow \infty} \frac{3x^2 + 1}{\sqrt{9x^4 + 7}}$$

ii) Find the inverse of the following function. Draw the graphs of the function and its inverse.

$$y = -3x - 4.$$

Q4) a) Attempt any one of the following: [5]

i) Given $A = (1, -2)$ and $B = (3, p)$. Determine the constant p so that

A and B make an angle of $\frac{\pi}{3}$ with each other.

ii) If $P(1, -2)$, $Q(-3, 1)$, $R(2, 4)$ and $S(-1, 6)$ are four points in a plane, then compute the vector $\overrightarrow{PQ} + 2\overrightarrow{RS}$.

b) Attempt any one of the following: [5]

i) For the matrices A and B . Solve $AX = B$ for the matrix X .

$$A = \begin{pmatrix} 1 & 1 \\ 1 & -1 \end{pmatrix}, B = \begin{pmatrix} 1 \\ 2 \end{pmatrix}$$

ii) If $A = \begin{pmatrix} 1 & -2 & 3 \\ 4 & 1 & 5 \\ -2 & 0 & 3 \end{pmatrix}$ and $B = \begin{pmatrix} 0 & 1 & -3 \\ 2 & 0 & 5 \\ -1 & 4 & 0 \end{pmatrix}$

Find $A + B$ and AB .



Total No. of Questions : 4]

SEAT No. :

PE-5173

[Total No. of Pages : 2

[6501]-670

S.Y.B.A/B.Sc. (Regular)

MATHEMATICS

MTS-241-MN(C) : Mathematics for Numerical Techniques

Sciences - I

(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Figures to the right side indicate full marks.
- 3) Use of calculator is allowed.

Q1) Attempt any five of the following: [5]

- a) Round off the number 75462 to four significant digits and then calculate its absolute error.
- b) Find the root in the first iteration of $x^3 - x - 4 = 0$ between 1 and 2 by bisection method.
- c) For $y = f(x)$, define Δy_2 ?
- d) Write down Newton's Gregory formula for backward interpolation.
- e) Evaluate $\int_0^2 y dx$ by Trapezoidal rule, where $y(0) = 0, y(1) = 1, y(2) = 8$.
- f) Write the formula for $y_1^{(n+1)}$ in modified Euler's method.
- g) State Simpson's $\frac{1}{3}$ rd rule.

Q2) a) Attempt any one of the following: [5]

- i) Explain Newton-Raphson method to find approximate root of $f(x) = 0$
- ii) Derive Newton-Gregory formula for forward interpolation.

P.T.O.

b) Attempt any one of the following: [5]

i) Evaluate $\int_0^1 \frac{1}{1+x} dx$ by using Simpson's rule with 4 strips.

ii) Given $\frac{dy}{dx} + 2y = 0$ with $y(0) = 1, h = 0.1$, find $y(0.2)$ using Euler's method.

Q3) a) Attempt any one of the following: [5]

i) Derive general quadrature formula for numerical integration.

ii) Explain modified Euler's method for successive approximation

b) Attempt any one of the following. [5]

i) Use the method of false position to find approximate root of the equation $x^3 + x^2 + x + 7 = 0$ upto two iterations.

ii) Using Newton-Gregory backward interpolation formula find $y(8)$ given that $y(1) = 24, y(3) = 120, y(5) = 336$ and $y(7) = 720$.

Q4) a) Attempt any one of the following: [5]

i) Prove that $\Delta = E - 1$ and $\nabla = 1 - E^{-1}$

ii) Derive Newton's divided difference formula.

b) Attempt any one of the following: [5]

i) Find a root of the equation $x^3 - 2x - 5 = 0$ using bisection method (perform 3 iterations)

ii) Find y when $x = 1$ by Runge-Kutta fourth order method. Given that

$$\frac{dy}{dx} = \frac{y-x}{y+x}, y(0) = 1.$$



Total No. of Questions : 5]

SEAT No. :

PE-5174

[Total No. of Pages : 2

[6501]-671

S.Y. B.Sc. (Regular)

NANOSCIENCE AND NANOTECHNOLOGY

NS-241-MN: Renewable Energy and Energy Harvesting
(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) Q.1 is compulsory.
- 2) Solve any three question from Q.2 to Q.5.
- 3) Draw the neat and labelled diagram wherever necessary.
- 4) Figure to the write indicates full marks.

Q1) Attempt any five of the following [5]

- a) Give the examples of conventional energy sources.
- b) What is fossil fuels?
- c) Define solar energy?
- d) Explain solar pond?
- e) What is solar green houses?
- f) Define wind?

Q2) a) Attempt any one of the following [6]

- i) Explain I-v characteristics of solar cell.
- ii) Explain any one type of solar cooker.
- b) Write difference between renewable energy and non-renewable energy sources. [4]

Q3) a) Attempt any one of the following [6]

- i) Explain wind turbines in detail.
- ii) Explain the basic photovoltaic system for power generation.
- b) Explain advantages and disadvantages of renewable energy sources with examples. [4]

Q4) a) Attempt any one of the following [6]

- i) Explain biogas generation.
- ii) Explain construction and working of solar pond.
- b) Explain ocean thermal energy conversion. [4]

P.T.O.

Q5) Attempt any four of the following

[10]

- a) Explain hydropower resources.
- b) Explain sun tracking system.
- c) Explain tidal energy
- d) Write short note on different electrical machine in turbines.
- e) Write short note on storage of solar energy.
- f) Explain solar distillation.



Total No. of Questions : 4]

SEAT No. :

PE-5175

[Total No. of Pages : 2

[6501]-672

S.Y. B.Sc. (Regular)

PHYSICS

PHY-241-MN : Applied Physics-I
(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Figure to the right indicate full marks.
- 3) Use of calculator is allowed.

Q1) Solve any five of the following [5]

- a) What is full form of Laser?
- b) Define Biophysics.
- c) What is classifications of Nanomaterials?
- d) List types of Laser
- e) What are future missions of ISRO?
- f) What are stars and planets?
- g) Define Nanotechnology

Q2) a) Attempt any one of the following [6]

- i) Discuss various applications of space missions for human being.
- ii) Explain characteristics of Laser light.

b) Attempt any one of the following [4]

- i) List various synthesis methods of nanomaterials.
- ii) Write various types of molecular interactions.

Q3) a) Attempt any one of the following [6]

- i) What are various applications of nanomaterials?
- ii) Discuss stimulated emission and population inversion.

b) Attempt any one of the following [4]

- i) Differentiate between natural and artificial satellite.
- ii) Why water is called the universal solvent?

P.T.O.

Q4) Attempt any four of the following

[10]

- a) What is pumping in Laser?
- b) What is the difference between RND and DNA?
- c) Explain Geostationary satellite
- d) What is classifications of nanomaterials?
- e) Differentiate between top down and bottom up approach in synthesis
- f) Write note on ISRO.



Total No. of Questions : 4]

SEAT No. :

PE-5186

[Total No. of Pages : 2

[6501]-673

S.Y. B.Sc. (Regular)

PSYCHOLOGY

PSY-245-MNT : Social psychology

(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Figures to the right Indicate full marks.
- 3) Illustration your answer with neat diagrams wherever necessary.

Q1) Solve any five of the following [5]

- a) What is impression management?
- b) Name the psychologist who was given the social learning perspective.
- c) Define pro-social behaviour
- d) Define self Esteem.
- e) What is social perception?
- f) What is heuristics?
- g) Define schemas.

Q2) a) Solve any two of the following [6]

- i) Discuss the scientific nature of social psychology
- ii) Elaborate the socio-cultural perspective of social behaviour.
- iii) Elaborate the role of body language in effective communication

b) Solve the following [4]

- i) Comment on the influence of prejudices on social behaviour.

Q3) a) Solve any two of the following [6]

- i) Discuss in brief types of conflicts.
- ii) Discuss how self-esteem influence the self confidence
- iii) Elaborate the Socio-cultural perspective.

b) Solve the following [4]

- i) Discuss how the attitudes are formed?

P.T.O.

Q4) Solve any four of the following

[10]

- a) Explain the concept of bystander effect with suitable example.
- b) Justify the concept 'social cognition' with an example.
- c) Explain the external determinants of attraction.
- d) Explain in brief the types of schemas.
- e) Why do people join groups?



Total No. of Questions : 4]

SEAT No. :

PE-5176

[Total No. of Pages : 2

[6501]-674

S.Y. B.Sc. (Regular)

SEED TECHNOLOGY

ST-241-MN-T : Morphology and Seed Development

(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) Q. No. 1 is compulsory.
- 2) Solve any three question from Q. 2 to Q.5
- 3) Question 2 to 5 carry equal marks.

Q1) Solve any five of the following [5]

- a) Define natural parthenogenesis
- b) Definition of seed.
- c) What is Genetic Purity?
- d) What is Apogamy?
- e) Define Apomixis
- f) Definition of Polyembryony.

Q2) a) Describe in details stages of seed development [6]

b) What is endosperm? Draw the structure of endosperm [4]

Q3) a) Write morphology of cotton crop w.r.t. stem, leaf, flower, fruit and seed for varietal identification. [6]

b) Comment on types of Apomixis. [4]

Q4) a) What is synthetic seed? Write its concept. [6]

b) What is Anthesis? Give its importance [4]

P.T.O.

Q5) Write short notes on any four of the following

[10]

- a) Seed as a basic input in Agriculture.
- b) Natural Polyembryony.
- c) Seed coat structure.
- d) Embryo abortion in seed
- e) Role of parthenogenesis in Agriculture
- f) Structure of embryo



Total No. of Questions : 5]

SEAT No. :

PE-5177

[Total No. of Pages : 2

[6501]-675

S.Y. B.Sc. (Regular)

SEED TECHNOLOGY

ST-242-MN : Principles of Seed Production

(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) Question No. 1 is compulsory
- 2) Attempt any three questions from Q.2 to Q.5.
- 3) Questions Q.2 to Q.5 Equal marks.
- 4) Draw neat labelled diagram wherever necessary.

Q1) Attempt any five of the following [5]

- a) What is a foundation seed?
- b) What is seed sampling?
- c) Define isolation distance
- d) What is a multi location trial?
- e) What is seed storage?
- f) Define seed treatment

Q2) a) What is seed production? Comment on seed village concept and challenges in seed production. [6]

b) Describe seed quality concept w.r.t. moisture and germination parameters. [4]

Q3) a) What is sowing? Comment on the indirect method of sowing with suitable example. [6]

b) Define irrigation. Comment on the losses due to excess irrigation. [4]

Q4) a) Describe the steps in evaluation for release of a new variety. [6]

b) Comment on precautions during crossing program [4]

P.T.O.

Q5) Write short notes on any four of the following

[10]

- a) Seed cleaning
- b) Seed grading
- c) Containers and packing material
- d) Seed marketing
- e) Importance of soil and water testing



Total No. of Questions : 4]

SEAT No. :

PE-5178

[Total No. of Pages : 3

[6501]-676

S.Y. B.A/B.Sc. (Regular)

STATISTICS

STS-241-MN : Probability Distributions and Demography
(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Figures to the right indicate full marks.
- 3) Use of Scientific calculator and statistical table is allowed.
- 4) Symbols and abbreviations have their usual meanings.

Q1) Attempt each of the following:

[1 each]

a) Choose the correct alternative of the following:

i) If $X \rightarrow \text{Poisson } (m = 3.4)$, then mode of X is _____.

- | | |
|------|----------|
| A) 3 | B) 3 & 4 |
| C) 0 | D) 0.4 |

ii) Which of the following probability distribution possesses lack of memory property?

- | | |
|--------------|------------|
| A) Uniform | B) Normal |
| C) Geometric | D) Poisson |

iii) Population growth mainly depends on _____.

- | | |
|-------------------------|-----------------------|
| A) No. of female births | B) No. of male births |
| C) Total No. of births | D) None of the above |

b) State whether the following statement is True or False:

[1 each]

- i) In Negative Binomial distribution variance $>$ mean.
- ii) Normal distribution is positively skewed.

Q2) Attempt any two of the following:

[5 each]

- a) It is known that only 15% of the applicants for a certain post are suitable for the job. Find the probability that the third person interviewed will be first one who is suitable.

P.T.O.

- b) Verify whether the following function is a p.d.f. of a random variable X.

$$f(x) = \begin{cases} \frac{3}{2}x^2 & ; -1 \leq x \leq 1 \\ 0 & ; \text{otherwise} \end{cases}$$

- c) Define exponential distribution. Also state its mean and variance. Give real life situation where it is applicable.

Q3) Attempt any two of the following:

[5 each]

- a) If $X \rightarrow N(5,9)$ find
- $P(X > 5)$
 - $P(|X| < 4)$
 - $P(X = 6)$
- b) Given the following table calculate G.R.R. and N.R.R.

Age Group	15-19	20-24	25-29	30-34	35-39	40-44	45-49
Female population	18	15	14	14	16	13	12
Female births	540	600	700	560	480	442	300
Survival rate	0.95	0.94	0.93	0.92	0.91	0.90	0.88

- c) Define Poisson distribution. State its mean and variance. Also, state the additive property of Poisson distribution.

Q4) Attempt any one of the following:

[5]

- a) i) Suppose $X \sim U(2,10)$, find
- mean of X
 - variance of X
 - $P(3 < X < 8)$
- ii) Define the following terms:
- C.D.R.
 - C.B.R.
 - Age specific fertility rate
 - Total fertility rate
 - Gross reproduction rate

- b) i) Define m.g.f. and c.g.f. for a continuous r.v. Also state any three properties of m.g.f.
- ii) A factory manufactures electric bulbs, and the probability that a bulb is defective is 0.1. Each bulb is tested on after another.
- 1) What is the probability that the first defective bulb is found on 5th test?
 - 2) Find expected number of defective bulbs.



Total No. of Questions : 4]

SEAT No. :

PE-5179

[Total No. of Pages : 2

[6501]-677

S.Y. B.Sc. (Regular)

ZOOLOGY

ZOO-241-MN : Modern Zoological Techniques &
Instrumentation - I (T)

(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

1) All questions are compulsory.

Q1) Answer any five of the following in one sentence: [5]

- a) Which personal protective equipment should be used during dissection?
- b) What is mean by saline solution?
- c) What does TEM stand for?
- d) What is the use of image analysis software?
- e) Give full form of NMR.
- f) What is chromatography?

Q2) a) Attempt any one of the following: [6]

- i) What is mean by molar solution and normal solution? Explain it with suitable example.
- ii) Write the principle and application of the electron microscope.

b) Attempt any one of the following: [4]

- i) Write a note on the disposal method for biological waste.
- ii) What is agarose gel electrophoresis? Give it's applications.

Q3) a) Solve any one of the following: [6]

- i) What is digital imaging? Give it's applications in biological research.
- ii) Write the principal and applications of UV-visible spectroscopy.

b) Solve any one of the following: [4]

- i) Write a note on Western blotting technique.
- ii) Give applications of DNA fingerprinting.

P.T.O.

Q4) Write notes on (any four):

[10]

- a) Importance of good laboratory practices.
- b) Preparation of buffer.
- c) Principle of colorimeter.
- d) Atomic absorption spectroscopy.
- e) Principle of Gas chromatography.
- f) Mounting of wings of an insect.



Total No. of Questions : 4]

SEAT No. :

PE-5180

[Total No. of Pages : 2

[6501]-678

S.Y. B.Sc. (Regular)

ZOOLOGY

ZOO-242-MN : Amazing of Invertebrates-I (T)

(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

1) All questions are compulsory.

Q1) Answer ANY FIVE of the following in one sentence [5]

- a) Write any one character of class Sporozoa
- b) Give an example of class Demospongiae
- c) Explain the term taxonomy
- d) Give an example of class Trematoda
- e) Write any one character of class Hexactinellida
- f) Which is the locomotory organ of Amoeba?

Q2) a) Attempt ANY ONE of the following [6]

- i) Give an account of binomial nomenclature.
- ii) Explain the process of binary fission in Paramecium

b) Attempt ANY ONE of the following [4]

- i) Give an account of Leuconoid canal system in Porifera.
- ii) Write the general characters of phylum cnidaria

Q3) a) Solve ANY ONE of the following [6]

- i) Write general characters of Phylum Porifera
- ii) Describe in detail morphological adaptations in parasitic flatworms

b) Solve ANY ONE of the following [4]

- i) Explain the role of systematics in evolutionary biology
- ii) Sketch and label external morphology of Paramecium

P.T.O.

Q4) Write notes on (ANY FOUR)

[10]

- a) Coral reef formation in Hydrozoa
- b) Veterinary importance of flatworms
- c) Linnaean hierarchy
- d) General characters of class Cestoda
- e) Sponge skeleton
- f) Economic role of Protozoa



Total No. of Questions : 4]

SEAT No. :

PE3398

[6501]-679

[Total No. of Pages : 1

S.Y. B.Sc.

GEOLOGY

OE-202-GL-T : Introduction to Natural Resources

(NEP 2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Neat diagrams must be drawn wherever necessary.*

Q1) Answer any five of the following in one sentence: **[5]**

- a) Define water as a resource.
- b) What is meant by energy crisis?
- c) Define Floral resources.
- d) Define 'Renewable Energy Resources'.
- e) Enlist the various types of natural resources.
- f) What is the principle behind tidal energy production?

Q2) a) Answer any one of the following: **[6]**

- i) Describe the uses of metallic economically important deposits.
- ii) What are various ways to harness solar energy?

b) Answer any one of the following: **[4]**

- i) Describe faunal resources.
- ii) Explain geothermal energy.

Q3) a) Answer any one of the following: **[6]**

- i) Explain in detail importance, scope and significance of Resources.
- ii) Explain Conservation and development of Natural Resources.

b) Answer any one of the following: **[4]**

- i) Explain Soil Conservation methods.
- ii) Explain Tidal energy.

Q4) Answer any four of the following: **[10]**

- a) Non-renewable resources
- b) Soil as natural resources
- c) Biomass energy
- d) Non-metallic deposits
- e) Various land natural resources
- f) Problems associated with mineral resources.



Total No. of Questions : 4]

SEAT No. :

PE-3399

[Total No. of Pages : 4

[6501]-680

S.Y. B.Com./B.A.

MATHEMATICS

**OE-201-MTS-(A)-T : Mathematics for Competitive Exams
(2024 Pattern) (NEP-2020) (Semester - III) (Open Elective)**

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicate full marks.*

Q1) Attempt any five of the following :

[5]

- a) Given that $268 \times 74 = 19832$, find the value of 2.68×7.4 .
- b) Simplify : $\frac{(6+6+6+6) \div 6}{4+4+4+4 \div 4}$
- c) Find the cube root of 2744.
- d) Simplify : $(27)^{\frac{2}{3}}$
- e) Evaluate : $\log_{34} 34$
- f) Find the loss if C.P. is ₹ 2516 and S.P. is ₹2272.
- g) A canteen requires 105kg of wheat for a week. How many kg of wheat will it require for 50 days?

Q2) a) Attempt any one of the following.

[5]

- i) Describe 'BODMAS' rule.
- ii) Explain the method to find the L.C.M. and H.C.F. of two numbers.

P.T.O.

- b) Attempt any one of the following. [5]
- i) A number when divided by 114, leaves remainder 21. If the same number is divided by 19, find the remainder.
 - ii) The average age of a man and his son is 40 years. The ratio of their ages is 11:5 respectively. Find the son's age.

- Q3) a) Attempt any one of the following : [5]
- i) Define cost price, selling price, gain, loss and percentage gain.
 - ii) Define the terms : ratio, proportion, fourth proportional, third proportional, mean proportional.

- b) Attempt any one of the following : [5]
- i) A invested ₹76000 in a business. After few months, B joined him with ₹57000. At the end of the year, the total profit earned was divided between them in the ratio 2:1. After how many months did B join? Find with proper justification.
 - ii) Find the ratio in which two varieties of pulses costing ₹15 and ₹20 per kg respectively to be mixed so as to get a mixture worth ₹16.50 per kg?

- Q4) a) Attempt any one of the following: [5]
- i) Define the terms : direct proportion and insirect proportion. Give an example of each of direct proportion and indirect proportion.
 - ii) Define the terms 'downstrem' and 'upstream'. Write the formula for speed downstream 'speed upstream' and 'speed in still water'.

- b) Attempt any one of the following : [5]
- i) How many minutes does Aditya take to cover a distance of 400m, if he runs at a speed of 20km/hr. Find with proper justification.
 - ii) A 100m long train is running at the speed of 30km/hr. Find the time taken by it to pass a railway platform of 200 m long.



Total No. of Questions : 4]

PE-3399

[6501]-680

S.Y. B.Com./B.A.

MATHEMATICS

OE-201-MTS-(A)-T : Mathematics for Competitive Exams
(2024 Pattern) (NEP-2020) (Semester - III) (Open Elective)

(मराठी रूपांतर)

वेळ : 2 तास]

[एकूण गुण : 35

- सूचना : 1) सर्व प्रश्न अनिवार्य आहेत.
2) उजवीकडील अंक गुण दर्शवितात.

प्रश्न 1) कोणतेही पाच प्रश्न सोडवा. [5]

- a) जर $268 \times 74 = 19832$ तर 2.68×7.4 ची किंमत काढा.
- b) सोडवा : $\frac{(6+6+6+6) \div 6}{4+4+4+4 \div 4}$
- c) 2744 या संख्येचे घनमूल काढा.
- d) सोडवा : $(27)^{\frac{2}{3}}$
- e) किंमत काढा : $\log_{34} 34$
- f) जर खरेदी किंमत ₹ 2516 आणि विक्री किंमत ₹ 2272 असेल तर तोटा काढा.
- g) एका कॅन्टीनला एका आठवड्यासाठी 105 किलो गेहू लागतो तर 50 दिवसांसाठी किती गहू लागेल ते काढा

प्रश्न 2) अ) कोणताही एक प्रश्न सोडवा. [5]

- i) BODMAS नियम विशद करा.
- ii) दोन संख्यांचा मसावि व लसावि काढण्याची पद्धत स्पष्ट करा.

ब) कोणताही एक प्रश्न सोडवा. [5]

- i) एका संख्येला 114 ने भागले असता बाकी 21 उरते. जर त्याच संख्येला 19 ने भागले तर बाकी किती येईल ते काढा.
- ii) एक पुरुषाचे व त्याच्या मुलाचे सरासरी वय 40 वर्षे आहे. त्यांच्या वयाचे गुणोत्तर अनुक्रमे 11:5 आहे. तर मुलाचे वय शोधा.

प्रश्न 3) अ) कोणताही एक प्रश्न सोडवा. [5]

- i) खरेदी किंमत, विक्री किंमत, नफा, तोटा व शेकडा नफा यांची व्याख्या लिहा.
- ii) गुणोत्तर, प्रमाण, तृतीयानुपाती (तिसरे समानुपातिक), चौथे प्रमाणपद आणि मध्य प्रमाणपद या संज्ञांच्या व्याख्या लिहा.

ब) कोणताही एक प्रश्न सोडवा. [5]

- i) एका व्यवसायात 'अ' ने ₹76000 गुंतवले. काही महिन्यांनंतर 'ब' ने त्याच व्यवसायात ₹57000 गुंतवले. वर्षा अखेरीस मिळालेला एकूण नफा त्यांच्यामध्ये अनुक्रमे 2:1 या प्रमाणात विभागला गेला. तर 'ब' किती महिन्यांनंतर व्यवसायात सामील झाला ते काढा.
- ii) ₹15 आणि ₹20 प्रति किलो किमतीच्या दोन प्रकारच्या डाळी कोणत्या प्रमाणात मिसळले असता ₹16.50 प्रति किलो किमतीचे मिश्रण मिळेल ते काढा.

प्रश्न 4) अ) कोणताही एक प्रश्न सोडवा. [5]

- i) प्रत्यक्ष प्रमाण व अप्रत्यक्ष प्रमाण यांच्या व्याख्या लिहून प्रत्येकाचे एक उदाहरण लिहा.
- ii) 'प्रवाहाच्या दिशेने' व 'प्रवाहाच्या विरुद्ध दिशेने' या संकल्पनांची व्याख्या लिहा. तसेच 'प्रवाहाच्या दिशेने वेग', 'प्रवाहाच्या विरुद्ध दिशेने वेग' आणि 'स्थिर पाण्यातील वेग' काढण्याचे सूत्र लिहा.

ब) कोणताही एक प्रश्न सोडवा. [5]

- i) जर आदित्य ताशी 20 किमी वेगाने धावत असेल तर त्याला 400 मीटर अंतर कापण्यासाठी किती मिनीटे लागतील हे शोधा.
- ii) 100 मीटर लांबीची रेल्वे ताशी 30 किमी वेगाने धावत आहे. तर तीला 200 मीटर लांबीचा रेल्वे प्लॅटफॉर्म ओलांडण्यास किती वेळ लागेल ते काढा.



Total No. of Questions : 4]

SEAT No. :

PE-3400

[Total No. of Pages : 4

[6501]-681

S.Y. B.Sc. (Regular)

MATHEMATICS

OE-201 MTS (B)-T : Mathematics for Social Science - I
(2024 Pattern) (Credit System) (Semester - III) (Open Elective)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Figures to right indicate full marks.

Q1) Attempt any five of the following : [5]

- a) Write any two scopes of statistics.
- b) Define cross sectional data.
- c) Define relative frequency.
- d) Define interval scale and ratio scale.
- e) Calculate the Arithmetic mean of marks scored by a student in 7 subjects given below :
61, 68, 69, 70, 63, 60, 78.
- f) Write one merit and demerit of mode.
- g) Determine mode of the following data :
35, 38, 40, 39, 35, 36, 37

Q2) a) Attempt any one of the following : [5]

- i) Write five scopes of statistics in social science.
- ii) Explain Homogeneous and Heterogeneous population.

b) Attempt any one of the following : [5]

- i) Explain the method of simple random sampling without replacement with an illustration.
- ii) Explain the method of stratified random sampling with an illustration.

P.T.O.

Q3) a) Attempt any one of the following : **[5]**

- i) Distinguish between inclusive and exclusive methods of classification.
- ii) Describe Histogram and frequency polygon.

b) Attempt any one of the following : **[5]**

- i) Draw a frequency curve and frequency polygon for the following data :

Mid Values	25	35	45	55	65
Frequencies	5	12	33	13	7

- ii) Draw less than cumulative frequency curve and more than cumulative frequency curve for the following frequency distribution.

Marks	0-10	10-20	20-30	30-40	40-50
Number of Students	5	12	43	32	8

Q4) a) Attempt any one of the following : **[5]**

- i) Write the characteristics of a good statistical average.
- ii) Write merits and demerits of Arithmetic mean and median.

b) Attempt any one of the following : **[5]**

- i) Compute the first (Q_1), second (Q_2) and third (Q_3) quartiles for the following series of observations

26, 30, 35, 5, 6, 7, 9, 20, 40, 45, 11, 18, 15, 49, 60.

- ii) Define trimmed mean. Determine 20% trimmed mean for a set of 10 values

10, 7, 6, 8, 10, 12, 5, 15, 18, 20



Total No. of Questions : 4]

PE-3400

[6501]-681

S.Y. B.Sc. (Regular)

MATHEMATICS

OE-201 MTS (B)-T : Mathematics for Social Science - I
(2024 Pattern) (Credit System) (Semester - III) (Open Elective)
(मराठी रूपांतर)

वेळ : 2 तास]

[एकूण गुण : 35

- सूचना : 1) सर्व प्रश्न अनिवार्य आहेत.
2) उजवीकडील आकडे पूर्ण गुण दर्शवतात.

-
- प्रश्न 1) खालीलपैकी कोणतेही पाच लिहा : [5]
- अ) सांख्यिकीच्या कोणत्याही दोन कार्य क्षेत्रांचे (scope of statistics) उल्लेख करा.
ब) आंतरविभागीय (cross sectional) माहितीची व्याख्या करा.
क) सापेक्ष वारंवारता (relative frequency) याची व्याख्या करा.
ड) खाली दिलेल्या सात विषयांतील विद्यार्थ्यांच्या गुणांच्या आधारे अंकगणितीय सरासरी (Arithmetic mean) काढा.
61, 68, 69, 70, 63, 60, 78
इ) बहुलकाचे (mode) एक गुण (merit) आणि एक दोष (demerit) लिहा.
फ) खालील आकडेवारीसाठी बहुलक (mode) शोधा.
35, 38, 40, 39, 35, 36, 37
- प्रश्न 2) अ) खालीलपैकी कोणतेही एक लिहा : [5]
- i) सामाजिक शास्त्रामध्ये सांख्यिकीच्या कोणत्याही पाच कार्य क्षेत्रांचे (scopes) स्पष्टीकरण करा.
ii) समाजातीय (Homogeneous) आणि विषमजातीय (Heterogeneous) जनसंख्येचे स्पष्टीकरण करा.
- ब) खालीलपैकी कोणतेही एक लिहा : [5]
- i) परताव्याविना साध्या यादृच्छिक नमुना पद्धतीचे (simple random sampling without replacement) उदाहरणासह स्पष्टीकरण करा.
ii) स्तरीकृत यादृच्छिक नमुना पद्धतीचे (stratified random sampling) उदाहरणासह स्पष्टीकरण करा.

प्रश्न 3) अ) खालीलपैकी कोणतेही एक लिहा : [5]

- समावेशक (inclusive) आणि बहिष्कृत (exclusive) वर्गीकरण पद्धतीतील फरक स्पष्ट करा.
- स्तंभ आलेख (Histogram) आणि वारंवारता बहुभुज (frequency polygon) यांचे वर्णन करा.

ब) खालीलपैकी कोणतेही एक लिहा : [5]

- खालील आकडेवारीसाठी वारंवारता वक्र (frequency curve) आणि वारंवारता बहुभुज (frequency polygon) काढा.

मध्यम मूल्ये	25	35	45	55	65
वारंवारता	5	12	33	13	7

- खालील वारंवारता वितरणासाठी 'कमी पेक्षा' (less than) आणि 'जास्त पेक्षा' (more than) संचयी वारंवारता वक्र (cumulative frequency curve) काढा.

गुण	0-10	10-20	20-30	30-40	40-50
वारंवारता	5	12	43	32	8

प्रश्न 4) अ) खालीलपैकी कोणतेही एक लिहा : [5]

- चांगल्या सांख्यिकीय सरासरीची (statistical average) वैशिष्ट्ये लिहा.
- अंकगणितीय सरासरी (Arithmetic mean) आणि मध्यक (median) यांचे गुण व दोष लिहा.

ब) खालीलपैकी कोणतेही एक लिहा : [5]

- खालील आकडेवारीसाठी पहिला चतुर्थांश (Q_1) (first quartile), दुसरा चतुर्थांश (Q_2) (second quartile) आणि तिसरा चतुर्थांश (Q_3) (third quartile) काढा.
26, 30, 35, 5, 6, 7, 9, 20, 40, 45, 11, 18, 15, 49, 60.

- कपात केलेली सरासरी (trimmed mean) याची व्याख्या करा आणि 10 मूल्यांच्या संचासाठी 20% कपात केलेली सरासरी काढा.

10, 7, 6, 8, 10, 12, 5, 15, 18, 20



Total No. of Questions : 4]

SEAT No. :

PE-3401

[Total No. of Pages : 4

[6501]-682

S.Y. B.A./B.Sc./B.Com.

MATHEMATICS

OE - 201 - MTS (C)T : Commercial Mathematics - I

(2024 Pattern) (Semester - III) (Open Eletive)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Figures to the right indicate full marks.

Q1) Attempt any five of the following : [5]

- a) Define Arithmetic Progression.
- b) Explain one difference between permutation and combination.
- c) Define an Independent Event.
- d) What is conditional probability?
- e) Define sample space.
- f) What is Complementary Event?
- g) Write any two Quadratic Polynomial Equations.

Q2) a) Attempt any one of the following : [5]

- i) Write any two examples of Arithmetic Progression.
- ii) Write the standard form of quadratic Equation.

b) Attempt any one of the following : [5]

- i) What is the degree of the Polynomial $(2x^3 + 5x - 1)$? Hence find at least one root.
- ii) Factorize the polynomial : $(x^2 - 16)$.

Q3) a) Attempt any one of the following : [5]

- i) In how many ways can 3 different books be arranged in a row?
- ii) If there are 3 shirts and 4 pants how many different outfits (one shirt and one pant) are possible?

b) Attempt any one of the following. [5]

- i) How many ways are there to choose 2 fruits from 5 different fruits?
- ii) What is the coefficient of x^3y^2 in the expansion of $(x+y)^5$?

P.T.O.

Q4) a) Attempt any one of the following : [5]

- i) Write the sample space when a die is thrown.
- ii) A bag contains 3 red and 2 blue balls. If two balls are drawn one after the other without replacement, what is the probability that both are red?

b) Attempt any one of the following : [5]

- i) If a card is drawn from a pack of 52 cards, what is the probability that it is a king or a Heart?
- ii) A die is thrown. What is the probability of not getting a 1?



Total No. of Questions : 4]

PE-3401

[6501]-682

S.Y. B.A./B.Sc./B.Com.

MATHEMATICS

OE - 201 - MTS (C)T : Commercial Mathematics - I
(2024 Pattern) (Semester - III) (Open Eletive)
(मराठी रूपांतर)

वेळ : 2 तास]

[एकूण गुण : 35

- सूचना : 1) सर्व प्रश्न अनिवार्य आहेत.
2) उजवीकडील आकडे पूर्ण गुण दर्शवतात.

-
- प्रश्न 1) खालीलपैकी कोणतेही पाच लिहा. [5]
- अ) अंकगणिती श्रेढीची व्याख्या लिहा.
ब) क्रमचय (क्रमपरिवर्तन) आणि संयोजन यातील एक फरक स्पष्ट करा.
क) स्वतंत्र घटनेची व्याख्या द्या.
ड) सप्रतिबंध संभाव्यता म्हणजे काय.
इ) नमुना अवकाशाची व्याख्या द्या.
फ) पूरक घटना म्हणजे काय?
य) कोणतीही दोन वर्ग बहुपदी समीकरणे लिहा.
- प्रश्न 2) अ) खालीलपैकी कोणतेही एक लिहा : [5]
- i) अंकगणिती श्रेढीची कोणतीही दोन उदाहरणे लिहा.
ii) वर्गसमीकरणाचे मानक रूप लिहा.
- ब) खालीलपैकी कोणतेही एक लिहा. [5]
- i) $(2x^3 + 5x - 1)$ या बहुपदीची कोटी किती? तसेच त्याचे किमान एक वर्गमूल काढा.
ii) बहुपदीचे अवयव पाडा : $(x^2 - 16)$
- प्रश्न 3) अ) खालीलपैकी कोणतेही एक लिहा : [5]
- i) 3 वेगवेगळ्या पुस्तकांना एका रांगेत किती प्रकारे मांडता येईल?
ii) जर 3 शर्ट आणि 4 पॅट असतील तर एक शर्ट आणि एक पॅट निवडण्याचे किती संच होऊ शकतात?
- ब) खालीलपैकी कोणतेही एक लिहा : [5]
- i) 5 वेगवेगळ्या फळांपैकी 2 फळे निवडण्याचे किती मार्ग आहेत.
ii) $(x+y)^5$ च्या विस्तारामध्ये x^3y^2 चा सहगुणक किती?

- प्रश्न 4) अ) खालीलपैकी कोणतेही एक लिहा : [5]
- i) एक फासा फेकला असता नमुना अवकाश लिहा.
 - ii) एका पिशवीत 3 लाल आणि 2 निळे चेंडू आहेत. एकाएकी दोन चेंडू काढले असता दोन्ही लाल असण्याची संभाव्यता किती?
- ब) खालीलपैकी कोणतेही एक लिहा : [5]
- i) 52 पत्त्यांच्या कॅटमधून एक पत्ता काढला असता, तो राजा किंवा बदाम असण्याची संभाव्यता किती?
 - ii) फासा फेकला असता 1 न मिळण्याची संभाव्यता किती?



Total No. of Questions : 4]

SEAT No. :

PE-3402

[Total No. of Pages : 4

[6501]-683

S.Y. B.Sc.

BOTANY

OE-201 BOT-I : Crop Science

(NEP) (2024 Pattern) (Semester - III) (Open Elective)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicate full marks.*
- 3) *Draw neat and labelled diagrams wherever necessary.*

Q1) Answer any five of the following in one sentence :

[5]

- a) Define Horticulture.
- b) Give name of any two cash crops.
- c) What is Zaid season?
- d) Define crop science.
- e) Give name of one disease of wheat.
- f) Define fibre crop.

Q2) a) Write any one of the following :

[6]

- i) Explain any two oil seed crops with their uses.
- ii) Explain culture practices, land preparation and sowing time of chick pea.

b) Write any one of the following :

[4]

- i) Describe diseases and pestmanagement of ground nut.
- ii) Describe effects of advanced agricultural technology on crop growth.

P.T.O.

Q3) a) Solve any one of the following : [6]

i) Describe impact of water quality and irrigation practices on crop production.

ii) Explain diseases, pest management, harvesting and storage of Guava.

b) Solve any one of the following : [4]

i) Explain characteristic features of fibre crops.

ii) Explain climatic and soil features of coconut.

Q4) Write notes on (any four) : [10]

a) Fruit crop

b) Varieties of wheat

c) Pulses

d) Impact of genetic factors on crop growth

e) Role of crop science in sustainable agriculture

f) Harvesting of pomegranate



Total No. of Questions : 4]

PE-3402

[6501]-683

S.Y. B.Sc.

BOTANY

OE-201 BOT-I : Crop Science

(NEP) (2024 Pattern) (Semester - III) (Open Elective)

(मराठी रूपांतर)

वेळ : 2 तास]

[एकूण गुण : 35

- सूचना : 1) सर्व प्रश्न अनिवार्य आहे.
2) उजव्या बाजूचे अंक गुण दर्शवितात.
3) आवश्यकतेनुसार नावासह आकृती काढा.
-

प्रश्न 1) खालीलपैकी कोणतेही पाच उत्तरे एका वाक्यात द्या : [5]

- अ) फलोत्पादन (Horticulture) व्याख्या लिहा.
- ब) दोन नगदी पिकांची नावे लिहा.
- क) जायद हंगाम म्हणजे काय?
- ड) पिकाशास्त्राची व्याख्या लिहा.
- इ) गहु पिकावरील एका रोगाचे नाव.
- फ) तंतुपिके म्हणजे काय?

प्रश्न 2) अ) खालीलपैकी कोणतेही एक लिहा : [6]

- i) कोणत्याही दोन तेलबिया पिकांची नावे व उपयोग स्पष्ट करा.
- ii) हरभरा पिकाचे लागवड पद्धती, जमीन तयार करणे व पेरणीची वेळ वर्णन करा.

ब) खालीलपैकी कोणतेही एक लिहा : [4]

- i) भुईमुग पिकाचे रोग व कीड व्यवस्थापन स्पष्ट करा.
- ii) पिकांच्या वाढीवर प्रगत कृषी तंत्रज्ञानाचा परिणाम वर्णन करा.

- प्रश्न 3) अ) खालीलपैकी कोणतेही एक लिहा : [6]
- i) पाण्याची गुणवत्ता व सिंचन पद्धती याचा पिक उत्पादनावर होणारा परिणाम वर्णन करा.
 - ii) पेरु पिकाचे रोग व कीड व्यवस्थापन स्पष्ट करा.
- ब) खालीलपैकी कोणतेही एक लिहा : [4]
- i) तंतुपिकांचे वैशिष्ट्यपूर्ण गुणधर्म वर्णन करा.
 - ii) नारळाचे हवामान व जमीन घटक वर्णन करा.

- प्रश्न 4) टिपा लिहा (कोणतेही चार) : [10]
- अ) फळ पिके
 - ब) गव्हाच्या जाती
 - क) डाळी
 - ड) अनुवंशिक घटकांचा पिक वाढीवर होणारा परिणाम
 - इ) शाश्वत शेतीत पिक शास्त्राची भूमिका
 - फ) डांळिबाची काढणी



Total No. of Questions : 4]

SEAT No. :

PE-3403

[Total No. of Pages : 4

[6501]-684

S.Y. B.Sc.

BOTANY

OE - 202 - BOT - T : Medicinal Botany

(2024 Pattern) (Semester - III) (Open Elective)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Figures to the right indicate full marks.
- 3) Draw neat labelled diagrams wherever necessary.

Q1) Answer any five of the following in one sentence. [5]

- a) What is Binomial nomenclature?
- b) Define Panchmahabhutas.
- c) Name any two Kitchen based herbal formulations.
- d) Define hypertension.
- e) What is triphala powder?
- f) What is biological pest control?

Q2) a) Write any one of the following : [6]

- i) What is traditional systems of medicine? Explain with a suitable examples.
- ii) What is Panchkarma? Explain the theories of body detoxification.

b) Write any one of the following : [4]

- i) Explain chemical constituents of medicinal plants.
- ii) Explain homeopathy system of medicine.

Q3) a) Solve any one of the following : [6]

- i) Explain the preparation of hair oil. Write it's uses.
- ii) Explain the in-situ conservation of medicinal plants.

b) Solve any one of the following. [4]

- i) Explain different ways to procure unadultrated medicinal plants.
- ii) What are the entrepreneurial opportunities for the sell of herbal products?

P.T.O.

Q4) Write notes on (Any four)

[10]

- a) Health and nutrition.
- b) Concept of Dhatu (Saptadhatu)
- c) Kitchen Ayurveda.
- d) Herbal shampoo.
- e) Biodiversity Parks.
- f) Conservation of medicinal plants.



Total No. of Questions : 4]

PE-3403

[6501]-684

S.Y. B.Sc.

BOTANY

OE - 202 - BOT - T : Medicinal Botany
(2024 Pattern) (Semester - III) (Open Elective)
(मराठी रूपांतर)

वेळ : 2 तास]

[एकूण गुण : 35

- सूचना : 1) सर्व प्रश्न अनिवार्य आहे.
2) उजव्या बाजूचे अंक गुण दर्शवितात.
3) आवश्यकतेनुसार नावासह आकृत्या काढा.

-
- प्रश्न 1) खालीलपैकी कोणतेही पाच उत्तरे एका वाक्यात द्या. [5]
अ) शास्त्रीय नामकरण (Binomial nomenclature) म्हणजे काय?
ब) पंचमहाभूत व्याख्या लिहा.
क) स्वयंपाकघरातील दोन औषधांचे नावे द्या.
ड) उच्च रक्तदाब म्हणजे काय?
इ) त्रिफळा चुर्ण व्याख्या लिहा.
फ) जैविक कीड नियंत्रण म्हणजे काय?
- प्रश्न 2) अ) खालीलपैकी कोणतेही एक लिहा. [6]
i) पारंपारिक औषधी पद्धती म्हणजे काय? उदाहरणासह स्पष्ट करा.
ii) पंचकर्म म्हणजे काय? शरीरशुद्धी च्या उपचार पद्धती लिहा.
ब) खालीलपैकी कोणतेही एक लिहा. [4]
i) औषधी वनस्पतीमधील रासायनिक घटक स्पष्ट करा.
ii) होमिओपॅथी औषधी पद्धती विशद करा.
- प्रश्न 3) अ) खालीलपैकी कोणतेही एक लिहा. [6]
i) केशतेल बनविण्याची कृती व उपयोग लिहा.
ii) औषधी वनस्पतींचे नैसर्गिक अधिवासातील (In-situ) संवर्धन स्पष्ट करा.
ब) खालीलपैकी कोणतेही एक लिहा. [4]
i) भेसळमुक्त औषधी वनस्पती मिळविण्याचे विविध मार्ग लिहा.
ii) औषधी उत्पादने विक्रीसाठी व्यावसायिक संधी स्पष्ट करा.

प्रश्न 4) टिपा लिहा. (कोणत्याही चार)

[10]

- अ) आरोग्य व पोषण
- ब) धातु संकल्पना (सप्तधातु)
- क) स्वयंपाकघरातील (Kitchen) आयुर्वेद
- ड) हर्बल शाम्पू
- इ) जैवविविधता उद्यान
- फ) औषधी वनस्पतीचे संवर्धन



Total No. of Questions : 4]

SEAT No. :

PE3404

[Total No. of Pages : 4

[6501]-685

S.Y. B.Sc./B.A./B.Com. (Regular)

ELECTRONICS SCIENCE

**OE-201-ELS-T : Fundamentals of Information Technology
(NEP 2024 Pattern) (Semester - III) (Open Elective)**

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicates full marks.*

Q1) Answer the following (any five) [5]

- a) What is microsoft excel?
- b) What is digital right?
- c) What is role of IT in modern education?
- d) Write full form of AI.
- e) What is use of digilocker?
- f) Give one example of LMS platform.
- g) Write one advantage of Digital Banking.

Q2) a) Answer the following (any two). [6]

- i) List features of MS-Excel.
- ii) Write applications of AI in detail.
- iii) Explain the use of IT in banking.

b) Answer the following (any one). [4]

- i) What is google meet? Write its key features and benefits.
- ii) Explain important steps to use MS-Word document.

P.T.O.

Q3) a) Answer the following (any two). **[6]**

- i) Explain digital responsibilities.
- ii) List features of microsoft power point.
- iii) Explain the use of IT in healthcare.

b) Answer the following (any one). **[4]**

- i) What are advantages and disadvantages of social media applications in daily life.
- ii) What is zoom? Write its key features and benefits.

Q4) Write short notes (any four). **[10]**

- a) MOOCs platforms
- b) IoT
- c) Antivirus
- d) Cyber security
- e) Umang
- f) Cloud Computing



Total No. of Questions : 4]

PE3404

[6501]-685

S.Y. B.Sc./B.A./B.Com. (Regular)

ELECTRONICS SCIENCE

OE-201-ELS-T : Fundamentals of Information Technology

(NEP 2024 Pattern) (Semester - III) (Open Elective)

(मराठी रूपांतर)

वेळ : 2 तास]

[एकूण गुण : 35

- सूचना :- 1) सर्व प्रश्न सोडविणे आवश्यक आहेत.
2) उजवीकडील अंक प्रश्नांचे पूर्ण गुण दर्शवितात.

प्र.1) खालील प्रश्नांची उत्तरे लिहा. (कोणतेही 5)

[5]

- अ) मायक्रोसॉफ्ट एक्सेल म्हणजे काय?
- ब) डिजिटल हक्क म्हणजे काय?
- क) आधुनिक शिक्षणात माहिती तंत्रज्ञानाची (IT) भूमिका काय आहे?
- ड) AI चे पूर्ण रूप लिहा.
- इ) डिजिटल लॉकरचा उपयोग काय आहे?
- फ) LMS प्लॅटफॉर्मचे एक उदाहरण द्या.
- य) डिजिटल बँकिंगचा एक फायदा लिहा.

प्र.2) अ) खालील प्रश्नांची उत्तरे लिहा. (कोणतेही 2)

[6]

- i) MS-Excel ची वैशिष्ट्ये लिहा.
- ii) कृत्रिम बुद्धिमत्तेचे (AI) उपयोग सविस्तर लिहा.
- iii) बँकिंग क्षेत्रात (IT) चा वापर लिहा.

ब) खालील प्रश्नांची उत्तरे लिहा. (कोणतेही 1)

[4]

- i) Google Meet म्हणजे काय? त्याची मुख्य वैशिष्ट्ये व फायदे लिहा.
- ii) MS-Word डॉक्युमेंट वापरण्याचे महत्वाच्या पायऱ्या लिहा.

प्र.3) अ) खालील प्रश्नांची उत्तरे लिहा. (कोणतेही 2)

[6]

- i) डिजिटल जबाबदाऱ्या सांगा.
- ii) मायक्रोसॉफ्ट पॉवर पॉइंटची वैशिष्ट्ये लिहा.
- iii) आरोग्य सेवेत (Healthcare) IT चा कशा प्रकारे वापर करतात ते लिहा?

ब) खालील प्रश्नांची उत्तरे लिहा. (कोणतेही 1)

[4]

- i) दैनंदिन जीवनातील सोशल मेडिया ॲप्लिकेशनचे फायदे आणि तोटे लिहा.
- ii) Zoom काय आहे? त्याची मुख्य वैशिष्ट्ये व फायदे लिहा.

प्र.4) टिपा लिहा. (कोणतेही 4)

[10]

- अ) MOOCs platforms
- ब) इंटरनेट ऑफ थिंग (IoT)
- क) अँटीव्हायरस
- ड) सायबर सुरक्षा (Cyber security)
- इ) उमंग
- फ) क्लाउड कंप्युटिंग (Cloud computing)



Total No. of Questions : 4]

SEAT No. :

PE3405

[Total No. of Pages : 4

[6501]-686

S.Y. B.Sc.

ENVIRONMENTAL SCIENCE

OE - 201-EVS-T : Natural Calamities

(2024 Pattern) (Semester - III)(Open Elective)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicate full marks.*

Q1) Answer any five of the following in one sentence. [5]

- a) What is mean by geological natural calamities?
- b) Write any two names of techniques used for hazard mapping and monitoring.
- c) What is sustainable urban planning?
- d) What are the psychological aspects of recovery?
- e) What are the international policies for disaster management frameworks?
- f) What does equity means in disaster management?

Q2) a) Write any one of the following. [6]

- i) Describe how climate change contributes to the increased frequency and intensity of natural disasters.
- ii) Write anthropogenic causes and impacts of natural calamities on human life and infrastructure.

b) Write any one of the following. [4]

- i) Explain the methods used to assess risk and vulnerability in various regions.
- ii) Write the role of infrastructure development in minimizing the impact of natural disasters.

P.T.O.

Q3) a) Solve any one of the following. **[6]**

- i) Discuss the major steps involved in post disaster reconstruction and rehabilitation.
- ii) Differentiate between structural and non structural mitigation measures with examples.

b) Solve any one of the following. **[4]**

- i) Write information on recent innovations in disaster prediction.
- ii) Explain how GIS is used in hazard mapping and disaster management.

Q4) Write notes on (any four). **[10]**

- a) Risk and vulnerability
- b) Hurricane
- c) Types of natural calamities
- d) Early warning system
- e) Disaster financing
- f) Sendai framework



Total No. of Questions : 4]

PE3405

[6501]-686

S.Y. B.Sc.

ENVIRONMENTAL SCIENCE

OE - 201-EVS-T : Natural Calamities

(2024 Pattern) (Semester - III)(Open Elective)

(मराठी रूपांतर)

वेळ : 2 तास]

[एकूण गुण : 35

- सूचना :- 1) सर्व प्रश्न सोडविणे आवश्यक आहेत.
2) उजवीकडील अंक प्रश्नांचे पूर्ण गुण दर्शवितात.

प्र.1) खालीलपैकी कोणत्याही पाच प्रश्नांची एका वाक्यात उत्तरे लिहा.

[5]

- अ) भूगर्भीय नैसर्गिक आपत्ती म्हणजे काय?
- ब) धोका नकाशा आणि देखरेखीसाठी वापरल्या जाणाऱ्या कोणत्याही दोन तंत्रांची नावे लिहा?
- क) शाश्वत शहरी नियोजन कसे असते?
- ड) पुनर्प्राप्तीचे मानसिक पैलू कोणते आहेत?
- इ) आपत्ती व्यवस्थापन आराखड्यासाठी आंतरराष्ट्रीय धोरणे काय आहेत?
- फ) आपत्ती व्यवस्थापनामध्ये समानतेचा काय अर्थ होतो?

प्र.2) अ) खालीलपैकी कोणत्याही एका प्रश्नाचे उत्तर लिहा.

[6]

- i) हवामान बदलामुळे नैसर्गिक आपत्तींची वारंवारता आणि तीव्रता कशी वाढते याचे वर्णन करा?
- ii) नैसर्गिक आपत्तींची मानवनिर्मित कारणे आणि त्यांचे मानवी जीवन व पायाभूत सुविधांवर होणारे परिणाम लिहा.

ब) खालीलपैकी कोणत्याही एका प्रश्नाचे उत्तर लिहा.

[4]

- i) विविध प्रदेशांतील धोका आणि असुरक्षितता यांचे मुल्यांकन करण्यासाठी वापरल्या जाणाऱ्या पद्धती स्पष्ट करा.
- ii) नैसर्गिक आपत्तींचा परिणाम कमी करण्यात पायाभूत सुविधांच्या विकासाची भूमिका लिहा.

प्र.3) अ) खालीलपैकी कोणताही एक प्रश्न सोडवा. [6]

- i) आपत्ती नंतरच्या पुनर्बांधणी आणि पुनर्वसनातील प्रमुख पायऱ्यांवर चर्चा करा.
- ii) संरचनात्मक आणि गैर संरचनात्मक शमन उपायांमधील फरक उदाहरणांसह लिहा.

ब) खालीलपैकी कोणताही एक प्रश्न सोडवा. [4]

- i) आपत्तीच्या भाकितातील अलीकडील नवकल्पनांची किंवा शोधांची माहिती लिहा.
- ii) धोक्याची रचना (मॅपिंग) आणि आपत्ती व्यवस्थापनात जी आय एस कसे वापरले जाते ते स्पष्ट करा?

प्र.4) टिपा लिहा. (कोणतेही चार) [10]

- अ) धोका आणि असुरक्षितता
- ब) चक्रीवादळ
- क) नैसर्गिक आपत्तींचे प्रकार
- ड) पुर्व चेतावनी प्रणाली
- इ) आपत्ती वित्त-पुर्ववठा
- फ) सॅंडाई फ्रेमवर्क



Total No. of Questions : 4]

SEAT No. :

PE3406

[Total No. of Pages : 4

[6501]-687

S.Y. B.Sc. (O.E.)

ENVIRONMENTAL SCIENCE

OE - 202 - EVS-T : Ecotourism

(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Use of scientific calculator and log table is allowed where applicable.*
- 3) *Figures to the right indicates full marks.*
- 4) *Illustrate your answers with neat diagrams wherever necessary.*

Q1) Answer any FIVE of the following in one sentence.

[5]

- a) What is the full form of UNWTO?
- b) Give one Benefits of Ecotourism for local people.
- c) What is agro - tourism?
- d) Name any one failed ecotourism project.
- e) What is wellness tourism?
- f) Give one use of AI in modern tourism.

Q2) a) Write any one of the following.

[6]

- i) Write six they key differences between ecotourism and mass tourism.
- ii) Explain Bhuton's "High Value, Low Volume" tourism policy.

b) Write any one of the following.

[4]

- i) What is destination branding in Ecotourism?
- ii) Give two challenges of ecotourism.

P.T.O.

Q3) a) Write any ONE of the following. **[6]**

- i) Explain how ecotourism protects indigenous cultures.
- ii) Describe the role of waste management in sustainable tourism.

b) Write any ONE of the following. **[4]**

- i) What is virtual tour? Give one advantage.
- ii) Give two lessons from costa rica's ecotourism success.

Q4) Write notes on (any four). **[10]**

- a) Bishnoi community and black buck protection.
- b) Worship of rivers (Ganga, Yamuna)
- c) Tulsi and peepal - Sacred plants.
- d) Troditional seed banks.
- e) Eco - Friendly practices during holi.
- f) Indian philosophy of "Live in Harmony with nature".



Total No. of Questions : 4]

PE3406

[6501]-687

S.Y. B.Sc.(O.E.)

ENVIRONMENTAL SCIENCE

OE - 202 - EVS-T : Ecotourism

(2024 Pattern) (Semester - III)

(मराठी रूपांतर)

वेळ : 2 तास]

[एकूण गुण : 35

- सूचना :-
- 1) सर्व प्रश्न सोडविणे आवश्यक आहेत.
 - 2) उजवीकडील अंक प्रश्नांचे पूर्ण गुण दर्शवितात.
 - 3) जेथे लागू असेल तेथे वैज्ञानिक कॅल्क्युलेटर आणि लॉग टेबल वापरण्यास परवानगी आहे.
 - 4) आवश्यक तेथे सुबक आकृत्यांसह तुमचे उत्तर स्पष्ट करा.

प्र.1) खालीलपैकी कोणत्याही 5 प्रश्नांची उत्तरे एका वाक्यात लिहा.

[5]

- अ) UNWTO चा पूर्ण रूप काय आहे?
- ब) स्थानिक लोकांसाठी इकोटुरिझम चा एक फायदा द्या.
- क) कृषी पर्यटन म्हणजे काय?
- ड) अपयशी इकोटुरिझम प्रकल्पाचे कोणतेही एक नाव द्या.
- इ) कल्याण पर्यटन म्हणजे काय?
- फ) आधुनिक पर्यटनातील AI चा एक उपयोग द्या.

प्र.2) अ) खालीलपैकी कोणतेही एक लिहा.

[6]

- i) इकोटुरिझम आणि मास टुरिझम यातील सहा फरक लिहा.
- ii) भूतानची “हाय व्हॅल्यू, लो व्हॉल्यूम” पर्यटन धोरण स्पष्ट करा.

ब) खालीलपैकी कोणतेही एक लिहा.

[4]

- i) इकोटुरिझमधील गंतव्य ब्रँडिंग म्हणजे काय?
- ii) इकोटुरिझमची दोन आव्हाने द्या.

प्र.3) अ) खालीलपैकी कोणतेही एक लिहा.

[6]

- i) इकोटुरिझम आदिवासी संस्कृतींचे संरक्षण कसे करते ते स्पष्ट करा?
- ii) शाश्वत पर्यटनातील कचरा व्यवस्थापनाची भूमिका वर्णन करा.

ब) खालीलपैकी कोणतेही एक लिहा.

[4]

- i) व्हर्चुअल टूर म्हणजे काय? एक फायदा द्या.
- ii) कोस्टा रिकाच्या इकोटुरिझम यशातील दोन धडे द्या.

प्र.4) टिपा लिहा. (कोणतेही 4)

[10]

- अ) बिश्नोई समुदाय आणि काळवीट संरक्षण
- ब) नद्यांची पुजा (गंगा, यमुना)
- क) तुळस आणि पिंपळ – पवित्र वनस्पती
- ड) पारंपारिक बियाणे बँका
- इ) होळी दरम्यान पर्यावरणपूरक पद्धती
- फ) भारतीय तत्वज्ञान, निसर्गासोबत सुसंवादाने जगणे



Total No. of Questions : 4]

SEAT No. :

PE3407

[Total No. of Pages : 2

[6501]-688

S.Y.B.Sc. (H.S)

OE-201-HS-T : FOOD HYGIENE & SAFETY

(2024 Pattern) (Semester - III)(Open Elective)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Draw diagram where applicable.*

Q1) Define the following (any 5 of 7).

[5×1=5]

- a) HACCP
- b) Food spoilage
- c) PH definition
- d) Five extinguisher
- e) AGMARK - Abhricrate
- f) FSMA
- g) Salting

Q2) a) Answer the following.

[2×3=6]

- i) Explain physical chemical and microbial spoilage of food.
- ii) Describe any three types of food preservation methods.

b) Answer the following.

[2×2=4]

- i) State the principles of HACCP.
- ii) Difference between food safety & food hygiene.

P.T.O.

Q3) a) Answer the following. **[2×3=6]**

- i) Mention causes of kitchen fires.
- ii) What is cross - contamination. Explain.

b) Answer the following. **[2×2=4]**

- i) Write the main components of MACCP.
- ii) Write importance of food preservation.

Q4) Write short notes on following (any 4 of 6). **[4×2.5=10]**

- a) Food safety laws in India name only.
- b) Types of fire extinguishers used in hotels.
- c) Pest control methods.
- d) Types of micro - organisms.
- e) Global food safety initiative (GFSI) Explain.
- f) ISO - 22000 Explain.



Total No. of Questions : 4]

SEAT No. :

PE3408

[Total No. of Pages : 2

[6501]-689

S.Y.B.Sc. (H.S)

OE-202-HS-T : MICE MANAGEMENT

(2024 Pattern) (Semester - III)(Open Elective)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicate full marks.*

Q1) Define the following terms (any 5 of 7).

[5×1=5]

- a) Conference
- b) Event Sponsorship
- c) Logistics
- d) Audience Management
- e) Green Events
- f) Zoho
- g) SMERF

Q2) a) Answer the following.

[2×3=6]

- i) What are the types of MICE?
- ii) Explain the importance of budgeting & financial planning in MICE.

b) Answer the following.

[2×2=4]

- i) List any four audiovisual equipments in MICE events.
- ii) Describe any four points considered for venue selection.

P.T.O.

Q3) a) Answer the following. **[2×3=6]**

- i) Explain the positive impacts of MICE on environment.
- ii) Describe the mobile applications used in event planning.

b) Answer the following. **[2×2=4]**

- i) What is the importance of MICE Tourism?
- ii) What are the sustainable event practices?

Q4) Write short note on following (any 4 of 6). **[4×2½=10]**

- a) Use of AI in event planning & promotion.
- b) Government compliances in MICE.
- c) Virtual & Hybrid events.
- d) Event management softwares
- e) Event promotion
- f) MICE packages



Total No. of Questions : 4]

SEAT No. :

PE3409

[Total No. of Pages : 4

[6501]-690

S.Y. B.Sc./B.A./B.Com./B.B.A.

ZOOLOGY

**OE - 201 - ZOO - T : Sericulture Practices and Management (T)
(NEP - 2020) (2024 Pattern) (Semester - III) (OE-2)**

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) All questions are compulsory.*
- 2) Figures to the right indicates full marks.*

Q1) Answer any five of the following in one sentence. [5]

- a) Write scientific name of tassar silkworm.
- b) What is univoltine?
- c) Write name of protozoan disease in silkworm.
- d) Define moriculture.
- e) Define mounting.
- f) Define reeling.

Q2) a) Attempt any one of the following. [6]

- i) Describe the factors responsible for mulberry cultivation.
- ii) Describe life cycle of Bombyx mori.

b) Attempt any one of the following. [4]

- i) Describe muga silkworm.
- ii) Give economics of mulberry cultivation.

P.T.O.

Q3) a) Solve any one of the following. **[6]**

- i) Describe in detail post harvesting processes of cocoons.
- ii) Give an account of any two rearing appliances used in sericulture.

b) Solve any one of the following. **[4]**

- i) Describe any one silkworm disease.
- ii) Describe sericulture as a handloom and powerloom activities.

Q4) Write notes on (any four). **[10]**

- a) Eri silkmoth.
- b) Economics of silk production
- c) Raw silk yarn
- d) Reeling equipments
- e) Rearing house
- f) Young age worm rearing



Total No. of Questions : 4]

PE3409

[6501]-690

S.Y. B.Sc./B.A./B.Com./B.B.A.

ZOOLOGY

OE - 201 - ZOO - T : Sericulture Practices and Management (T)
(NEP - 2020) (2024 Pattern) (Semester - III) (OE-2)

(मराठी रूपांतर)

वेळ : 2 तास]

[एकूण गुण : 35

- सूचना :- 1) सर्व प्रश्न सोडविणे आवश्यक आहेत.
2) उजवीकडील अंक प्रश्नांचे पूर्ण गुण दर्शवितात.

प्र.1) खालीलपैकी कोणत्याही पाच प्रश्नांची एका वाक्यात उत्तरे लिहा.

[5]

- अ) टसर रेशीम पतंगाचे शास्त्रीय नाव लिहा.
- ब) युनिवोल्टाईन (univoltine) व्याख्या लिहा.
- क) रेशीमकिड्यामधील एकपेशीय (prozoan) रोगाचे नाव लिहा.
- ड) मोरीकल्चर (moriculture) म्हणजे काय?
- इ) आरोहण (mounting) म्हणजे काय?
- फ) ओवणी प्रक्रिया (Reeling) व्याख्या लिहा.

प्र.2) अ) खालीलपैकी कोणताही एक प्रश्न सोडवा.

[6]

- i) तुती शेतीवर परीणाम करणारे घटकांचे वर्णन करा.
- ii) तुती रेशीम किड्याचे जीवनचक्र वर्णन करा.

ब) खालीलपैकी कोणताही एक प्रश्न सोडवा.

[4]

- i) मुगा रेशीम किड्याचे वर्णन करा. (Muga silkmoth)
- ii) तुती शेतीचे आर्थिक महत्त्व स्पष्ट करा.

प्र.3) अ) खालीलपैकी कोणताही एक प्रश्न सोडवा. [6]

- i) कोष काढणीनंतरच्या प्रक्रियेचे सविस्तर वर्णन करा.
- ii) रेशीम शेतीमध्ये वापरले जाणारे कोणत्याही दोन उपकरणांचे वर्णन करा.

ब) खालीलपैकी कोणताही एक प्रश्न सोडवा. [4]

- i) रेशीम किड्यांच्या कोणत्याही एका रोगाचे वर्णन करा.
- ii) रेशीम शेती ही हातमाग (Handloom) आणि पॉवरलूम (powerloom) उद्योगाशी संबंधित क्रिया आहे म्हणून स्पष्ट करा.

प्र.4) खालीलपैकी कोणत्याही चार विषयांवर लघु निबंध लिहा. [10]

- अ) एरी रेशीमपतंग (Eri silkmoth)
- ब) रेशीम उत्पादनाचे आर्थिक महत्त्व (Economics of silk production)
- क) कच्चा रेशीम दोरा (Raw silk yarn)
- ड) ओवणीची उपकरणे (Reeling equipments)
- इ) पालनगृह (Rearing House)
- फ) लहान अवस्थेतील किड्यांचे पालन (young age worm Rearing)



Total No. of Questions : 4]

SEAT No. :

PE3410

[Total No. of Pages : 4

[6501]-691

S.Y. B.Sc./B.A./B.Com./B.B.A. (Regular)

ZOOLOGY

**OE - 202 - ZOO - T : Pearl Culture and Management
(2024 Pattern) (Semester - III) (Open Elective)**

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) All questions are compulsory.*
- 2) Figures to the right indicates full marks.*

Q1) Answer any five of the following in one sentence.

[5]

- a) What is pearl culture?
- b) What is natural pearl?
- c) What is nucleus implantation?
- d) What is tissue grafting?
- e) What is pearl marketing?
- f) Mention any one benefit of pearl farming.

Q2) a) Attempt any one of the following.

[6]

- i) Describe the process of pearl formation.
- ii) Describe the process of harvesting of pearls.

b) Attempt any one of the following.

[4]

- i) Give the chemical composition of pearl.
- ii) Explain the process of MBBE.

P.T.O.

Q3) a) Solve any one of the following. **[6]**

- i) Describe the recent trends in freshwater pearl farming.
- ii) Give physical properties of pearl.

b) Solve any one of the following. **[4]**

- i) Describe various types of pearl oysters.
- ii) Describe income and expenditure of pearl culture.

Q4) Write notes on (any four). **[10]**

- a) Importance of pearls.
- b) Factors influencing the secretion of nacre.
- c) Uses of pearls.
- d) Water quality management in pearl farming.
- e) Scientific classification of pearls oyster.
- f) Pearl Farming regions in India.



Total No. of Questions : 4]

PE3410

[6501]-691

S.Y. B.Sc./B.A./B.Com./B.B.A. (Regular)

ZOOLOGY

**OE - 202 - ZOO - T : Pearl Culture and Management
(2024 Pattern) (Semester - III) (Open Elective)**

(मराठी रूपांतर)

वेळ : 2 तास]

[एकूण गुण : 35

- सूचना :- 1) सर्व प्रश्न सोडविणे आवश्यक आहेत.
2) उजवीकडील अंक प्रश्नांचे पूर्ण गुण दर्शवितात.
-

प्र.1) खालीलपैकी कोणत्याही पाच प्रश्नांची उत्तरे एका वाक्यात लिहा.

[5]

- अ) मोती पालन म्हणजे काय?
- ब) नैसर्गिक मोती म्हणजे काय?
- क) न्युक्लीयस इम्प्लांटेशन म्हणजे काय?
- ड) टिश्यू ग्राफ्टिंग म्हणजे काय?
- इ) मोत्यांचे विपनन म्हणजे काय?
- फ) मोती शेतीचा एक फायदा लिहा.

प्र.2) अ) खालीलपैकी कोणत्याही एका प्रश्नाचे उत्तर लिहा.

[6]

- i) मोती तयार होण्याची प्रक्रिया लिहा.
- ii) मोती काढण्याची प्रक्रिया विषद करा.

ब) खालीलपैकी कोणत्याही एका प्रश्नाचे उत्तर लिहा.

[4]

- i) मोत्यामधील रासायनिक घटक लिहा.
- ii) M.B.B.E. प्रक्रिया विषद करा.

प्र.3) अ) खालीलपैकी कोणताही एक प्रश्न सोडवा. [6]

- i) गोड्या पाण्यातील मोती संवर्धनातील नवीन घडामोडी (बदल) विषद करा.
- ii) मोत्याचे भौतिक गुणधर्म लिहा.

ब) खालीलपैकी कोणताही एक प्रश्न सोडवा. [4]

- i) मोती शिंपल्याचे विविध प्रकार विषद करा.
- ii) मोती शेतीतील उत्पन्न खर्च विषद करा.

प्र.4) खालीलपैकी कोणत्याही चार टिपा लिहा. [10]

- अ) मोत्याचे महत्त्व
- ब) नॅकरे स्त्रवणावर परीणाम करणारे घटक
- क) मोत्याचे उपयोग
- ड) मोती शेतीतील पाण्याच्या गुणवत्तेचे व्यवस्थापन
- इ) मोती शिंपल्याचे शास्त्रीय वर्गीकरण
- फ) भारतातील मोती उत्पादन क्षेत्रे



Total No. of Questions : 4]

SEAT No. :

PE3411

[6501]-692

[Total No. of Pages : 2

S.Y.B.Sc. (Animation)(O.E.)

OE-201-ANM-T : DESIGNING & VIDEO ANIMATION

FOR SOCIAL MEDIA

(NEP 2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 30

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicate full marks.*

Q1) Answer any six of the following. (Any 6)

[6×1=6]

- a) Define Motion Graphics.
- b) List any three design software.
- c) What dose SVG stand for?
- d) Define brand colour.
- e) Mention one key element of design.
- f) What is the purpose of social design?
- g) Write one principle of typography.
- h) What is the main use of After Effects?

Q2) Attempt any four of the following. (Any 4)

[4×2=8]

- a) Explain Balance & contrast as elements of design.
- b) Describe the use of Adobe photoshop in design.
- c) Explain the term “Brand Style Guide”.
- d) Differentiate between Static Design & Motion Graphics.
- e) Write short note on “Exporting for different social media platforms”.

P.T.O.

Q3) Attempt any two of the following. (Any 2)

[2×4=8]

- a) Explain the 07 elements of design with suitable examples.
- b) Describe the importance of typography in brand communication.
- c) Discuss types of colour schemes & their uses in design.

Q4) Attempt any two of the following. (Any 2)

[2×4=8]

- a) Explain the steps involved in creating branded Assets.
- b) Discuss the process of creating a social media design from planning to publishing.
- c) Write a detailed note on the role of motion graphics in digital media.



Total No. of Questions : 3]

SEAT No. :

PE3412

[Total No. of Pages : 2

[6501]-693

S.Y.B.Sc. (Regular)

GEOGRAPHY

**OE-201-GEO (S)-T : Geography of Soil
(2024 Pattern) (Semester - III) (O.E.)**

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *Attempt all Questions.*
- 2) *Figures to the right indicate full marks.*
- 3) *Draw neat diagrams wherever necessary.*
- 4) *Use of map stencils is allowed.*

Q1) Answer the following questions in 20 words each (Any five) [10]

- a) Define Soil Geography.
- b) Soil geography is a sub-branch of which geography.
- c) What is the pH value of neutral soil?
- d) What effect does over irrigation have on the soil?
- e) What is soil degradation?
- f) What is soil profile?
- g) Which soil is suitable for cotton cultivation in India?

Q2) Answer the following questions in 80 words each (Any two) [10]

- a) Laterite soil
- b) Impact of deforestation on soil
- c) Soil erosion

Q3) Answer the following questions in 100 words each (Any two) [15]

- a) Explain the scope of soil geography.
- b) Explain types of soil degradation.
- c) Write the factors of soil formation.

* * *

P.T.O.

Total No. of Questions : 3]

PE3412

[6501]-693

S.Y.B.Sc. (Regular)

GEOGRAPHY

OE-201-GEO (S)-T : Geography of Soil
(2024 Pattern) (Semester - III) (O.E.)

(मराठी रूपांतर)

वेळ : 2 तास]

[एकूण गुण : 35

- सूचना :-
- 1) सर्व प्रश्न सोडविणे आवश्यक आहेत.
 - 2) उजवीकडील अंक प्रश्नांचे पूर्ण गुण दर्शवितात.
 - 3) आवश्यक तेथे सुबक आकृत्या काढा.
 - 4) नकाशा स्टेन्सिल वापरण्यास परवानगी आहे.
 - 5) संदर्भासाठी मुळ इंग्रजी प्रश्नपत्रिका पहावी.

प्र.1) प्रत्येकी 20 शब्दात उत्तरे लिहा. (कोणतेही 5)

[10]

- अ) मृदा भूगोलाची व्याख्या लिहा.
- ब) मृदा भूगोल कोणत्या भूगोलाची उपशाखा आहे?
- क) तटस्थ मातीचा सामू (pH मुल्य) किती असतो?
- ड) अती जलसिंचनामुळे मृदेवर कोणता परिणाम होतो?
- इ) मृदा अवनती म्हणजे काय?
- फ) मृदेचा छेद म्हणजे काय?
- य) भारतात कोणती मृदा कापूस पिकास पोषक ठरते?

प्र.2) प्रत्येकी 80 शब्दात उत्तरे लिहा. (कोणतेही 2)

[10]

- अ) लॅटेराईट मृदा
- ब) जंगलतोडीचा मृदेवरील परिणाम
- क) मृदा धुप

प्र.3) प्रत्येकी 100 शब्दात उत्तरे लिहा. (कोणतेही 2)

[15]

- अ) मृदा भूगोलाची व्याप्ती स्पष्ट करा.
- ब) मृदा अवनतीचे प्रकार स्पष्ट करा.
- क) मृदा निर्मितीचे घटक लिहा.

* * *

Total No. of Questions : 4]

SEAT No. :

PE3413

[Total No. of Pages : 4

[6501]-694

S.Y.B.Sc.

PHYSICS (O.E.)

**OE-221-PHY-T : Eco-friendly Energy for Modern Living
(NEP 2024 Pattern) (Semester - III)**

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicate full marks.*
- 3) *Question 2 to question 4 carry equal marks.*
- 4) *Use of map stencils is allowed.*

Q1) Solve any five of the following.

[5]

- a) Define renewable energy. And state it's SI unit.
- b) Write any two conventional energy sources.
- c) Give any one limitations of hydropower energy.
- d) Give any one disadvantage of wind energy.
- e) State any one use of solar water heater.
- f) Give any one limitations of tidal energy.
- g) State any one renewable energy application in agriculture.

Q2) a) Attempt any one of the following.

[6]

- i) Explain the conventional and non-conventional sources of energy.
- ii) Discuss any two applications of solar energy.

b) Attempt any one of the following.

[4]

- i) Discuss any two applications of hydropower energy.
- ii) Explain the use of solar cookers.

P.T.O.

Q3) a) Attempt any one of the following. **[6]**

- i) Define wind energy. Discuss the advantages and applications of wind energy.
- ii) Describe hydropower energy. Discuss advantages and applications of hydropower energy.

b) Attempt any one of the following. **[4]**

- i) Discuss the use of renewable energy in agriculture and food production.
- ii) Explain environmental impact on conventional energy sources.

Q4) Attempt any four of the following. **[10]**

- a) Write a short note on need and importance of renewable energy sources.
- b) Describe the operational mechanism of a solar water heater.
- c) Discuss any two limitations of wind energy.
- d) Discuss any two applications of tidal energy.
- e) Describe the operational mechanism of windmill.
- f) Discuss the various uses of wind energy in agriculture and food production.



Total No. of Questions : 4]

PE3413

[6501]-694

S.Y.B.Sc.

PHYSICS (O.E.)

OE-221-PHY-T : Eco-friendly Energy for Modern Living
(NEP 2024 Pattern) (Semester - III)

(मराठी रूपांतर)

वेळ : 2 तास]

[एकूण गुण : 35

- सूचना :-
- 1) सर्व प्रश्न सोडविणे आवश्यक आहेत.
 - 2) उजवीकडील अंक प्रश्नांचे पूर्ण गुण दर्शवितात.
 - 3) प्रश्न क्रं. 2 ते प्रश्न क्रं. 4 प्रत्येकी समान गुण.
 - 4) गणकयंत्र वापरण्याची परवानगी आहे.
 - 5) संदर्भासाठी मुळ इंग्रजी प्रश्नपत्रिका पहावी.
-

प्र.1) खालीलपैकी कोणतेही पाच प्रश्न सोडवा.

[5]

- अ) नूतनीकरणीय उर्जेची (renewable energy) व्याख्या सांगा आणि तिचे एस. आय एकक (SI unit) नमूद करा.
- ब) कोणतेही दोन पारंपारीक उर्जा स्रोत लिहा.
- क) जलविद्युत उर्जेची कोणतीही एक मर्यादा सांगा.
- ड) पवन उर्जेचा कोणताही एक तोटा नमूद करा.
- इ) सौर जलतापक चा कोणताही एक उपयोग सांगा.
- फ) समुद्री भरती-ओहोटीच्या उर्जेची कोणतीही एक मर्यादा सांगा.
- य) शेतीत नूतनीकरणीय उर्जेचा कोणताही एक अनुप्रयोग सांगा.

प्र.2) अ) खालीलपैकी कोणताही एक प्रश्न सोडवा.

[6]

- i) पारंपारीक आणि अपारंपारीक ऊर्जा स्रोताचे स्पष्टीकरण करा.
- ii) सौर ऊर्जेचे कोणतेही दोन अनुप्रयोग (उपयोग) चर्चा करा.

ब) खालीलपैकी कोणताही एक प्रश्न सोडवा.

[4]

- i) जलविद्युत उर्जेचे कोणतेही दोन उपयोग चर्चा करा.
- ii) सौर कुकरच्या वापराचे स्पष्टीकरण करा.

प्र.3) अ) खालीलपैकी कोणताही एक प्रश्न सोडवा. [6]

- i) पवन ऊर्जेची व्याख्या सांगा. पवन ऊर्जेचे फायदे आणि अनुप्रयोग (उपयोग) चर्चा करा.
- ii) जलविद्युत उर्जेचे वर्णन करा. जलविद्युत ऊर्जेचे फायदे आणि अनुप्रयोग चर्चा करा.

ब) खालीलपैकी कोणताही एक प्रश्न सोडवा [4]

- i) शेतीत आणि अन्न उत्पादनात नूतनीकरण ऊर्जेच्या वापराची चर्चा करा.
- ii) पारंपारीक ऊर्जा स्रोतावरच्या पर्यावरणाच्या परिणामांचे स्पष्टीकरण करा.

प्र.4) खालीलपैकी कोणतेही चार प्रश्न सोडवा. [10]

- अ) नूतनीकरणयोग्य उर्जा स्रोतांची गरज आणि महत्त्वावर एक संक्षिप्त टिप लिहा.
- ब) सौर जलतापकाच्या कार्यप्रणालीचे वर्णन करा.
- क) पवन उर्जेच्या कोणत्याही दोन मर्यादांची चर्चा करा.
- ड) समुद्र भरती-ओहटीच्या उर्जेचे कोणतेही दोन अनुप्रयोग चर्चा करा.
- इ) पवन चक्कीच्या कार्यप्रणालीचे वर्णन करा.
- फ) शेतीत आणि अन्न उत्पादनात पवन ऊर्जेच्या विविध उपयोगांची चर्चा करा.



Total No. of Questions : 5]

SEAT No. :

PE3414

[6501]-695

[Total No. of Pages : 2

S.Y.B.Sc. (Computer Applications)
OE-201-CA-T : INTRODUCTION TO ARTIFICIAL
INTELLIGENCE
(NEP 2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) All questions are compulsory.*
- 2) Figures to the right indicate full marks.*
- 3) Assume suitable data, if necessary.*

Q1) Attempt any EIGHT of the following.

[8×1=8]

- a) What is machine Learning?
- b) List two applications of AI.
- c) Describe the concept of Intelligent Agents.
- d) What is production system?
- e) Define state space search.
- f) List the types of knowledg Representation.
- g) Write any 2 disadvantages of AI.
- h) Define the term perception.
- i) Write advantages of DFS.
- j) Define the term environment in AI.

Q2) Attempt any FOUR of the following.

[4×2=8]

- a) What is the state space search?
- b) Explain the differences between deep learning and machine learning.
- c) Describe the structure of Agents and their environments.
- d) Define search & its control strategies concept.
- e) Write two reasons why knowledge representation is important in AI.

P.T.O.

Q3) Attempt any TWO of the following. **[2×4=8]**

- a) Explain AO* algorithm.
- b) Explain the methods used for knowledge representation.
- c) Discuss the different types of search Algorithms used in AI.

Q4) Attempt any Two of the following. **[2×4=8]**

- a) Discuss the significance of AI in real-world applications.
- b) Explain how AI techniques are used in problem solving.
- c) Describe the applications of knowledge representation in artificial intelligence.

Q5) Attempt any ONE of the following. **[1×3=3]**

- a) Write advantages & disadvantages of A* algorithm.
- b) What is problem? Explain any 2 characteristics.



Total No. of Questions : 5]

SEAT No. :

PE3415

[Total No. of Pages : 2

[6501]-696

S.Y.B.Sc.

SEED TECHNOLOGY

OE-201-ST-T : Landscape Gardening

(NEP 2020 Pattern) (Semester - III) (Open Elective)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) Question no. 1 is compulsory.
- 2) Attempt any three questions from Q.2 to Q.5.
- 3) Questions Q.2 to Q.5 Equal marks.
- 4) Draw neat labelled diagram wherever necessary.

Q1) Attempt any five of the following. [5]

- a) Give any one importance of landscaping.
- b) Define informat garden.
- c) Give the use of garden forks.
- d) Define rock garden.
- e) Define pest.
- f) Give any one objective of landscape Gardening.

Q2) a) Discuss the role of light and colour in garden design. [6]

b) What is water garden and what elements are included in it? [4]

Q3) a) Describe name of any three types of omamental plants used in landscaping. [6]

b) Explain the role of trees, shrubs & creepers in landscape design. [4]

Q4) a) How does soil type affect plant selection? [6]

b) Describe how climate and sunlight influence plant choice in a garden.[4]

Q5) Write short notes (any four) [10]

- a) Control of Black spot Disease
- b) Control of plant pest
- c) Purpose of green house
- d) Landscape fertigation management
- e) Garden Weed management



P.T.O.

Total No. of Questions : 5]

PE3415

[6501]-696

S.Y.B.Sc.

SEED TECHNOLOGY

OE-201-ST-T : Landscape Gardening
(NEP 2020 Pattern) (Semester - III) (Open Elective)
(मराठी रूपांतर)

वेळ : 2 तास]

[एकूण गुण : 35

- सूचना :-
- 1) प्रश्न क्रं. 1 सोडविणे आवश्यक आहेत.
 - 2) प्रश्न क्रं. 2 ते 5 यापैकी कोणतेही 3 सोडवा.
 - 3) प्रश्न क्रं. 2 ते 5 समान गुण.
 - 4) आवश्यक तेथे सुबक आकृत्या काढा.
 - 5) संदर्भासाठी मुळ इंग्रजी प्रश्नपत्रिका पहावी.

-
- प्र.1)** खालीलपैकी पाच प्रश्न सोडवा. [5]
- अ) लँड स्केपींगचे कोणतेही एक महत्व लिहा?
 - ब) अनौपचारिक बाग व्याख्या लिहा.
 - क) गार्डन फोर्कचा एक उपयोग लिहा.
 - ड) खडक बागेची व्याख्या लिहा.
 - इ) किटकांची व्याख्या लिहा.
 - फ) लँडस्केप बागेचे कोणतेही एक उद्दिष्टे लिहा?
- प्र.2)** अ) बागेच्या रचनेत प्रकाश व रंग यांची भूमिका स्पष्ट करा. [6]
ब) वॉटर (पाणी) बाग म्हणजे काय आणि त्यात कोणते घटक समाविष्ट आहेत? [4]
- प्र.3)** अ) लँडस्केपिंग साठी वापरल्या जाणाऱ्या तीन सजावटी वनस्पतींची नावे लिहा. [6]
ब) लँडस्केप रचनेत झाडे, झुडपे आणि वेलवर्गीय वनस्पतींची भूमिका स्पष्ट करा. [4]
- प्र.4)** अ) मातीच्या प्रकाराचा वनस्पतींच्या निवडीवर कसा परिणाम होतो? [6]
ब) हवामान आणि सूर्यप्रकाशाचा वनस्पतींच्या निवडीवर कसा परिणाम होते, ते स्पष्ट करा. [4]
- प्र.5)** टिपा लिहा. (कोणत्याही चार) [10]
- अ) काळे ठिपके या रोगाचे नियंत्रण
 - ब) वनस्पती वरील अळीचे नियंत्रण
 - क) ग्रीन हाऊसचे उद्दिष्टे
 - ड) बागेमधील खत व्यवस्थापन
 - इ) बागेतील तण व्यवस्थापन

* * *

Total No. of Questions : 5]

SEAT No. :

[Total No. of Pages : 2

PE3416

[6501]-697

S.Y.B.Sc.

SEED TECHNOLOGY

OE-202-ST-T : Organic Farming

(NEP 2024 Pattern) (Semester - III) (Open Elective)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) Question no. 1 is compulsory.
- 2) Attempt any three questions from Q.2 to Q.5.
- 3) Questions Q.2 to Q.5 Equal marks.
- 4) Draw neat labelled diagram wherever necessary.

Q1) Answer of the following. [5]

- a) Give any one name of organic fertilizer.
- b) What do you mean by organic farming?
- c) Define Integrated weed management.
- d) What is Integrated pest Management?
- e) What is vermicompost?

Q2) a) Describe indetail scope and importance of Integrated weed management.[6]

b) Comment on methods of integrated pest management. [4]

Q3) a) Explain indetail methods of organic farming. [6]

b) Write concept and advantages of Biofertilizer [4]

Q4) a) Write concept and importance of vermicomposting. [6]

b) Common insect pest found in Maharashtra. [4]

Q5) Write short notes on Any four of the following. [10]

- a) Vermi compost techniques
- b) Green manuring
- c) Need of organic fertilizer in farming
- d) Role of live stock in organic farming
- e) Effect of weed on crop Growth

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P.T.O.

Total No. of Questions : 5]

PE3416

[6501]-697

S.Y.B.Sc.

SEED TECHNOLOGY

OE-202-ST-T : Organic Farming

(NEP 2024 Pattern) (Semester - III) (Open Elective)

(मराठी रूपांतर)

वेळ : 2 तास]

[एकूण गुण : 35

- सूचना :-
- 1) प्रश्न क्रं. 1 सोडविणे आवश्यक आहेत.
 - 2) प्रश्न क्रं. 2 ते 5 यापैकी कोणतेही 3 सोडवा.
 - 3) प्रश्न क्रं. 2 ते 5 समान गुण.
 - 4) आवश्यक तेथे सुबक आकृत्या काढा.
 - 5) संदर्भासाठी मुळ इंग्रजी प्रश्नपत्रिका पहावी.

-
- प्र.1)** खालील प्रश्न सोडवा. [5]
- अ) कोणत्याही एका सेंद्रीय खताचे नाव लिहा?
 - ब) शेंद्रीय शेतीचा अर्थ सांगा.
 - क) एकात्मिक तण व्यवस्थापनाची व्याख्या लिहा.
 - ड) एकात्मिक किड व्यवस्थापन म्हणजे काय?
 - इ) गांडूळ खत म्हणजे काय?
- प्र.2)** अ) एकात्मिक तण व्यवस्थापनाची व्याप्ती व महत्व विशद करा. [6]
ब) एकात्मिक कीड व्यवस्थापनाच्या पद्धति लिहा. [4]
- प्र.3)** अ) सेंद्रीय शेतीच्या पद्धती विस्तृत विशद करा. [6]
ब) शेंद्रीय खतांची संकल्पना व फायदे लिहा. [4]
- प्र.4)** अ) गांडूळ खताची संकल्पना व महत्व लिहा. [6]
ब) महाराष्ट्रामध्ये सामान्य काढळणाऱ्या किडी कोणत्या? [4]
- प्र.5)** टिपा लिहा. (कोणत्याही चार) [10]
- अ) गांडूळ खत तंत्रज्ञान
 - ब) हिरवळीचे खत
 - क) सेंद्रीय खतांची शेतीमधील गरज
 - ड) पशुधनाची सेंद्रीय शेतीमधील भूमिका
 - इ) पीकांच्या वाढीवर तणांचा परिणाम

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Total No. of Questions : 5]

SEAT No. :

PE3417

[Total No. of Pages : 2

[6501]-698

S.Y.B.Sc.

SEED TECHNOLOGY

OE-203-ST-T : Modern Irrigation Techniques

(NEP 2024 Pattern) (Semester - III) (2 Credits) (Open Elective)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) Question no. 1 is compulsory.
- 2) Attempt any three questions from Q.2 to Q.5.
- 3) Questions 2 to 5 carry Equal marks.
- 4) Draw neat labelled diagram wherever necessary.

Q1) Attempt any five of the following. **[5]**

- a) Enlist any one source of water.
- b) Enlist any one traditional system of irrigation.
- c) What is Drip irrigation?
- d) Write any one advantage of sprinkler irrigation.
- e) What is precision irrigation?
- f) Give any one strategy to create awareness regarding water conservation.

Q2) a) What is irrigation? Comment on water conservation. **[6]**

b) Comment on Microsprinkler irrigation & its benefits. **[4]**

Q3) a) What are the drip irrigation advantages & disadvantages. **[6]**

b) Comment on the components of sprinkler irrigation. **[4]**

Q4) a) Write benefits of precision irrigation and comment on soil moisture sensor. **[6]**

b) Comment on any two strategies for awareness programs regarding modern irrigation systems. **[4]**

Q5) Write a short notes on any four of the following. **[10]**

- a) History and importance of irrigation
- b) Rain pipe irrigation
- c) Government schemes for drip irrigation
- d) Disadvantages of sprinkler irrigation
- e) Concept of precision irrigation



P.T.O.

Total No. of Questions : 5]

PE3417

[6501]-698

S.Y.B.Sc.

SEED TECHNOLOGY

OE-203-ST-T : Modern Irrigation Techniques

(NEP 2024 Pattern) (Semester - III) (2 Credits) (Open Elective)

(मराठी रूपांतर)

वेळ : 2 तास]

[एकूण गुण : 35

- सूचना :-
- 1) प्रश्न क्रं. 1 सोडविणे आवश्यक आहेत.
 - 2) प्रश्न क्रं. 2 ते 5 यापैकी कोणतेही 3 सोडवा.
 - 3) प्रश्न क्रं. 2 ते 5 समान गुण.
 - 4) आवश्यक तेथे सुबक आकृत्या काढा.
 - 5) संदर्भासाठी मुळ इंग्रजी प्रश्नपत्रिका पहावी.

-
- प्र.1)** खालीलपैकी कोणतेही पाच प्रश्न सोडवा. [5]
- अ) कोणताही एक पाण्याचा स्रोत लिहा?
 - ब) कोणताही एक पारंपारिक सिंचन प्रणाली लिहा?
 - क) ठिबक सिंचन म्हणजे काय?
 - ड) स्प्रिंकलर सिंचनाचा कोणताही एक फायदा लिहा?
 - इ) अचूक सिंचन प्रणाली म्हणजे काय?
 - फ) जलसंधारण जनजागृती करण्यासाठीची कोणतीही एक पद्धती नमूद करा?
- प्र.2)** अ) सिंचन म्हणजे काय? जल संधारण विशद करा. [6]
ब) मायक्रो स्प्रिंकलर सिंचन व त्याचे फायदे विशद करा. [4]
- प्र.3)** अ) ठिबक सिंचनाचे फायदे व तोटे विशद करा. [6]
ब) स्प्रिंकलर सिंचनाचे घटक विशद करा. [4]
- प्र.4)** अ) प्रीसिजन सिंचन प्रणालीचे फायदे लिहा व मातीतील ओलावा सेन्सर वर टिप लिहा. [6]
ब) आधुनिक शेती पद्धती संदर्भात जागरूकता कार्यक्रम राबविण्यासाठी कोणतेही दोन धोरण विशद करा. [4]
- प्र.5)** टिपा लिहा. (कोणत्याही चार) [10]
- अ) जल सिंचनाचा इतिहास व महत्त्व
 - ब) रेन पाईप जलसिंचन
 - क) ठिबक सिंचनाच्या सरकारी योजना
 - ड) तुषार सिंचनाचे तोटे लिहा.
 - इ) अचूक जलसिंचनाची संकल्पना

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Total No. of Questions : 4]

SEAT No. :

PE3419

[Total No. of Pages : 6

[6501]-700

S.Y.B.Sc.

STATISTICS (O.E.)

OE-202-STS-T: Applied Statistics - I

(NEP 2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) All questions are compulsory.*
- 2) Figures to the right indicate full marks.*
- 3) Use of Statistical tables and calculator is allowed.*
- 4) Symbols and abbreviations have their usual meaning.*

Q1) A) Choose the correct alternative for each of the following: [1 each]

i) The heights (in cm) of five students are 150, 157, 160, 155, 165.
The median height is

- | | |
|-----------|-----------|
| a) 155 cm | b) 157 cm |
| c) 160 cm | d) 165 cm |

ii) The mean of 4 numbers is 15. Three of the numbers are 10, 20 and 25. What is the fourth number?

- | | |
|------|------|
| a) 3 | b) 6 |
| c) 5 | d) 4 |

iii) Which among the following is determined by using histogram?

- | | |
|-----------|----------|
| a) mean | b) mode |
| c) median | d) range |

B) State whether the following statements are True or False: [1 each]

- i) Median is affected by extreme values.
- ii) “Size of the family” is an example of discrete variable.

P.T.O.

Q2) Attempt any two of the following:

[5 each]

- a) State the merits and demerits of arithmetic mean.
- b) Calculate range and quartile deviation for the following data:
12, 15, 18, 20, 25, 30, 35, 40, 45, 50, 41, 19, 27, 34, 20.
- c) Classify the following characteristics as attribute or variable:
 - i) Gender of students in a class
 - ii) Height of basketball players
 - iii) Blood group of patients
 - iv) Temperature recorded in a city
 - v) Customer satisfaction level (Satisfied/Neutral/Unsatisfied)

Q3) Attempt any two of the following:

[5 each]

- a) Describe different parts of the statistical table.
- b) For the data of marks obtained by 20 students
45, 62, 78, 55, 82, 67, 58, 72, 65, 48,
75, 68, 52, 88, 63, 59, 71, 66, 54, 70
 - i) Construct a table of frequency distribution
 - ii) Find the less than cumulative frequencies for each class
(Use class intervals: 40-50, 50-60, 60-70, 70-80, 80-90)
- c) Define the following terms
 - i) Mean
 - ii) Mode
 - iii) Median
 - iv) Range
 - v) Quartile Deviation

Q4) Attempt any one of the following:

- a) i) What are the requisites of good measure of central tendency? [5]
ii) Write the formula for coefficient of variation (CV). Calculate CV for two datasets: [5]

Dataset A: Mean = 50, Standard Deviation = 10

Dataset B: Mean = 80, Standard Deviation = 20

Interpret your result.

- b) i) Compute mode for the following grouped data: [5]

Age (years)	Number of People
0-10	15
10-20	25
20-30	35
30-40	20
40-50	5

- ii) The following frequency distribution shows the marks of 60 students:[5]

Marks	Number of Students
0-20	8
20-40	12
40-60	20
60-80	15
80-100	5

Construct a histogram and frequency curve on the same graph.

* * *

PE3419

(मराठी रूपांतर)

[एकूण गुण : 35

- 1) सर्व प्रश्न सोडविणे आवश्यक आहे.
- 2) उजवीकडील अंक प्रश्नांचे पूर्ण गुण दर्शवितात.
- 3) सांख्यिकीय तक्ते आणि कॅल्क्युलेटर वापरण्यास परवानगी आहे.
- 4) चिन्हे आणि संक्षेपांचे त्यांचे नेहमीचे अर्थ घेतात.

[प्रत्येकी 1 गुण]

ਡ) 165

ਡ) 4

ड) विस्तार

[प्रत्येकी 1 गुण]

ii) “कुटुंबाचा आकार” हे असंतत चलाचे उदाहरण आहे.

[प्रत्येकी 5 गुण]

12, 15, 18, 20, 25, 30, 35, 40, 45, 50, 41, 19, 27, 34, 20.

क) खालील वैशिष्ट्यांचे गुणधर्म किंवा चल म्हणून वर्गीकरण करा:

- i) वर्गातील विद्यार्थ्यांचे लिंग
- ii) बास्केटबॉल खेळाडूंची उंची
- iii) रूग्णांचे रक्तगट
- iv) शहरात नोंदवलेले तापमान
- v) ग्राहकांच्या समाधानाची पातळी (समाधानी/तटस्थ/असमाधानी)

प्र.3) खालीलपैकी कोणतेही दोन प्रश्न सोडवा.

[प्रत्येकी 5 गुण]

- अ) सांख्यिकीय सारणीच्या वेगवेगळ्या भागांचे वर्णन करा.
- ब) 20 विद्यार्थ्यांनी मिळवलेल्या गुणांच्या आधारसामग्री साठी
45, 62, 78, 55, 82, 67, 58, 72, 65, 48,
75, 68, 52, 88, 63, 59, 71, 66, 54, 70
i) वारंवारता वितरणाचा सारणी तयार करा.
ii) प्रत्येक वर्गासाठी “पेक्षा कमी संचयी वारंवारता” काढा.
(टीप : पुढील वर्ग अंतराळ वापरा 40-50, 50-60, 60-70, 70-80, 80-90)
- क) खालील संज्ञा परिभाषित करा.
i) सरासरी
ii) बहुलक
iii) मध्यक
iv) विस्तार
v) चतुर्थक विचलन

प्र.4) खालीलपैकी कोणताही एक प्रश्न सोडवा.

- अ) i) केंद्रीय प्रवृत्तीचे चांगले मापन करण्यासाठी कोणत्या गोष्टी आवश्यक आहेत? [5]
ii) विचरण गुणांकाचे सूत्र लिहा. तसेच पुढील दोन आधारसामग्री साठी विचरण गुणांकाची किंमत काढा. [5]
आधारसामग्री अ : सरासरी = 50, प्रमाणित विचलन = 10
आधारसामग्री ब: सरासरी = 80, प्रमाणित विचलन = 20
आलेल्या निकालावरून निष्कर्ष लिहा.

ब) i) खाली दिलेल्या गटबद्ध आधारसामग्री साठी बहुलक काढा:

[5]

वर्ग अंतराल	वारंवारता
0-10	15
10-20	25
20-30	35
30-40	20
40-50	5

ii) खालील वारंवारता वितरण 60 विद्यार्थ्यांचे गुण दर्शविते.

[5]

गुण	विद्यार्थी संख्या
0-20	8
20-40	12
40-60	20
60-80	15
80-100	5

दिलेल्या माहितीसाठी स्तंभालेख काढा व वारंवारता वक्र एकाच आलेखावर काढा.

* * *

Total No. of Questions : 4]

SEAT No. :

PE3420

[6501]-701

[Total No. of Pages : 2

S.Y.B.Sc.

BIOTECHNOLOGY (O.E.)

OE-201-BT-T : Wine Technology

(2024 Pattern) (NEP 2020) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) All questions are compulsory.*
- 2) Draw neat labelled diagram wherever necessary.*

Q1) Answer any five of the following. [5]

- a) Which microorganism is commonly used in the production of alcoholic beverages.
- b) What is the main raw material used for the wine production.
- c) Which fermentation process softens the acidity of wine.
- d) Which country is the largest producer of wine in the world.
- e) What is the main sugar source for fermentation in grape juice.
- f) Define post fermentation process in wine making.

Q2) a) Explain the process of wine making in detail. [6]

OR

Discuss the key parameters that affect fermentation and how they influence the final wine quality. **[6]**

b) Describe the history and cultural significance of wine production. [4]

OR

Discuss role of wine in the hospitality industry. **[4]**

Q3) a) Discuss different business models used in the wine tourism industry.[6]

OR

What is wine tourism? Describe major wine tourism destinations around the world. **[6]**

b) Explain how wine festivals and vine yard tours promote tourism. [4]

OR

Explain the opportunities available for professionals in wine journalism and communication. **[4]**

P.T.O.

Q4) Write notes on (Any four)

[10]

- a) Global wine market trends
- b) Wine tourism and regional development
- c) Benefits & Potential risks of wine consumption
- d) Quality control in wine making
- e) Types of fermenters used in wine making
- f) Aging of wine



Total No. of Questions : 4]

SEAT No. :

PE3421

[6501]-702

[Total No. of Pages : 2

S.Y.B.Sc.

BIOTECHNOLOGY (O.E.)

**OE-202-BT-T : Dairy Technology
(NEP 2020 Pattern) (Semester - III)**

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *All Questions are compulsory.*
- 2) *Draw neat labelled diagram wherever necessary.*

Q1) Answer any five of the following. **[5]**

- a) Enlist the by products obtained from live stock.
- b) Which minerals are present in milk?
- c) Define quality of milk.
- d) Write significance of milk fat.
- e) What is MBRT test?
- f) What is double toned milk?

Q2) a) Describe the steps involved in selection of elite animals. **[6]**

OR

Describe the role of indigenous live stock breeds in Indian agriculture. **[6]**

b) Explain the care and management of udder before and after milking. **[4]**

OR

Explain the types of practices contribute to an efficient dairy farm. **[4]**

Q3) a) Explain the various types of milk spoilage alonge with microorganisms responsible for it. **[6]**

OR

Explain the HACCP system and describe its applications in dairy processing. **[6]**

b) Describe the advantages of using Tetra pack cartons for milk packaging. **[4]**

OR

Explain the environmental issues related to milk packaging waste. **[4]**

P.T.O.

Q4) Write notes on (Any four)

[10]

- a) GMP and sanitation of dairy products
- b) Flavored milk
- c) Homogenization
- d) Quality assessment of raw milk
- e) Ultra High temperature processing
- f) Process of butter production



Total No. of Questions : 4]

SEAT No. :

PE3422

[Total No. of Pages : 4

[6501]-703

S.Y. B.Sc.

CHEMISTRY (O.E.)

OE-201-CHE-T : Chemistry of Cosmetics and Perfumes - I
(2024 Pattern) (NEP 2020) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidate:

- 1) *All questions are compulsory.*
- 2) *Use of scientific calculator and log tables is allowed.*
- 3) *Figures to the right indicate full marks.*
- 4) *Illustrate your answers with neat diagrams wherever necessary.*

Q1) Solve any five of the following.

[5]

- a) Define cosmetics.
- b) Name the vegetable oils used in cosmetics.
- c) Define skin cleansers.
- d) What is the role of anti dandruff shampoo?
- e) Define preservatives.
- f) How much percent (%) of aromatic compounds are present in Eau de Parfum (EDP)?
- g) Write the uses of eugenol oil.

Q2) a) Solve any two of the following.

[6]

- i) Write a note on skin moisturisers.
- ii) Describe the different hair care treatments.
- iii) Describe the different sources of fragrances.

b) Discuss the role of following ingredients used in cosmetics.

[4]

- i) Oils
- ii) Herbal materials

P.T.O.

Q3) a) Solve any two of the following. [6]

- i) Give the classification of cosmetics on the basis of physical nature.
- ii) Discuss the properties and uses of eucalyptus oil.
- iii) What is night cream? Give its typical formulation.

b) What are hair colourants? Discuss their properties and types. [4]

Q4) Solve any four of the following. [10]

- a) What are sunscreen lotions? Discuss its characteristics and applications?
- b) Write in brief about 'History of Cosmetics'.
- c) Write a note on 'Hair Styling'.
- d) What are deodorants? Describe different forms of deodorants and their applications.
- e) Describe different types of face powders.



Total No. of Questions : 4]

PE3422

[6501]-703

S.Y. B.Sc.

CHEMISTRY (O.E.)

OE-201-CHE-T : Chemistry of Cosmetics and Perfumes - I
(2024 Pattern) (NEP 2020) (Semester - III)

(मराठी रूपांतर)

वेळ : 2 तास/

/एकूण गुण : 35

- सूचना :-
- 1) सर्व प्रश्न सोडविणे आवश्यक आहेत.
 - 2) वैज्ञानिक कॅलकुलेटर आणि लॉग टेबल वापरण्यास परवानगी आहे.
 - 3) उजवीकडील अंक प्रश्नांचे पूर्ण गुण दर्शवितात.
 - 4) आवश्यक असल्यास सुबक आकृतीसह तुमची उत्तरे स्पष्ट करा.

प्र.1) खालीलपैकी कोणतेही पाच सोडवा.

[5]

- अ) 'सौंदर्य प्रसाधने' व्याख्या लिहा.
- ब) सौंदर्य प्रसाधनांमध्ये वापरल्या जाणाऱ्या वनस्पती तेलांची नावे लिहा.
- क) 'स्कीन क्लीनझर्स' परिभाषित करा.
- ड) 'अँटी-डँड्रफ' शम्पूची कार्ये लिहा.
- इ) 'संरक्षकांची' (प्रिझरवेटीव्हज) व्याख्या लिहा.
- फ) 'इओ-डी. परफ्यूम' (ई.डी.पी.) मध्ये सुगंधी संयुगांचे प्रमाण किती टक्के असते?
- य) युजेनॉल तेलाचे उपयोग लिहा.

प्र.2) अ) खालीलपैकी कोणतेही दोन सोडवा.

[6]

- i) त्वचेच्या मॉइश्चरायझर्सवर टीप लिहा.
 - ii) केसांची निगा राखण्यासाठी वापरल्या जाणाऱ्या विविध उपचारांचे वर्णन करा.
 - iii) सुगंधी घटक द्रव्यांच्या विविध स्रोतांचे वर्णन करा.
- ब) सौंदर्य प्रसाधनांमध्ये वापरल्या जाणाऱ्या खालील घटकांबद्दल माहिती लिहा.
- i) तेल
 - ii) हर्बल (वनस्पतीजन्य) साहित्य

प्र.3) अ) खालीलपैकी कोणतेही दोन सोडवा.

[6]

- i) भौतिक स्वरूपाच्या आधारावर सौंदर्यप्रसाधनांचे वर्गीकरण करा.
- ii) निलगीरी तेलाचे गुणधर्म आणि उपयोग स्पष्ट करा.
- iii) नाइट क्रीम म्हणजे काय? त्याचे विशिष्ट सूत्र सांगा.

ब) केसांना रंग देणारे पदार्थ म्हणजे काय? त्यांचे गुणधर्म आणि प्रकारांची माहिती लिहा.

[4]

प्र.4) खालीलपैकी कोणतेही चार सोडवा.

[10]

- अ) सनस्क्रीन लोशन म्हणजे काय? त्याचे वैशिष्ट्ये आणि उपयोग सांगा.
- ब) 'सौंदर्यप्रसाधनांचा इतिहास' थोडक्यात स्पष्ट करा.
- क) 'केसांची शैली' यावर टीप लिहा.
- ड) डिओड्रंटस् म्हणजे काय? डिओड्रंटस्चे विविध प्रकार आणि त्यांचे उपयोग याचे वर्णन करा.
- इ) वेगवेगळ्या प्रकारच्या 'फेस पावडर' विषयी माहिती द्या.



Total No. of Questions : 4]

SEAT No. :

[Total No. of Pages : 4

PE3423

[6501]-704

S.Y.B.Sc.

CHEMISTRY (O.E.)

**OE - 202 - CHE - T (B) : Dairy Chemistry
(NEP 2024 Pattern) (Semester - III)**

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates :

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicate full marks.*
- 3) *Illustrate your answers with neat diagrams wherever necessary.*

Q1) Solve any five of the following :

[5]

- a) Define Lactose.
- b) Name any two vitamins soluble in fat.
- c) Define density of milk.
- d) Define Cheese.
- e) Name two proteins present in Milk.
- f) Give two examples of whey proteins.
- g) Give types of yogurt.

Q2) a) Solve any two of the following :

[6]

- i) Difference between cow milk & buffalo milk.
- ii) Describe the structure and type of milk fats.
- iii) Describe the production of ice-cream.

b) Solve the following :

[4]

Give the classification of milk proteins and Give its properties.

P.T.O.

Q3) a) Solve any two of the following : **[6]**

- i) Differentiate between fat soluble & water soluble vitamin in milk.
- ii) Why does casein precipitate when milk becomes sour?
- iii) Differentiate between cream and butter.

b) Solve the following : **[4]**

- i) What is meant by dairy chemistry?
- ii) Write any two uses of milk powder.

Q4) Solve any four of the following : **[10]**

- a) Describe the role of milk proteins in human nutrition.
- b) Write a note on milk from different animals & their characteristics.
- c) Write a note on boiling of milk.
- d) Explain the importance of viscosity in milk quality.
- e) What are the disadvantages of milk powder?



Total No. of Questions : 4]

PE3423

[6501]-704

S.Y.B.Sc.

CHEMISTRY(O.E.)

OE - 202 - CHE - T (B) : Dairy Chemistry
(NEP 2024 Pattern) (Semester - III)

(मराठी रूपांतर)

वेळ : 2 तास/

/एकूण गुण : 35

- सूचना :-
- 1) सर्व प्रश्न सोडविणे आवश्यक आहेत.
 - 2) उजवीकडील अंक प्रश्नांचे पूर्ण गुण दर्शवितात.
 - 3) संदर्भासाठी मूल इंग्रजी प्रश्नपत्रिका पहावी.

प्र.1) खालीलपैकी कोणतेही पाच प्रश्न सोडवा.

[5]

- अ) लैक्टोज ची व्याख्या लिहा.
- ब) दुधात विरघळणाऱ्या कोणत्याही दोन जीवनसत्वाची नावे लिहा?
- क) दुधाची घनता म्हणजे काय?
- ड) चीज म्हणजे काय?
- इ) दुधातील कोणत्याही दोन प्रथिनांची नावे लिहा?
- फ) व्हे प्रथिनांचे दोन उदाहरणे लिहा.
- य) दह्याचे प्रकार सांगा.

प्र.2) अ) खालीलपैकी कोणतेही दोन प्रश्न सोडवा.

[6]

- i) गायीचे दुध व म्हशीचे दुध यातील फरक लिहा.
- ii) दुधाच्या चरबीची रचना आणि प्रकार लिहा.
- iii) आईसक्रीमच्या उत्पादनाची प्रक्रिया स्पष्ट करा.

ब) खालील प्रश्न सोडवा.

[4]

दुधातील प्रथिनांचे वर्गीकरण आणि त्यांचे गुणधर्म सांगा.

प्र.3) अ) खालीलपैकी कोणतेही दोन प्रश्न सोडवा. [6]

- i) दुधातील चरबीत विरघळणारे आणि पाण्यात विरघळणारे जीवनसत्त्व यांच्यातील फरक करा.
- ii) दुध आंबल्यावर केसीन का जमते?
- iii) साय आणि लोणी यातील फरक लिहा.

ब) खालील प्रश्न सोडवा. [4]

- i) डेअरी केमिस्ट्री म्हणजे काय?
- ii) दुध पावडरचे दोन उपयोग लिहा.

प्र.4) खालीलपैकी कोणतेही चार प्रश्न सोडवा. [10]

- अ) दुधातील प्रथिनांची पोषणात्मक भूमिका स्पष्ट करा.
- ब) विविध प्राण्यांच्या दुधाची वैशिष्ट्ये थोडक्यात लिहा.
- क) दुधाचा उत्कलनांक बिंदु स्पष्ट करा.
- ड) दुधाच्या गुणवत्तेत श्यानतेचे (Viscosity) महत्त्व समजावून सांगा.
- इ) दुध पावडरचे तोटे काय आहेत?



Total No. of Questions : 4]

SEAT No. :

PE3424

[Total No. of Pages : 4

[6501]-705

S.Y.B.Sc.

MICROBIOLOGY (O.E.)

OE - 201 - MB - T : Scope of Microbiology

(NEP 2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates :

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicate full marks.*
- 3) *Draw neat labelled diagrams wherever necessary.*

Q1) Answer any five of the following :

[5]

- a) Define Microbiology.
- b) Define Fermentation.
- c) Enlist two biofertilizers.
- d) State True/False : In Biotechnology study of development of newer techniques of microbial product formation.
- e) _____ is a perishable food.
 - i) Milk
 - ii) Grains
 - iii) Sugar
 - iv) Canned food
- f) What is immunology.

Q2) a) Write any one of the following :

[6]

- i) Describe role of microbes in agriculture.
- ii) What are potential job role in industrial microbiology.

b) Write any one of the following :

[4]

- i) Explain scope of soil microbiology in sustainable agriculture.
- ii) Compare biofertilizer and biopesticide.

P.T.O.

Q3) a) Write any one of the following : **[6]**

- i) Describe Beer production with the help of flow sheet.
- ii) Describe role of probiotics present in fermented foods in maintaining gut health.

b) Write any one of the following : **[4]**

- i) Define vaccines. Write its types with suitable examples.
- ii) Write advantages of biopesticides.

Q4) Write short notes any four of the following : **[10]**

- a) Chemotherapy
- b) Types of milk
- c) Food Microbiology
- d) Wine production
- e) Role of air microbiologist
- f) Selective toxicity



Total No. of Questions : 4]

PE3424

[6501]-705

S.Y.B.Sc.

MICROBIOLOGY(O.E.)

OE - 201 - MB - T : Scope of Microbiology
(NEP 2024 Pattern) (Semester - III)

(मराठी रूपांतर)

वेळ : 2 तास/

/एकूण गुण : 35

- सूचना :-
- 1) सर्व प्रश्न सोडविणे आवश्यक आहेत.
 - 2) उजवीकडील अंक प्रश्नांचे पूर्ण गुण दर्शवितात.
 - 3) आवश्यक तेथे सुबक आकृत्या काढा.
 - 4) संदर्भासाठी मूळ इंग्रजी प्रश्नपत्रिका पहावी.

प्र.1) खालीलपैकी कोणत्याही पाच प्रश्नांची उत्तरे लिहा.

[5]

- अ) व्याख्या लिहा - सूक्ष्म जीवशास्त्र
- ब) व्याख्या लिहा - किण्वण (Fermentation)
- क) दोन जैविक खतांची नावे लिहा.
- ड) खरे/खोटे सांगा : जैवतंत्रज्ञानात सूक्ष्मजीव उत्पादन निर्मितीच्या नवीन तंत्रांच्या विकासाचा अभ्यास.
- इ) हे नाशवंत अन्न आहे.
 - i) दूध
 - ii) धान्ये
 - iii) साखर
 - iv) कॅन केलेला अन्न
- फ) शरीर संरक्षणशास्त्र (Immunology) म्हणजे काय?

प्र.2) अ) खालीलपैकी कोणत्याही एका प्रश्नाचे उत्तर लिहा.

[6]

- i) सूक्ष्मजीवांचे शेती मधील महत्त्व स्पष्ट करा.
- ii) औद्योगिक सूक्ष्मजीवशास्त्र (Industrial Microbiology) शाखेतील महत्वाच्या रोजगार संधी विशद करा.

ब) खालीलपैकी कोणत्याही एका प्रश्नाचे उत्तर लिहा.

[4]

- i) मृदा सूक्ष्मजीवशास्त्राचे (Soil Microbiology) शास्त्र शेतीमध्ये महत्त्व स्पष्ट करा.
- ii) जैविक खते (Biofertilizers) आणि जैविक किटकनाशके यांमधील फरक स्पष्ट करा.

प्र.3) अ) खालीलपैकी एका प्रश्नाचे उत्तर लिहा. [6]

- i) बीयर (Beer) उत्पादन करण्याची प्रक्रिया सारांश रूपाने (Flow Chart) लिहा.
- ii) प्रोबायोटिक्स (Probiotics) चे आंबवलेल्या पदार्थांमधील महत्त्व लिहा.

ब) खालीलपैकी कोणत्याही एका प्रश्नाचे उत्तर लिहा. [4]

- i) लसीची (Vaccine) व्याख्या लिहा. लसींचे विविध प्रकार सोदाहरण लिहा.
- ii) जैविक किटक नाशकांचे फायदे लिहा.

प्र.4) खालीलपैकी कोणत्याही चार प्रश्नांवर टिपा लिहा. [10]

- अ) किमोथेरेपी (Chemotherapy)
- ब) दुधांचे प्रकार
- क) अन्न सुक्ष्मजीवशास्त्र
- ड) वाइन उत्पादन (Wine Production)
- इ) हवामान सुक्ष्मजीवशास्त्राचे (Air Microbiology) महत्त्व
- फ) निवडक विषारी क्षमता (Selective toxicity)



Total No. of Questions : 4]

SEAT No. :

PE-5181

[Total No. of Pages : 2

[6501]-719

S.Y. B.Sc. (CDS)

**OE-204-CDS-T : Introduction to Cyber Security
(2024 Pattern) (Semester - III) (O.E.)**

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *All questions carry equal marks.*
- 3) *Figures to the right indicate full marks.*
- 4) *Neat diagrams must be drawn wherever necessary.*

Q1) Attempt any Eight of the following:

[8×1=8]

- a) Define Cybersecurity.
- b) What is Data Diddling?
- c) Define Salami Attack.
- d) What is a Worm?
- e) Define Spyware.
- f) What is SQL Injection?
- g) What is Industrial Espionage?
- h) Define Credit Card Fraud.
- i) What is a Proxy Anonymizer?
- j) What is Online Fraud?

Q2) Attempt any Four of the following:

[4×2=8]

- a) What are the types of Hackers with suitable examples.
- b) Describe the CIA Triad with real-world illustration.
- c) Explain Phishing techniques and their impact.
- d) List any two types of cyber crime with example.
- e) What is E-mail bombing?

P.T.O.

Q3) Attempt any Two of the following:

[2×4=8]

- a) Explain Virus and Worms in detail with difference.
- b) Describe Keyloggers and Spyware with examples.
- c) Explain Steganography and its applications.

Q4) Attempt any Two of the following:

[2×4=8]

- a) Explain Challenges to Indian Cyber Law.
- b) Describe Cybercrime and Punishment under the IT Act.
- c) Explain the Indian Context of Cyber Laws and their necessity.

Q5) Attempt any One of the following:

[1×3=3]

- a) Write a short note on Cyber Law, Technology and Students.
- b) What is the role of Digital Signatures in Cyber security?



Total No. of Questions : 5]

SEAT No. :

PE3425

[Total No. of Pages : 2

[6501]-720

S.Y. B.Sc. (Computer Science)

OE-201-CS-T : E-COMMERCE - I

(2024 Pattern) (Semester - III)(O.E.)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicate full marks.*
- 3) *Neat diagrams must be drawn wherever necessary.*

Q1) Attempt any eight of the following.

[8×1=8]

- a) Define E-Commerce.
- b) Give any two advantages of E-Commerce.
- c) What is a B2C business model?
- d) Define C2C E-Commerce.
- e) What is online marketing?
- f) What is an electronic payment gateway?
- g) Mention any one requirement of an electronic payment system.
- h) What does GDPR stand for?
- i) Define Chatbots.
- j) What is IoT in E-Commerce?

Q2) Attempt any four :

[4×2=8]

- a) Explain any two disadvantages of E-Commerce.
- b) Describe the E-Tailer business model.
- c) Explain Browsing Behavior Model.
- d) What are the purposes of E-Advertising?
- e) Explain the significance of the IT Act 2000.

P.T.O.

Q3) Attempt any two.

[2×4=8]

- a) Explain Business Models in emerging E-Commerce areas: C2C, P2P, B2G.
- b) Discuss the various Internet Marketing Trends with examples.
- c) Explain electronic or digital currency its characteristics and operation.

Q4) Attempt any two.

[2×4=8]

- a) Explain Major B2B Business Models: E-Distributor, E-Procurement, and Exchanges.
- b) Explain online credit card payments and smart cards.
- c) Discuss GDPR and its importance in E-Commerce.

Q5) Attempt any one.

[1×3=3]

- a) Write a short note on AI & Chatbots in E-Commerce.
- b) Explain the role of IoT in E-Commerce.



Total No. of Questions : 5]

SEAT No. :

PE3426

[Total No. of Pages : 2

[6501]-721

S.Y. B.Sc. (Computer Science) (AI & ML)/(CDS) (DS)

OE-202-CS-T : WEB DESIGN - I

(2024 Pattern) (Semester - III) (O.E.)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) All questions are compulsory.*
- 2) Figures to the right indicate full marks.*

Q1) Attempt any eight of the following.

[8×1=8]

- a) Define Web Browser.
- b) What is a tag in HTML?
- c) Write full form of CGI.
- d) What is multipart image in HTML?
- e) Define Hyperlink.
- f) What is a table row in HTML?
- g) Define frameset.
- h) State any two advantages of Internet.
- i) What is WYSIWYG?
- j) Write any two examples of email client.

Q2) Attempt any four of the following :

[4×2=8]

- a) Explain the role of web servers and clients.
- b) Write basic structure of an HTML document.
- c) What are table tags? Explain any two.
- d) Explain floating (Inline) frames.
- e) Explain graphics & image insertion in HTML.

P.T.O.

Q3) Attempt any two of the following :

[2×4=8]

- a) Explain working of Internet, Intranet & WWW.
- b) Describe HTML form and form attributes with example.
- c) Explain frames, its types and their targeting.

Q4) Attempt any two of the following.

[2×4=8]

- a) Describe various table appearance properties used in HTML.
- b) Explain get parameter() method with example.
- c) Explain linking of webpages with example.

Q5) Attempt any one of the following :

[1×3=3]

- a) Create an HTML page using links, image and lists.
- b) Define DIV tag and CSS for HTML form.



Total No. of Questions : 5]

SEAT No. :

PE3427

[Total No. of Pages : 2

[6501]-722

S.Y. B.Sc. (Computer Science/AIML/DS/CDS)

OE-203-CS-T : DIGITAL MARKETING - I

(2024 Pattern) (Semester - III) (O.E.)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Figures to the right indicate full marks.

Q1) Fill in the blanks (Any Eight) :

[8×1=8]

- a) _____ is the process of improving website visibility on search engines.
- b) Digital devices used for advertising without internet come under _____ digital marketing.
- c) A website whose content remains unchanged unless manually updated is called a _____ website.
- d) In e-commerce, the model where customers sell products to other customers is known as _____.
- e) _____ marketing uses email to communicate directly with customers.
- f) A _____ is a centralized platform giving access to varied information and services.
- g) The B2B model involves transactions between _____ and _____.
- h) _____ is the technique of creating valuable content to attract and retain audience.
- i) A payment made through UPI is an example of _____ transaction.
- j) Websites that provide online news and updates are known as _____ portals.

P.T.O.

Q2) Attempt any Four of the following : **[4×2=8]**

- a) What is online advertising? Explain any two of its features.
- b) Write a short note on email marketing.
- c) Explain the term “online marketplace” with one example.
- d) State benefits of using social media for marketing.
- e) Differentiate between online and offline marketing.

Q3) Attempt any Two of the following : **[2×4=8]**

- a) Explain various types of web portals with examples.
- b) Describe the Business-to-Consumer (B2C) model in detail.
- c) Explain the key components of a website and their importance.

Q4) Attempt any Two of the following : **[2×2=4]**

- a) What are the characteristics of dynamic websites?
- b) State any four advantages of digital marketing.
- c) What is phone-based advertising? Give an example?
- d) Write short note on social media influencers.

Q5) Attempt any One Case Study : **[1×7=7]**

- a) Discuss how a retail store (e.g., clothing brand) can use digital marketing strategies such as SEO, social media, email campaigns, and online ads to increase customer engagement.

OR

- b) Analyse how a multimedia news portal uses digital subscriptions, mobile apps, notifications, and personalized recommendations to grow its online presence.



Total No. of Questions : 4]

SEAT No. :

PE-5182

[Total No. of Pages : 2

[6501]-723

S.Y. B.Sc. (Computer Science)

**OE-204-CS-T : AI for Everyone - I
(2024 Pattern) (Semester - III) (O.E.)**

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicate full marks.*
- 3) *Assume suitable data if necessary.*

Q1) Attempt any Eight of the following:

[8×1=8]

- a) What is the main goal of AI?
- b) Where can you find open-source AI models?
- c) What is a limitation of AI compared to humans?
- d) Give one example of supervised learning.
- e) What is a neural network?
- f) What is NLP?
- g) How is AI used in medical imaging?
- h) Name one AI tool used for fraud detection.
- i) Define deep learning.
- j) What is a chatbot?
- k) How does AI help teachers?

Q2) Attempt any Four of the following:

[4×2=8]

- a) What is reinforcement learning and where is it used?
- b) What is an autonomous vehicle? Mention one technology it uses.
- c) Mention two real-world applications of AI.
- d) Explain how does Google AI support learners?
- e) What is bias in AI systems and why does it occur?

P.T.O.

Q3) Attempt any Two of the following: **[2×4=8]**

- a) Discuss the major privacy risks associated with AI systems.
- b) Explain how AI leads to both job loss and job creation.
- c) Describe how AI can increase and reduce social inequality.

Q4) Attempt any Two of the following: **[2×4=8]**

- a) Explain the structure and working of a neural network.
- b) Explain the contributions of AI in improving patient care in hospitals.
- c) Discuss the benefits and challenges of using AI in finance.

Q5) Attempt any One of the following: **[1×3=3]**

- a) Compare deep learning with traditional machine learning.
- b) How is AI helping in traffic management?



Total No. of Questions : 6]

SEAT No. :

PE-5777

[Total No. of Pages : 4

[6501]-724

S.Y. B.Sc. (Aviation)

**OE-201-BAV-T : FUNDAMENTALS OF COMPUTER AND
PROGRAMMING LANGUAGE**

(2024 Pattern) (Semester - III) (Open Elective)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *All questions compulsory.*
- 2) *Figures to the right indicate full marks.*

Q1) Choose the appropriate answer (MCQs) :

[5 × 1 = 5]

- i) Scanner is an ____ type of electronic device.
 - a) Input
 - b) Output
 - c) Both a) & b)
 - d) None of these
- ii) In computer microprocessor, CPU consists of ____
 - a) ALU (Arithmetic & Logic Unit)
 - b) CU (Control Unit)
 - c) Memory registers
 - d) All of above
- iii) Typically, char data type of C language utilizes ____ byte/s to store symbols
 - a) 1
 - b) 2
 - c) 3
 - d) 4
- iv) In C programming, ____ represents the equality operator.
 - a) =
 - b) ==
 - c) !=
 - d) None of these
- v) In aviation, CDU stands for ____
 - a) Computer Display Unit
 - b) Centralized Display Unit
 - c) Control Display Unit
 - d) Common Display Unit

P.T.O.

Q2) Fill in the blanks with suitable word/words : **[5 × 1 = 5]**

- a) Physical, touchable components of a computer system are referred as _____
- b) Pin configuration of 8085 microprocessor has _____ number of pins in total.
- c) _____ is the program that translates source code from a high-level programming language to a low-level programming language to create an executable program.
- d) A basic computer instruction has two parts : opcode & _____
- e) In computer terminology, sequence of 8 continuous bits is referred as _____

Q3) State whether True or False : **[5 × 1 = 5]**

- a) In C program, keywords are the words written in uppercases only.
- b) In C programming, the float data type occupies 4 bytes of memory.
- c) ROM is a volatile memory as data is lost when the power is turned off.
- d) Flag Register gives more information about the results of arithmetic operations.
- e) The Control Display Unit (CDU) acts as mediator between Flight Management Computers (FMC) & cabin crew.

Q4) Attempt all the following questions : **[5 × 2 = 10]**

- a) Explain the basic character set used in C programming language.
- b) Explain function prototype in C programming language.
- c) What are the different types of buses used in computer system & mention their purposes.
- d) What are the various phases of an instruction cycle?
- e) Explain the difference between RAM & ROM memories?

Q5) Attempt the following questions : **[2 × 3 = 6]**

- a) Write a C program to determine whether a number is even or odd.
- b) Explain working of computer system with the help of block diagram.

Q6) Attempt the following question : **[1 × 4 = 4]**

Explain the 5-bit flag register of 8085 microprocessor?



Total No. of Questions : 6]

PE-5777

[6501]-724

S.Y. B.Sc. (Aviation)

OE-201-BAV-T : FUNDAMENTALS OF COMPUTER AND
PROGRAMMING LANGUAGE

(2024 Pattern) (Semester - III) (Open Elective)

(मराठी रूपांतर)

वेळ : 2 तास]

[एकूण गुण : 35

- सूचना : 1) सर्व प्रश्न सोडविणे आवश्यक आहे.
2) उजवीकडील अंक प्रश्नांचे पूर्ण गुण दर्शवितात.

प्रश्न 1) योग्य उत्तर निवडा

[5 × 1 = 5]

- i) स्कॅनर हे प्रकारचे इलेक्ट्रॉनिक उपकरण आहे.
अ) इनपुट ब) आउटपुट
क) वरील दोन्ही ड) यापैकी काहीही नाही
- ii) संगणकाच्या मायक्रोप्रोसेसरमध्ये, CPU मध्ये विभाग असतात.
अ) ALU (अंकगणित आणि तर्कशास्त्र युनिट)
ब) CU (नियंत्रण युनिट)
क) मेमरी रजिस्टर्स
ड) वरील सर्व
- iii) सामान्यतः, C भाषेतील char data type माहिती साठवण्यासाठी बाइट/बाइट्स वापरतो.
अ) 1 ब) 2
क) 3 ड) 4
- iv) C सी प्रोग्रामिंगमध्ये, ऑपरेटर हे समानता दर्शविते.
अ) = ब) ==
क) != ड) यापैकी नाही
- v) विमानचालन परिभाषेत, CDU चा अर्थ आहे.
अ) कॉम्प्युटर डिस्प्ले युनिट
ब) सेण्टरलाइंड डिस्प्ले युनिट
क) कंट्रोल डिस्प्ले युनिट
ड) कॉमन डिस्प्ले युनिट

- प्रश्न 2) शब्द/शब्दांनी रिकाम्या जागा भरा. [5 × 1 = 5]
- अ) संगणक प्रणालीच्या भौतिक, स्पर्श करण्यायोग्य (visible) घटकांना असे संबोधले जाते.
- ब) 8085 मायक्रोप्रोसेसरच्या पिन कॉन्फिगरेशनमध्ये एकूण पिन असतात.
- क) प्रोग्राम हा एक्झिक्युटेबल प्रोग्राम (program) तयार करण्यासाठी उच्च - स्तरीय प्रोग्रामिंग भाषेतून (High Level Language) निम्न - स्तरीय प्रोग्रामिंग भाषेत (Low Level Language) मूळ प्रोग्रामचे (source code) भाषांतर करतो.
- ड) मूलभूत संगणक सूचनेचे (Instruction) दोन भाग असतात: ऑपकोड (Opcode) आणि.....
- इ) संगणक परिभाषेत, 8 सतत बिट्सच्या गटाला असे संबोधले जाते.
- प्रश्न 3) खरे की खोटे ते सांगा. [5 × 1 = 5]
- अ) सी प्रोग्राममध्ये, कीवर्ड (keyword) म्हणजे फक्त मोठ्या टाइपमध्ये (uppercase) लिहिलेले शब्द.
- ब) सी प्रोग्रामिंगमध्ये फ्लोट डेटा प्रकार (float data type) 4 बाइट्स मेमरी वापरतो.
- क) रॉम (ROM) ही एक अस्थिर मेमरी आहे कारण वीज (Power Supply) बंद केल्यावर डेटा नष्ट होतो.
- ड) फ्लॅग रजिस्टर (Flag Register) अंकगणितीय ऑपरेशन्सच्या (arithmetic operations) परिणामांबद्दल अधिक माहिती देते.
- इ) कंट्रोल डिस्प्ले युनिट (सीडीयू) फ्लाइंग मॅनेजमेंट कॉम्प्यूटर (एफएमसी) आणि केबिन चालक (pilot) यांच्यात मध्यस्थ म्हणून काम करते.
- प्रश्न 4) सर्व प्रश्नांचा प्रयत्न करा. [5 × 2 = 10]
- अ) C प्रोग्रामिंग भाषेत वापरल्या जाणाऱ्या मूलभूत चिन्हांचे (character set) स्पष्टीकरण द्या.
- ब) C प्रोग्रामिंग भाषेत फंक्शन प्रोटोटाइप (function prototype) स्पष्ट करा.
- क) संगणक प्रणालीमध्ये वापरल्या जाणाऱ्या वेगवेगळ्या प्रकारच्या बसेस कोणत्या आहेत आणि त्यांचे उद्देश सांगा.
- ड) सूचना चक्राचे (Instruction Cycle) विविध टप्पे कोणते आहेत?
- इ) रॅम (RAM) आणि रॉम (ROM) मेमरीमधील फरक स्पष्ट करा.
- प्रश्न 5) प्रश्नांचा प्रयत्न करा. [2 × 3 = 6]
- अ) संख्या सम आहे की विषम हे ठरवण्यासाठी C प्रोग्राम लिहा.
- ब) ब्लॉक आकृतीच्या मदतीने संगणक प्रणालीचे कार्य स्पष्ट करा.
- प्रश्न 6) प्रश्नांचा प्रयत्न करा. [1 × 4 = 4]
- 8085 मायक्रोप्रोसेसरच्या 5 बिट्स फ्लॅग रजिस्टरचे स्पष्टीकरण द्या.



Total No. of Questions : 4]

SEAT No. :

PE-5528

[Total No. of Pages : 2

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S.Y. B.Sc.

DEFENCE AND STRATAGIC STUDIES
OE-201-DEF-T : INTERNAL SECURITY CHALLENGES
FOR INDIA - I
(2024 NEP Pattern) (Semester - III) (O.E.)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicate full marks.*

Q1) Answer the following question (any Five) :

[5 × 2 = 10]

- a) Write the type of Regionalism of Language.
- b) Write the type of Regionalism of Religion.
- c) Write the type of Regionalism of Politics.
- d) Write the type of Financial regionalism.
- e) State the Communal Tensions as a Threat to India's Internal Security.
- f) State the riots as a Threat to India's Internal Security.

Q2) Answer the following question (any Two) :

[2 × 4 = 8]

- a) State the Meaning & concept of India's internal security problems.
- b) Explain in detail about Casteism in India.
- c) Explain in detail Regionalism in India.

Q3) Answer the following question (any One) :

[1 × 7 = 7]

- a) Explain in detail Socio-cultural, Politico-Economic & Geographical dimensions of India's Internal Security.
- b) Explain in detail Communal Tensions & Riots :- As a Threat to India's Internal Security.

P.T.O.

Q4) Write short notes (any Two) :

[2 × 5 = 10]

- a) Social Problems in India
- b) Effect of Regionalism on National Security.
- c) Impact of Casteism on India's Internal Security.



Total No. of Questions : 4]

SEAT No. :

PE-5187

[Total No. of Pages : 4

[6501]-727

S.Y. B.A./B.Com./B.Sc.

PSYCHOLOGY

OE-202-PSY-T : Psychological Skills and Enrichment of Life
(2024 Pattern) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Figures to the right indicate full marks.
- 3) Illustrate your answers with diagrams wherever necessary.

Q1) Solve any Five of the following:

[5]

- a) Define psychological skills.
- b) State the types of communication.
- c) What is mindfulness?
- d) What are the components of SMART goals?
- e) Define Mindset.
- f) State any two psychological skills.
- g) Define emotional intelligence.

Q2) A) Solve any two of the following:

[6]

- i) Describe the nature of life enrichment with an example.
- ii) Explain the importance of assertiveness in communication.
- iii) Describe how gratitude enhances well-being.

B) Solve the following:

[4]

- i) Apply mindfulness technique to manage stress.

P.T.O.

Q3) A) Solve any two of the following: **[6]**

- i) Analyse the relationship between psychological skills and life satisfaction.
- ii) Examine various goal setting techniques.
- iii) Examine how resilience can be developed in individuals.

B) Solve the following: **[4]**

- i) Evaluate the role of psychological skills in enhancing social relationships.

Q4) Write short note on any Four : **[10]**

- a) Negotiation skills
- b) Empathy
- c) Social skills
- d) Development of psychological skills
- e) Happiness



Total No. of Questions : 4]

PE-5187

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S.Y. B.A./B.Com./B.Sc.

PSYCHOLOGY

OE-202-PSY-T : Psychological Skills and Enrichment of Life

(2024 Pattern) (Semester - III)

(मराठी रूपांतर)

वेळ : 2 तास]

[एकूण गुण : 35

- सूचना :
- 1) सर्व प्रश्न सोडविणे अनिवार्य आहे.
 - 2) उजवीकडील अंक प्रश्नाचे पूर्ण गुण दर्शवितात.
 - 3) संदर्भासाठी मुळ इंग्रजी प्रश्नपत्रिका पहावी.

प्रश्न 1) खालीलपैकी कोणतेही पाच प्रश्न लिहा. [5]

- अ) मानसशास्त्रीय कौशल्यांची व्याख्या लिहा.
- ब) संभाषणाचे प्रकार लिहा.
- क) सजगता (mindfulness) म्हणजे काय?
- ड) SMART उद्दिष्टांचे घटक कोणते आहेत?
- इ) माइंडसेटची व्याख्या लिहा.
- फ) कोणतेही दोन मानसशास्त्रीय कौशल्ये नमूद करा.
- य) भावनिक बुद्धिमत्तेची व्याख्या लिहा.

प्रश्न 2) अ) खालीलपैकी कोणतेही दोन प्रश्न सोडवा. [6]

- i) जीवन समृद्धीचे स्वरूप उदाहरणासह स्पष्ट करा.
- ii) संवादातील ठामपणाचे महत्व स्पष्ट करा.
- iii) कृतज्ञता (gratitude) कल्याण (well-being) कसे वाढवते ते लिहा.

ब) खालील प्रश्न सोडवा. [4]

- i) तणाव व्यवस्थापनासाठी सजगता (mindfulness) तंत्राचा उपयोग लिहा.

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प्रश्न 3) अ) खालीलपैकी कोणतेही दोन प्रश्न सोडवा. [6]

- i) मानसशास्त्रीय कौशल्ये आणि जीवन समाधान यांच्यातील नातेसंबंधाचे विश्लेषण करा.
- ii) ध्येय निश्चितीच्या विविध तंत्रांचे परीक्षण करा.
- iii) व्यक्तींमध्ये कणखरवृत्ती (resilience) कशी विकसित करता येते याचे परीक्षण करा.

ब) खालील प्रश्न सोडवा. [4]

- i) सामाजिक नातेसंबंध सुधारण्यात मानसशास्त्रीय कौशल्यांची भूमिका मूल्यांकित करा.

प्रश्न 4) खालीलपैकी कोणत्याही चार टिपा लिहा. [10]

- अ) वाटाघाटी कौशल्ये (Negotiation skills)
- ब) अनुभूती (Empathy)
- क) सामाजिक कौशल्ये
- ड) मानसशास्त्रीय कौशल्यांचा विकास
- इ) आनंद (Happiness)

