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F.Y.B.Sc.

MATHEMATICS

MT-111 : Algebra

(2019 Pattern) (Semester - I) (11111)

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 g.c.d. of 35 and 49.

    b)   Define equivalence relation on z.

    c)   Let $f : R \to R$, $g : R \to R$ defined as $f(x) = x + 1$ and $g(x) = x^2$, find fog.

    d)   If w is a cube root of unity then find the value of $1 + w + w^2$.

    e)   Is $R_1 = \{(1, 1), (1, 2), (2, 2), (3, 3), (4, 4), (2, 1), (2, 3)\}$ reflexive relation on the set $A = \{1, 2, 3, 4\}$? Justify?

    f)   Find the value of $\overline{100}$ in Z_3.

    g)   Find the modulus of $z = 1 + \sqrt{3}\hat{z}$.

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

    i)   State and prove De-Moivre's theorem for an integer indices.

    ii)   Prove that there are n distinct residue classes modulo n in integer.

B) Attempt any one of the following. **[5]**

    a) Find the g.c.d. '*d*' of integers 357 and 2210 and express $d = 2210$ $x + 357y$ for some $x, y \in z$.

    b) Find the remainder of 7^{486} when divided by 13.

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

    a) Prove that every partition of non empty set X defines an equivalence relation on X.

    b) Prove that any two equivalence classes are either identical or disjoint.

B) Attempt any one of the following. **[5]**

    a) If a, b, c are integers such that $a|bc$ and $(a, b) = 1$ then show that $a|c$.

    b) Which elements of z_6 satisfies $x^2 = x$?

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

    a) Let $z_1, z_2 \in c$ then prove that $|z_1 + z_2| \leq |z_1| + |z_2|$

    b) State and prove Euclid's lemma.

B) Attempt any one of the following. **[5]**

    a) Find the expression for $\cos^5\theta$ in terms of cosine of multiple of θ.

    b) Express $z = 1 + i$ in polar form.

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F.Y. B.Sc.

MATHEMATICS

MT - 112 : Calculus - I

(CBCS) (2019 Pattern) (Semester - I) (Paper - II) (11112)

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 <u>Five</u> of the following:
[5]

a)   Determine the set $A = \left\{ x \in \mathbb{R} \,/\, x < \dfrac{1}{x}, x > 0 \right\}$.

b)   Find first four terms of the sequence (x_n) where $x_n = \dfrac{1}{n(n+1)}$.

c)   Define monotone sequence of real numbers.

d)   Find domain of the function $f(x) = \dfrac{1}{x-3}$.

e)   State boundedness theorem for continuous function on an interval.

f)   At what points the function $f(x) = \dfrac{x}{(x-2)(x-4)}$ is discontinuous?

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

i)   State and prove triangle inequality for real numbers. Hence, prove that $|a - b| \geq \big||a| - |b|\big|$, for all $a, b \in \mathbb{R}$.

ii)   Define limit of sequence of real numbers and prove that if limit of sequence exists then it is unique.

b) Attempt any <u>one</u> of the following: **[4]**

i) Evaluate : $\lim\limits_{n \to \infty} \dfrac{2n^2 + 3}{5n^2 + 1}$.

ii) Discuss the continuity of the function $f(x)$ at origin,

where $f(x) = \dfrac{e^{1/x}}{1 + e^{1/x}}$; for $x \neq 0$

$\qquad = 0 \quad$; for $x = 0$

Q3) a) Attempt any <u>one</u> of the following: **[6]**

i) Show that the sequence (x_n) defined by $x_1 = 1$ and $x_{n+1} = \sqrt{2 + x_n}, \forall n \in N$ is monotonic and bounded.

ii) Find the values of α and β, if the function $f(x)$ is continuous in $(-3, 3)$ where, $f(x) = x + \alpha$; $-3 < x < 0$

$\qquad = 2x + 1$; $0 \leq x > 2$

$\qquad = \beta - x$; $2 \leq x < 3$

b) Attempt any <u>one</u> of the following: **[4]**

i) Find the infimum and supremum of the set $S = \left\{ 1 - \dfrac{(-1)^n}{n} \,/\, n \in N \right\}$.

ii) Let $f : A \to \mathbb{R}$ and c be the cluster point of A. If $\lim\limits_{x \to c} f(x) = L$ and the sequence (x_n) converges to 'c' such that $x_n \neq c$, for all $n \in N$ then prove that $(f(x_n))$ converges to L.

Q4) a) Attempt any <u>one</u> of the following: **[6]**

i) State squeeze theorem and hence show that $\lim\limits_{x \to 0} x \cdot \cos\left(\dfrac{1}{x}\right) = 0$.

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ii) Let $f : I \rightarrow \mathbb{R}$ be continuous on $I = [a, b]$. If $K \in \mathbb{R}$ satisfies $f(a) < K < f(b)$ then prove that there exist a point $c \in I$ between a and b such that $f(c) = K$.

b) Attempt any <u>one</u> of the following: **[4]**

i) If $A \subseteq \mathbb{R}$ and $f : A \rightarrow \mathbb{R}$ has limit at $x = c \in \mathbb{R}$, then prove that f is bounded on some neighbourhood of 'c'.

ii) Let $A \subseteq \mathbb{R}$ and $f, g : A \rightarrow \mathbb{R}$. If f and g are continuous functions at $c \in A$ then prove that $f+g$ and $f \cdot g$ are also continuous functions at $x = c$.

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F.Y. B.Sc. (Physics)

PHY - 111 : MECHANICS AND PROPERTIES OF MATTER

(CBCS 2019 Pattern) (Semester - I) (Paper - I) (2 Credits) (11121)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) *Que. 1 is compulsory.*
2) *Solve any three questions from Que. 2 to Que. 5.*
3) *Questions 2 to 5 carry equal marks.*

Q1) Solve any five of the following. **[5]**
   a) State Newton's First law of motion.
   b) State work-energy theorem.
   c) Give physical significance of Reynold's number.
   d) What is surface Tension. Give its CGS unit.
   e) A 3 cm long copper wire is streched to increase its length by 0.3 cm. Find the longitudinal strain produced in the wire.
   f) Force of 5 Nacts on a body of weight 9.8N. What is acceleration produced?

Q2) a) i) Define Youn'g modulus, bulk modulus and Poission's ratio. **[3]**
      ii) Calculate the workdone by constant force. **[3]**
   b) The position of a particle moving along straight line is given by, $x = 5t^3 - 2t^2 + 4$. Find, Average acceleration between $t = 2$sec and $t = 4$ sec. **[4]**

Q3) a) i) What is gravitational force? Give its properties. **[3]**
      ii) Show that in any type of strain workdone per unit volume is equal to ½ × stress × strain. **[3]**
   b) What will be workdone in blowing a soap bubble of radius 2cm, the surface tension of soap solution is 0.035 N/m? **[4]**

Q4) a) If Y, *n* & K represent Young's modulus, modulus of rigidity & bulk modulus respectively then prove that $\dfrac{9}{Y} = \dfrac{3}{n} + \dfrac{1}{K}$. **[6]**

b) Calculate Poission's ratio for aluminium, if Young's modulus of aluminium is 7×10^{10} N/m^2 and modulus of rigidity is 2.5×10^{10} N/m^2. **[4]**

Q5) Write short notes on any four of the following. **[10]**

a) Describe in detail Jaeger's method to determine surface tension of a liquid.

b) Distinguish between conservative force and non-conservative force.

c) Give any five applications of elasticity.

d) Obtain the relation between volume strain and longitudinal strain.

e) Obtain equation of continuity.

f) What is electromagnetic force? Give its properties.

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F.Y. B.Sc.

PHYSICS

PHY - 112 : Physics Principles and Applications

(CBCS 2019 Pattern) (Semester - I) (Paper - II) (11122)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) *Q.1 is compulsory.*

2) *Solve any three questions from Q.2 to Q.5.*

3) *Questions 2 to 5 carry equal marks.*

4) *Figures to right indicates full marks.*

Q1) Attempt any five of the following. **[5]**

a) What is stimulated emission?

b) Give any two properties of ionic bond.

c) The radius of first Bohr orbit is 0.52A°. Calculate radius of 2nd (second) Bohr orbit.

d) What do you mean by photon?

e) What are different types of solar cell?

f) What is the frequency of a wave with a wavelength of 200 cm?

Q2) a) Draw energy level diagram of hydrogen atom and hence explain Lyman and Balmer Series. **[6]**

b) Explain in brief the characteristics of a laser beam. **[4]**

Q3) a) What is X-ray radiography? State its applications. **[6]**

b) The vibration frequency for a diatomic molecule HF is 1.24×10^{14} Hz. The mass of hydrogen atom and fluorine atom are 1.67×10^{-27} kg and 3.15×10^{-26} kg. Find **[4]**

i) Force constant k for the interatomic force,

ii) The energies in ground state and first excited state.

Q4) a) Explain rotational energy levels of a diatomic molecule. Draw the rotational energy level diagram. **[6]**

b) Given the energy level of 6.624×10^{-18}J imparted an electron stream by X-ray device. Calculate frequency in MHz and wavelength. **[4]**

Q5) Write short notes on any four of the following. **[10]**

   a) Applications of UV-Radiations.

   b) Source of Electromagnetic waves.

   c) Ruby Laser.

   d) Optical Pumping.

   e) Absorption spectrum.

   f) Ruther Ford's Atomic Model.

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First Year B.Sc.
CHEMISTRY - I
CH - 101 : Physical Chemistry
(CBCS 2019 Pattern) (Semester - I) (Paper - I) (11131) (Regular)

Time : 2 Hours]   *[Max. Marks : 35*

Instructions to the candidates:
1) *Question 1 is compulsory.*
2) *Solve any three questions from Q.2 to Q.5.*
3) *Questions 2 to Question 5 carry equal marks.*
4) *Figures to the right indicates full marks.*
5) *Draw neat diagrams wherever necessary.*
6) *Use of logarithm tables and calculator is allowed.*

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

    a)   Define the 'exothermic reaction'.

    b)   Explain 'Intensive properties'.

    c)   What is degree of dissociation?

    d)   State the law of mass action.

    e)   What is the pH of 0.1 M HNO_3?

    f)   Calculate the value of C_p when C_v = 23.846 J k^{-1} mole^{-1} and R = 8.314 J k^{-1} mole^{-1}.

Q2) a)   Attempt the following (Any Two):   **[6]**

    i)   State and explain the types of thermodynamic systems.

    ii)   Derive an equation for relation between reaction quotient and Gibb's free energy.

    iii)   Define Buffer and explain mechanism of 'Basic Buffer'.

    b)   State and explain common ion effect with suitable example.   **[4]**

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

    i)   Derive $k_h = \dfrac{k_w}{k_b}$.

ii)   State third law of thermodynamics and give its importance.

iii)   Explain types of chemical equilibrium.

b)   Calculate the enthalpy change for the reaction: **[4]**

$H_{2(g)} + Cl_{2(g)} \rightarrow 2HCl_{(g)}$, Given that, the bond energies of H – H, Cl – Cl and H – Cl are 435 kJ mole^{-1}, 242 kJ mole^{-1}, and 431 kJ mole^{-1} respectively.

Q4) a)   Attempt the following (Any Two):   **[6]**

i)   What is the pH scale? Give the range of pH scale and Justify your answer.

ii)   Derive the Kirchhoff's equation.

iii) Draw the plots of Gibb's free energy against progress of reaction.

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

i)   Solubility product of Fe(OH)$_3$ is 1.1×10^{-38} in water calculate the solubility of Fe(OH)$_3$ in mole per litre.

ii)   Calculate K$_c$ for reaction:

$$NH_{3(g)} \rightleftharpoons \frac{1}{2}N_{2(g)} + \frac{3}{2}H_{2(g)}$$
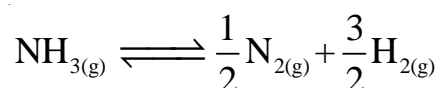
$$\left(\text{Given } [N_2]^{\frac{1}{2}} = 3.1 \times 10^{-2} \, \text{mol L}^{-1}, \ [H_2]^{\frac{3}{2}} = 8.5 \times 10^{-1} \, \text{mol L}^{-1},\right.$$

$$\left.[NH_3] = 3.1 \times 10^{\circ} \, \text{mol L}^{-1}\right).$$

Q5) Attempt the following (Any Four):   **[10]**

a)   Write short note on heat of ionization.

b)   State and explain Le-Chatliers principle.

c)   Explain the responce of equilibria to concentration.

d)   What conclusions can be drown about equilibriun constant.

e)   Explain the hydrolysis of salt of weak acid and weak base.

f)   Give applications of solubility product.

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F.Y. B.Sc.
CHEMISTRY
CH - 102 : Organic Chemistry
(CBCS 2019 Pattern) (Semester - I) (Paper - II) (11132)

Time : 2 Hours]   *[Max. Marks : 35*

Instructions to the candidates:
- *1) Q.1 is compulsory.*
- *2) Solve any three questions from Q.2 to Q.5.*
- *3) Questions 2 to 5 carry equal marks.*

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

- a) Define electrophile.
- b) What is chain isomerism?
- c) Define Saytzeff's rule.
- d) Define racemic mixture.
- e) Explain n-pentane boils at higher temperature than neo-pentane.
- f) Draw cis and trans isomer of 2-pentene.

Q2) a) Attempt the following: **[6]**

- i) Chloroacetic acid is stronger than acetic acid. Explain.
- ii) What is hydrocarbon? Give classification of hydrocarbons.

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

- i) Assign R/S configuration of the following compound.

$$CHO$$
$$H—\!\!\!\!\!—OH$$
$$CH_3$$
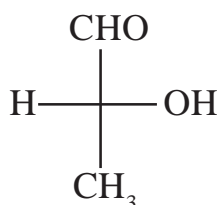
- ii) Assign E/Z configuration of the following compound.

$$H_3C \qquad Cl$$
$$C = C$$
$$H \qquad CH_2–CH_3$$
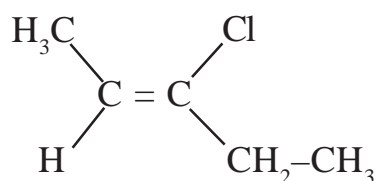
Q3) a)   Attempt the following: [6]
      i)   Explain hyperconjugation effect with suitable example.
      ii)   What the action of O_3 on
          1)   Propene
          2)   2-butene

   b)   Answer the following: [4]
      i)   Draw structural isomers for molecular formula C_5H_{12}.
      ii)   How will you prepare cis-2-butene from 2-butyne.

Q4) a)   Answer the following: [6]
      i)   State Huckel's rule with suitable examples.
      ii)   How will you prepare n-butane from ethyl chloride?

   b)   Answer the following: [4]
      i)   Draw resonance structure of phenoxide ion.
      ii)   Define the terms -
          1)   Dihedral angle
          2)   Specific rotation

Q5) Answer any two of the following: [10]
   a)   What is conformational isomerism? Discuss conformational isomerism in ethane.
   b)   Define Erythro and threo isomer. Draw erythro and threo structure of
      i)   2, 3 - dibromobutane
      ii)   2, 3 - butane diol
   c)   Identify the products:
      i) $CH_3 - CH_2 - Mg - Br \xrightarrow{H_2O} A$
      ii) $CH_3 - CH = CH_2 \xrightarrow[H_2O_2]{HBr} A$
      iii) $CH_3 - C \equiv C - H \xrightarrow{NaNH_2} A$
      iv) $CH_3 - CH = CH - CH_3 \xrightarrow[KMnO_4]{alk.} A$
      v) $CH_3 - CH_2 - C \equiv C^{\ominus} Na^{\oplus} \xrightarrow{CH_3 - Br} A$

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First Year B.Sc.
BOTANY
BO : 111 : Plant Life and Utilization - I
(CBCS 2019 Pattern) (Semester - I) (Paper - I) (11141)

Time : 2 Hours]   *[Max. Marks : 35*
Instructions to the candidates:
   1)   *Question 1 is compulsory.*
   2)   *Attempt any three questions from Q. 2 to Q. 5.*
   *3)*   *Questions 2 to 5 carry equal marks.*
   4)   *Figures to right indicates full marks.*
   5)   *Draw neat labelled diagrams wherever necessary.*

Q1) Attempt any <u>five</u> of the following.   **[5]**

   a)   What are phanerogams?

   b)   Give any one general character of Algae.

   c)   What is phycobiont?

   d)   What is mycelium?

   e)   Give any one general characters of Hepaticae.

   f)   Enlist any two-sub-divisions of eumycota proposed by Ainsworth (1973).

Q2) a)   Describe thallus structure and lateral conjugation in <u>Spirogyra</u>. **[6]**

     b)   Write any four general characters of dicotyledons.   **[4]**

Q3) a)   Define mycelium? Explain structure of Gill of basidiocarp of <u>Agaricus</u>.**[6]**

     b)   Describe fruticose Lichen.   **[4]**

Q4) a)   Describe structure of antheridium and archegonium in <u>Riccia</u> **[6]**

     b)   Write any four utilization of fungi.   **[4]**

Q5) Write short notes on any four of the following.   **[10]**

a)   Cell structure of <u>Spirogyra</u>.

b)   Algae as fodder.

c)   Algae as food.

d)   Types of thalli in <u>Agaricus</u>.

e)   Sporophyte of <u>Riccia</u>.

f)   Bryophytes in Medicines.

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First Year B.Sc.
BOTANY - II
BO - 112 : Plant Morphology and Anatomy
(CBCS - 2019 Pattern) (Semester - I) (Paper - II) (11142)

Time : 2 Hours]   *[Max. Marks : 35*

Instructions to the candidates:
1) *Q.1 is compulsory.*
2) *Attempt any three questions from Q.2 to Q.5.*
3) *Questions 2 to 5 carry equal marks.*
4) *Figures to the right indicate full marks.*
5) *Draw neat labeled diagrams wherever necessary.*

Q1) Attempt <u>any five</u> of the following: **[5]**
   a)   What is descriptive morphology?
   b)   Define anatomy.
   c)   What is aggregate fruit?
   d)   Write any one function of collenchyma.
   e)   What is indehiscent fruit?
   f)   What is acropetal succession?

Q2) a)   What are vascular tissue? Describe various types of vascular bundle.**[6]**
      b)   Write short note on Uniparous cyme.   **[4]**

Q3) a)   What is adelphy? Describe the types of adelphy.   **[6]**
      b)   Describe stomata in detail.   **[4]**

Q4) a)   Describe primary internal structure of monocot root with labeled diagram. **[6]**
      b)   Define flower. Describe the parts of typical flower.   **[4]**

Q5) Write short notes on any four of the following: **[10]**
   a)   Importance of morphology in plant classification.
   b)   Motor cells.
   c)   Compound gynoecium.
   d)   Mesophyll tissue of Dicot leaf.
   e)   Legume fruit.
   f)   Importance of anatomy in pharmacognosy.

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F.Y. B.Sc.
ZOOLOGY
ZO - 111 : Animal Diversity - I
(CBCS 2019 Pattern) (Semester - I) (11151)

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)   Q2 to Q5 carry equal marks.

Q1) Solve any five of the following.   **[5]**

   a)   Define Gamma taxonomy.

   b)   Define Metazoa.

   c)   Describe Trematoda.

   d)   Define Polymorphism.

   e)   Give two examples of Protozoa.

   f)   Define Regeneration.

Q2) a)   Give the salient features of Porifera.   **[6]**

OR

Define the term binomial nomenclature. Add a note on its significance.

   b)   Write a note on useful Protozoa - Trichonympha.   **[4]**

Q3) a)   With a neat labelled diagram explain the process of conjugation in Paramoecium.   **[6]**

OR

Describe the general characters of Kingdom Animalia.

   b)   Explain Polymorphism in Cnidaria.   **[4]**

Q4) a) Describe in detail the characters of class Cestoda. [6]

OR

Describe the types of Spicules in Sponges.

b) Explain in detail the characters of five Kingdoms. [4]

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

a) Morphological adaptation in Platyhelmenthes.

b) Class Hydrozoa.

c) Regeneration in Sponges.

d) Amoeboid locomotion in Protozoa.

e) Alpha level of taxonomy.

f) Economic importance of coral reefs.

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F.Y. B.Sc.
ZOOLOGY
ZO - 112 : Animal Ecology
(CBCS 2019 Pattern) (Semester - I) (11152)

Time : 2 Hours]   *[Max. Marks : 35*

Instructions to the candidates:
   1) *Question 1 is compulsory.*
   2) *Solve any three questions from Question No.2 to Question No.5.*
   3) *Question No.2 to Question No.5 carry equal marks.*

Q1) Solve any five of the following.   **[5]**

   a)   Define Eutrophication

   b)   Define Food chain

   c)   Define Species dominance

   d)   Define Secondary Succession

   e)   Define Commensalism

   f)   Define Predation

Q2) a)   Explain in detail terrestrial Ecosystem.   **[6]**

OR

   Explain the two types of growth curves.

   b)   Explain the concept of Biosphere.   **[4]**

Q3) a)   Explain interspecific and intraspecific competition in animals. **[6]**

OR

   Explain the process of Primary Succession.

   b)   Explain any two examples of Parasitism.   **[4]**

Q4) a) Explain in brief desert ecosystem. Add a note on different types of deserts.

[6]

OR

Explain the effect of Fecundity and dispersal on Population.

b) Explain the concept of species diversity. **[4]**

Q5) Write short notes on any four of the following. **[10]**

   a) Food Web

   b) Mortality

   c) Ecotone and Edge effect

   d) Beneficial association

   e) Decomposers

   f) Gause's principle.

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F.Y.B.Sc

GEOLOGY

GL-111: Fundamentals of Geology and Understanding the Planet Earth

(2019 Pattern) (Semester - I) (Paper - I) (11161)

Time : 2 Hours]   *[Max. Marks : 35*

Instructions to the candidates:

1) *Qestion no. 1 is compulsory.*
2) *Solve any three questions from Q.2 to Q.5.*
3) *Questions No.'s 2 to 5 carry equal marks.*

Q1) Answer the following in 2-3 lines (any five):   **[5]**

     a) Define structural Geology.

     b) What is the name of our galaxy?

     c) Define Climate change.

     d) Define crust.

     e) Define Asthenosphere.

     f) Enlist the gaseous products of volcano.

Q2) Answer the following.

     a) Describe the various products of volcano.   **[6]**

     b) Explain the fold, fault and joint with neat labeled diagram.   **[4]**

Q3) Answer the following.

     a) Describe the structure & composition of lithosphere.   **[6]**

     b) Describe the importance of Geological time scale.   **[4]**

Q4) Answer the following.

     a) Explain Nebular hypothesis with the help of neat labeled diagram. **[6]**

     b) Explain the various conditions necessary for fossilization.   **[4]**

Q5) Write short note on <u>any four</u> of the following.   **[10]**

     a) Petrification.

     b) Geological time scale.

     c) Carbon dating method.

     d) Oceanic crust.

     e) Causes of volcano.

     f) meteorite.

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First Year B.Sc.

GEOLOGY - II

GL - 112T : Mineralogy and Crystallography

(2019 Pattern) (Semester - I) (Paper - II) (11162)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) Question 1 is compulsory.

2) Solve any three questions from Q.2 to Q.5.

3) Questions 2 to 5 carry equal marks.

4) Neat diagrams must be drawn wherever necessary.

Q1) Solve any five of the following. **[5]**

a) What is plane of symmetry.

b) Define covalent bond.

c) What is isotropic mineral.

d) Draw cyclosilicate structure of mineral.

e) What is luminescence.

f) Define Atoms and Ions.

Q2) Answer the following.

a) Explain any six physical properties of mineral. **[6]**

b) Describe the forms of Hexagonal system type Beryl. **[4]**

Q3) Answer the following.

a) Give tabular classification of minerals based on silicate structure. **[6]**

b) Explain process of crystalusation of minerals from solution. **[4]**

Q4) Anwer the following.

    a)   Define indices of crystal face. Explain Index system of miller.   **[6]**

    b)   Describe the minerals used in manufracturing of paints.   **[4]**

Q5) Write short notes on any Four.   **[10]**

    a)   Pseudomorphism.

    b)   Law of rational indices.

    c)   Branches of mineralogy.

    d)   Oridation and supergene enrichment.

    e)   Jolly's spring balance.

    f)   Enlist the factors related to geometrical and electrical stability of mineral.

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F.Y. B.Sc.

STATISTICS

ST-111 : Descriptive Statistics-I

(2019 Pattern) (Semester - I) (Paper-I) (11171)

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 and statistical table is allowed.*

Q1) A) Choose the correct alternative from each of the following.   **[1 each]**

   i)   The unprocessed data is called_____

   a)   Raw data   b)   Secondary data

   c)   Processed data   d)   Formated data

   ii) The odd order central moments of_____are zero.

   a)   Positively skewed distribution

   b)   Negatively skewed distribution

   c)   Symmetric distribution

   d)   Bernoulli distribution

   iii) With the help of ogive curve, one can determine

   a)   Median   b)   Mean

   c)   Mode   d)   Geometric Mean

   B) State whether following statements are true or false.   **[1 each]**

   i)   CSO stands for Central Service Office.

   ii) Honesty is an example of attribute.

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

   a)   Define kurtosis and explain different types of it.

   b)   Distinguish between SRSWR and SRSWOR.

   c)   For two observations a and b arithmetic mean and geometric mean are 6.5 and 6. Find a and b also find harmonic mean.

P.T.O.

Q3) Attempt any two of the following. **[5 each]**

    a)   What is box plot. state its uses.

    b)   If $Q_{AB}=0$ then prove that $(AB)N=(A)(B)$.

    c)   Compute mean and coefficient of variation for the data given below. 54,61,64,69,58,56,49,57,55,50.

Q4) Attempt any one of the following. **[10 each]**

    a) i)   Define raw and central moments. Express first four central moments in terms of raw moments. **[6]**

        ii)   Examine the consistency of data: **[4]**

                $N=100$, $(A)=30$, $(B)=80$, $(AB)=40$

    b) i)   State and prove any two properties of arithmetic mean. **[6]**

        ii)   If $N=100$, $(A)=47$, $(B)=62$, $(AB)=32$ find the coefficient of association between A and B and interpret it. **[4]**

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[5822]-114
F.Y.B.Sc.
STATISTICS
ST-112: Discrete Probability and Probability Distributions - I
(CBCS 2019 Pattern) (Semester - I) (Paper-II) (11172)

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 have their usual meaning.*

Q1) A) *Choose the correct alternative for the following*:   **[1 each]**

   i)   If random variable (r.v.) X follows discrete uniform distribution on 1,2,3,.....,10 then mean of X is

     a) $\dfrac{9}{4}$ b) $\dfrac{11}{2}$

     c) $\dfrac{9}{2}$ d) $\dfrac{11}{4}$

   ii)   If X is discrete r.v. then

     a) $E(X^2) \geq [E(X)]^2$ b) $E(X^2) = [E(X)]^2$
     c) $E(X^2) \leq [E(X)]^2$ d) $E(X^2) \geq E(X)$

   iii) If $P(A \cap B) = 0$, then the two events A and B are

     a) exhaustive events

     b) dependent events

     c) mutually exclusive events

     d) independent events

  B) State whether the following statements are true or false: **[1 each]**

   i)   A discrete r.v. cannot take negative values.

   ii)   The variance of a r.v. is never negative.

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

a) Define moment generating function(m.g.f) of r.v. X. State and prove its additive property.

b) Explain with one illustration each of the following.

    i) Equiprobable sample space.

    ii) Deterministic experiment.

    iii) Simple event.

c) If X and Y are independent binomial variates with $X \rightarrow B(5, \frac{1}{2})$ and $Y \rightarrow B(8, \frac{1}{2})$ find $p\left[\frac{X+Y}{2} \geq 1\right]$ and $P[X+Y=5]$.

Q3) Attempt any **Two** of the following: **[5 each]**

a) State and prove Baye's theorem.

b) Let $X \rightarrow B(n_1, p)$ and $Y \rightarrow B(n_2, p)$. Further X and Y are independent. Obtain the conditional distribution of X given X+Y= n.

c) The probability mass function(p.m.f.) of a r.v. is

$P(X=x) = Kx$; x=1,2,3.

           = 0 ; o.w.

Find the value of K and variance of X.

Q4) Attempt any **ONE** of the following.

a) i) Define partition of sample space **[2]**

    ii) State properties of distribution function. **[4]**

    iii) Let A and B be two events defined on a sample space Ω such that $P(A) = \frac{3}{4}$ and $P(B) = \frac{5}{8}$ then show that $\frac{3}{8} \leq P(A \cap B) \leq \frac{5}{8}$. **[4]**

b) i) Derive mean and variance of a discrete uniform distribution. **[5]**

    ii) A group of 20 cricket players contains 7 Maharashtrians and remaining non-Maharashtrians. An Indian team of 12 player's is to be formed. What is the probability that one fourth of the players in the team are Maharashtrians? **[5]**

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[5822] - 115
F.Y.B.Sc.
GEOGRAPHY - I
Gg - 111 : Introduction to Physical Geography - I (Geomorphology)
(2019 CBCS Pattern) (Semester - I) (Paper - I) (11181)

Time : 2 Hours]   *[Max. Marks : 35*
Instructions to the candidates:
1) *All questions are compulsory.*
2) *Neat diagrams must be drawn wherever necessary.*
3) *Use of map stencils is allowed.*

Q1) Answer the following questions in twenty words (Any Five): **[5]**

   a)   Define Geomorphology.

   b)   What do you mean by normal fault?

   c)   What do you mean by Gutenburg discontinuity?

   d)   What is meant by plate Boundaries?

   e)   What is minerals?

   f)   Define Mass Movement.

Q2) A)   Explain the following in 50 words each (Any Two): **[6]**

   a)   Components of earth system.

   b)   Block mountain.

   c)   Effects of earthquakes.

   B)   Answer the following questions in two to three sentences. **[4]**

   a)   What do you mean by volcanoes?

   b)   Give the characteristics of Metamorphic rocks.

Q3) A) Explain the following in 50 words each (Any Two): **[6]**

     a)   Evidences of Wegener's Continental Drift Theory.

     b)   Types of Volcanoes.

     c)   Types of Mass Movement.

  B) Answer the following questions in two to three sentences: **[4]**

     a)   What do you mean by applied geomorphology?

     b)   What is Earthquake?

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

    a)   Nature of Geomorphology.

    b)   Types of folding.

    c)   Mechanical weathering.

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[5822]-116

F.Y. B.Sc.

GEOGRAPHY

Gg -112 : Introduction to Physical Geography-II

(Geography of Atmosphere and Hydrosphere)

(2019 CBCS Pattern) (Semester-I) (Paper-II) (11182)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1)   Question no. 1 is compulsory.

2)   Attempt any three questions from questions No. 2 to 5.

3)   Questions No. 2 to 5 carry equal marks.

4)   Use of map stencils is allowed.

Q1) Answer the following questions in 20 words (Any Five) **[5]**

a)   Define the term 'Atmosphere'.

b)   What is insolation?

c)   What do you mean by conduction?

d)   Define planetary winds.

e)   What do you mean by monsoon winds?

f)   Define hydrological cycle?

Q2) a)   Answer the following questions in 100 words (Any Two) **[6]**

i)   Describe the elements of weather and climate.

ii)   Describe 'Polar winds'.

iii)   State the causes of Tides.

b)   Answer the following questions in 150 words (Any One) **[4]**

i)   Describe any four factors affecting on the horizontal distribution of temperature.

ii)   Describe the concept of pressure gradiant.

Q3) a) Answer the following questions in 100 words (Any Two) **[6]**

     i) Explain the water vapour as a component of earth atmosphere.

     ii) Discuss sub-tropical high pressure belts on the earth.

     iii) Explain effect of ocean currents.

   b) Answer the following questions in 150 words (Any One) **[4]**

     i) Explain the concept of 'Lapse rate'.

     ii) Describe 'Antitrade winds.

Q4) a) Answer the following questions in 100 words (Any Two) **[6]**

     i) Describe the ozonosphere of earth atmosphere.

     ii) Describe the equatorial low pressure belt.

     iii) Describe 'albedoof the earth'.

   b) Answer the following questions in 150 words (Any One) **[4]**

     i) Describe the Gaseous component of earth atmosphere.

     ii) Explain the vertical distribution of temperature.

Q5) Write short notes on the following (Any Four) **[10]**

   a) Stratosphere.
   b) Heat budget of the earth.
   c) South-West monsoon winds.
   d) Mountain winds.
   e) Continental shelf.
   f) Types of ocean currents.

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[5822]-117

F.Y. B.Sc.

MICROBIOLOGY

MB - 111 : Introduction to Microbial World

(2019 Pattern) (CBCS) (Semester - I) (Paper - I) (11191)

Time : 2 Hours]   *[Max. Marks : 35*

Instructions to the candidates:

1) *Q.1 is compulsory.*

2) *Solve any three questions from Q.2 to Q.5.*

3) *Questions 2 to 5 carry equal marks.*

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

   a) What was Aristotle's notion?

   b) Name any two plant pathogens.

   c) Name any two food borne diseases.

   d) Carl Woese classified bacteria based on _____.

   e) State True or False : Actinomycetes are filamentous bacteria.

   f) Name any two solvents produced by industrial fermentation.

Q2) a) Describe Any three of the following: **[6]**

     i) Koch's Postulates.

     ii) Edward Jenner's contribution.

     iii) Five domain system of classification.

     iv) Role of Probiotics in human health.

   b) Explain in detail Antony Van Leewenhoek's contributions in Microbiology.

                                                            [4]

Q3) a) Explain Any three of the following: **[6]**

     i)   Discovery of penicillin.

     ii)   Human Microbiome.

     iii) Differentiating characters of Algae.

     iv) Any two bacterial diseases with causative agent.

   b) Explain in detail contributions of Martinus Beijerinck in Microbiology.**[4]**

Q4) a) Discuss any three of the following: **[6]**

     i)   Role of contaminants in Industrial fermentation.

     ii)   Components of first line of defense mechanisms.

     iii) Swan neck flask experiment.

     iv) The use of biocontrol agents in agriculture.

   b) Write differentiating characters of Eubacteria. **[4]**

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

   a) Discovery of viruses.

   b) Characters of Protozoa.

   c) Prions.

   d) Eutrophication.

   e) Use of vaccines.

   f) Discovery of Streptomycin.

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F.Y. B.Sc.
MICROBIOLOGY
MB-112: Basic Techniques in Microbiology
(2019 Pattern) (Semester-I) (CBCS) (Paper-II) (11192)

Time : 2 Hours]   *[Max. Marks : 35*
Instructions to the candidates:
  1)   Q.1 is compulsory.
  2)   Solve any three questions from Q.2 to Q.5
  3)   Questions 2 to 5 carry equal marks.

Q1) Solve any five of the following.   **[5]**

  a)   Name the method used for flagella staining.

  b)   1 ml = _____ μl

  c)   Name any two types of condensors used in microscopy.

  d)   Write any one example of biological indicator used to check efficiency of sterilization.

  e)   Define Sterilization.

  f)   Name any two gaseous agents used as disinfectants.

Q2) a)   Describe any three of the following.   **[6]**

  i)   Mode of action of U.V. rays.

  ii)   Functions of eye-piece

  iii) Role of accentuator

  iv)   Applications of Heavy metals as disinfectants

  b)   Name the method used to check efficiency of disinfectant and describe it.   **[4]**

P.T.O.

Q3) a) Explain any Three of the following. **[6]**

     i) Numerical aperture of compound microscope

     ii) Role of mordents in staining

     iii) Mode of action of Aldehydes as disinfectants

     iv) Applications of Dyes as disinfectants.

  b) Describe spore staining by using any one method. **[4]**

Q4) a) Discuss any Three of the following. **[6]**

     i) Write any two applications of phase contrast microscope.

     ii) What are acidic stains? write about their role in staining.

     iii) Halogens as disinfectants.

     iv) Sterilization by millipore filters.

  b) Describe Acid - Fast Staining **[4]**

Q5) Write Short notes on any Four of the following. **[10]**

  a) Sterilization by moist Heat

  b) Characteristics of Ideal disinfectants

  c) TEM

  d) Spherical aberrations

  e) Quaternary ammonium compounds used for disinfection

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[5822] - 119A

F.Y.B.Sc. (Nanoscience and Nanotechnology)
N.S. - 111 : FUNDAMENTALS OF NANOSCIENCE
(2019 Pattern) (Semester - I) (Paper - I) (11261)

Time : 2 Hours]   *[Max. Marks : 35*
Instructions to the candidate:
1) *Question 1 is compulsory.*
2) *Solve any three questions from Q.2 to Q.5.*
3) *Question 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 <u>FIVE</u> of the following.   **[5]**

   a) What is standard?

   b) What is Nanomanufacturing?

   c) What are ' Documentary Standards'?

   d) Give classification of Nanomaterials.

   e) Define 'Bioluminescence'.

   f) Why total surface area of Gecko's Feet is large?

Q2) A) Attempt any <u>ONE</u> of the following.   **[6]**

     a) Explain in detail 'Nanoscopic colours'.

     b) Explain in detail surface plasma resonance.

   B) Explain the term scanning electron micro scope.   **[4]**

Q3) A) Attempt any <u>ONE</u> of the following.   **[6]**

     a) Describe 'Zero-dimensional nanomaterials' with examples.

     b) Explain in detail X-ray diffraction method.

   B) Explain in detail quantum confinement (auantum size effect).   **[4]**

Q4) A) Attempt any <u>ONE</u> of the following. [6]

    a) Explain in detail carbon nanotubes.

    b) Explain in detail classification of Nanomaterials.

  B) Explain the term detail Nanomechanical tool. [4]

Q5) Attempt any <u>FOUR</u> of the following. [10]

    a) Insect wings.

    b) 2D - Nanomaterial.

    c) Microelectronics.

    d) Nanoplasmonics.

    e) Bioluminescence.

    f) Bucky Balls.

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[5822] - 120

F.Y.B.Sc. (Nano Science & Nanotechnology)
NS - 112 : Materials Science
(2019 Pattern) (Semester - I) (Paper-II) (11262)

Time : 2 Hours]   *[Max. Marks : 35*

Instructions to the candidates:
  1) *Question.1 is compulsory.*
  2) *Solve any THREE questions from Q.2 to Q.5.*
  3) *Questions.2 to 5 carry equal marks.*
  4) *Draw neat labeled diagram wherever necessary.*
  5) *Figures to the right indicate full marks.*

Q1) Attempt any <u>FIVE</u> of the following.   **[5]**

  a)   What is solidus line?

  b)   Calculate Miller indices of crystal plane which cut through the crystal axes at (2a, 3b, c).

  c)   Define alloy

  d)   What is mean by basis?

  e)   Define microporosity of material.

  f)   What is mean by eutectic point?

Q2) A)   Attempt any <u>ONE</u> of the following   **[6]**

  a)   What is atomic radius? obtain an expression of atomic radius for simple cubic & BCC & FCC crystal structure.

  b)   State & explain Gibb's phase rule.

  B)   Explain three dimension crystal structure.   **[4]**

P.T.O.

Q3) A) Attempt any <u>ONE</u> of the following. [6]

    a) Derive an expression for interplaner distance for cubic system.

    b) Give the classification of bonding in solid in brief.

  B) Explain core - shell nano particles in detial. [4]

Q4) A) Attempt any <u>ONE</u> of the following. [6]

    a) Define solubility limit. With neat labeled diagram explain Cu-Ni phase diagram.

    b) Explain porous materials. Also explain types of porous materials.

  B) Explain covalent bond & ionic bond in solids. [4]

Q5) Write a short note on any <u>FOUR</u> of the following. [10]

  a) Metallic soilds.

  b) Aerogels.

  c) Primitive translation vectors.

  d) Types of phase diagram.

  e) Number of atoms in unit cell.

  f) Bravais lattices.

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[5822]-121

F.Y. B.Sc.

ELECTRONICS SCIENCE

EL - 111 : Basics of Applied Electronics

(CBCS 2019 Pattern) (Semester - I) (Paper - I) (11221)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) Q.1 is compulsory.

2) Solve any three questions from Q.2 to Q.5.

3) Questions 2 to 5 carry equal marks.

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

a) Evaluate the value of the resister having colour code : Yellow, Violet, Brown, Gold.

b) List the fuses used in domestic appliances.

c) What is capacitive reactance?

d) State Kirchoff's current law.

e) What is GPS feature in smart phone?

f) Give the two names of Electronic System.

Q2) a) Answer the following:

i) What are different characteristics of switch? **[2]**

ii) State working principle of an inductor. State its specifications & applications in electronics. **[4]**

b) State & prove maximum power transfer theorem. **[4]**

P.T.O.

Q3) a) Answer the following:

    i) What is the effective value of two capacitors, if they are connected in series & parallel. **[2]**

    ii) What are the ideal current & ideal voltage sources? Explain practical voltage & current source. **[4]**

  b) Find Norton's equivalent circuit for the following network. **[4]**
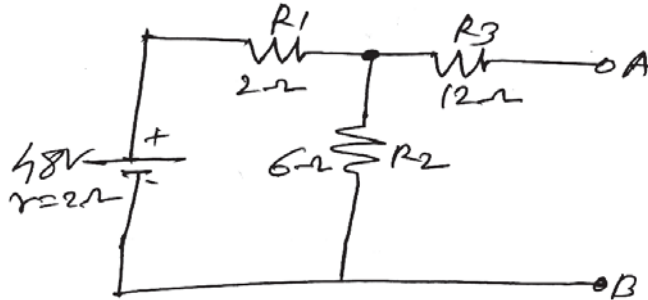
Q4) a) Answer the following:

    i) State Thevenin's theorem & explain term "open circuit voltage" & Equivalent resistance. **[2]**

    ii) What is electronic system? Explain any one with example. **[4]**

  b) What is smart phone system? Discuss its features in brief. **[4]**

Q5) Write short notes on any four of the followings: **[10]**

  a) Applications of Electronics.

  b) Inductors.

  c) Thevenin's theorem.

  d) CCTV system.

  e) Public Adress System.

  f) Thermostat.

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F.Y. B.Sc.

ELECTRONIC SCIENCE

EL - 112 : Electronic Devices & Circuits

(2019 Pattern) (Semester - I) (Paper - II) (11222)
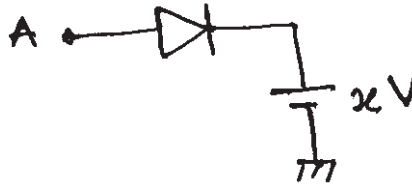
Time : 2 Hours]   *[Max. Marks : 35*

Instructions to the candidates:

   1)   *Q1 is compulsory.*

   2)   *Solve any three questions from Q2 to Q5.*

   3)   *Questions 2 to 5 carry equal marks.*

Q1) Solve any five of the following.   **[5]**

   a)   Draw circuit symbol of zener diode.

   b)   What is Voltage required at point A in the following circuit to make diode (Si) ON?

   c)   State relation between α & β of a transistor.

   d)   BJT is called current controlled device comment.

   e)   Why Si & Ge are not used in fabrication of LED?

   f)   Draw circuit symbol of optocoupler.

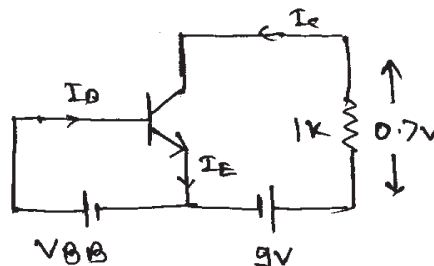*Q2)* a)   i)   Give circuit symbol of LDR & phototransistor.   **[2]**

         ii)   Draw circuit diagrams of forward & reverse bias p-n function & explain its working.   **[4]**

   b)   In the following circuit of $\alpha = 0.96$, calculate collector emitter voltage & base current.   **[4]**

P.T.O.

Q3) a) i) Draw circuit diagram to study I-V characteristics of FET. **[2]**

ii) Describe working of zener diode as voltage regulator. **[4]**

b) Explain working of photodiode with suitable circuit. **[4]**

Q4) a) i) Draw circuit diagram of full wave rectifier. **[2]**

ii) Explain working of MOSFET as switch. **[4]**

b) Describe application of LDR in street light controller. **[4]**

Q5) Attempt any four of the following. **[10]**

a) Define rectifier compare efficiency & ripple factor of half and full wave rectifier.

b) Discuss effect of temp on current in reverse bias diode.

c) Define junction capacitance. How it varies with voltage.

d) Explain working of BJT as switch.

e) Draw circuit diagram of single stage transistor amplifier.

f) Describe use of LED as an indicator in 5V regulated power supply.

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[5822]-123

First Year B.Sc.
PSYCHOLOGY
PSY - 111 : Foundations of Psychology
(2019 Pattern) (Semester - I) (11201)

Time : 2 Hours]   *[Max. Marks : 35*
Instructions to the candidates:
   1)   *Q.1 is compulsory.*
   2)   ***Solve any Three questions from Q.2 to Q.5.***
   3)   ***Questions 2 to 5 carry equal marks.***

Q1) Solve <u>any five</u> of the following: **[5]**
   a)   Define Attention.
   b)   Write the formula of I.Q.
   c)   Define Sensation.
   d)   What is Psychology?
   e)   Define Motivation.
   f)   Define Learning.

Q2) a)   Explain the goals of Psychology. (80 words)   **[6]**
   b)   Explain any two biological Motives. (50 words)   **[4]**

Q3) a)   Explain the experiment on classical conditioning. (80 words).   **[6]**
   b)   State the divisions of mind. (50 words)   **[4]**

Q4) a)   Explain the basic emotions. (80 words)   **[6]**
   b)   State the causes of forgetting. (50 words)   **[4]**

Q5) Write short notes (Any Four):   **[10]**
   a)   Id.
   b)   Educational Psychology.
   c)   Emotional Intelligence.
   d)   Industrial Psychology.
   e)   Big Five Model.
   f)   Gestalt Psychology.

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[5822] - 124
First Year B.Sc.
PSYCHOLOGY
PSY - 112 : Experimental Psychology
(2019 Pattern) (Semester - I) (11202)

Time : 2 Hours]   *[Max. Marks : 35*
Instructions to the candidates:
  1)   Q.1 is compulsory.
  2)   Solve any three questions from Q.2 to Q.5.
  3)   Q. 2 to Q. 5 carry equal marks.

Q1) Solve <u>any five</u> of the following.   **[5]**

  a)   Define independent variable.

  b)   Name any two areas where psychological experimentation can be applied.

  c)   Who established the first psychological laboratory?

  d)   Write down the definition of hypothesis.

  e)   State the fechner's law.

  f)   Define experimental psychology.

Q2) a)   Describe the nature of experimental psychology. (80 words)   **[6]**

  b)   Discuss the necessity of defining research problems. (50 words)   **[4]**

Q3) a)   What is mean by 'Quasi experimental method'? (80 words)   **[6]**

  b)   Differenciate between active & attribute variables. (50 words)   **[4]**

Q4) a)   Discuss basic concepts of psycho-physics. (80 words)   **[6]**

  b)   Discuss the applications of research in learning process. (50 words) **[4]**

Q5) Write short notes on any Four. [10]

a) Non-equivalent quasi-experimental design.

b) Extroneous variable.

c) Sensitivity.

d) Randomization.

e) Point of subjective equality.

f) Contribution of 'wundt' in experimental psychology.

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F.Y. B.Sc.

ENVIRONMENTAL SCIENCE

EVS - 111 : Fundamental of Environmental Biology

(2019 Pattern) (Semester - I) (11241) (Paper-I) (Revised)

Time : 2 Hours]   *[Max. Marks : 35*

Instructions to the candidates:

1)   *Question 1 is compulsory.*

2)   *Solve any three questions from Q. 2 to Q. 5.*

3)   *Neat and labeled diagrams must be drawn wherever necessary.*

4)   *Figures to the right indicate full marks.*

5)   *Questions 2 to 5 carry equal marks.*

Q1) Solve any five of the following.   **[5]**

a)   Define : Biological Diversity.

b)   Write the difference between Era and Period.

c)   What is Speciation?

d)   Define : Taxonomy.

e)   What is mimicry?

f)   What are Bioresources? Give one example.

Q2) Answer the following: **[10]**

a)   Describe some notable events in the evolution of life through geological time.   **[6]**

b)   Explain various factors responsible for current mass extinction. Add a note on current mass extinction.   **[4]**

Q3) Answer the following: **[10]**

a)   Describe Taxonomic objectives and hierarchy.   **[6]**

b)   Discuss various Biogeographic Profile of world.   **[4]**

Q4) Answer the following: **[10]**

    a)   Explain Linnaeus system of classification. **[6]**

    b)   Give detailed account of major varieties of Livestock of India. **[4]**

Q5) Write short notes on any four of the following. **[10]**

    a)   Write Paleontological evidences of mass extinction.

    b)   Write ecological adaptations in Hydrophytes.

    c)   What is vestigiability? Explain with example.

    d)   Write about the concept of species.

    e)   Mention unique faunal biodiversity of India.

    f)   Describe in brief Biogeographical profile of world.

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[5822]-126

F.Y. B.Sc.

ENVIRONMENTAL SCIENCE

EVS - 112 : Fundamentals of Environmental Chemistry and Physics
(2019 Pattern - New) (Semester - I) (11242)

Time : 2 Hours]   *[Max. Marks : 35*

Instructions to the candidates:

1) Question no. 1 is compulsory.

2) Solve any three questions from Q.2 to Q.5.

3) Questions 2 to 5 carry equal marks.

4) Neat labeled diagrams must be drawn wherever necessary.

5) Figures to the right indicate full marks.

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

a) Define Environmental Physics.

b) Enlist any 2 scope of Environmental Chemistry.

c) Define Food Adulteration.

d) Enlist Oxides of Nitrogen.

e) Define Normality.

f) Enlist any 2 harmful effects of Lead on Human Health.

Q2) Answer the following: **[10]**

a) Explain Sulphur Oxide Chemistry.   **[6]**

b) Discuss Harmful effects of Arsenic on Human Health.   **[4]**

Q3) Answer the following: **[10]**

    a)   Enlist and Define Surfactants and types of Surfactants. **[6]**

    b)   Explain Food adulteration with example. **[4]**

Q4) Answer the following: **[10]**

    a)   Explain with neat labelled diagram principle and working of pH meter.**[6]**

    b)   Explain Climate change. **[4]**

Q5) Answer any 4 of the following: **[10]**

    a)   Short note on Titrimetric methods.

    b)   Explain Green Chemistry.

    c)   Explain characteristics of Chemical reaction in Atmosphere.

    d)   Explain Impacts of Soaps and Detergents on Environment and Human Health.

    e)   Discuss scope of Environmental Physics.

    f)   Explain Food additives.

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[5822]-127
First Year B.Sc.
DEFENCE AND STRATEGIC STUDIES
DS - 101 : India's National Security : Key Concept
(2019 Pattern) (Semester - I) (Paper-I) (11231)

Time : 2½ 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 questions. **[5]**

   a) Define National Security

   b) Define Collective Security

   c) State the Meaning of Terrorism

   d) What is the meaning of Human Trafficking

   e) State the role of media in security issue

Q2) Write short notes on (any two) **[10]**

   a) India's National Security

   b) Water and Food Security

   c) Cyber Crime

Q3) Attempt the following questions (any two) **[10]**

   a) Explain the Meaning Elements of State

   b) Explain the Conceptual framework of India's National Security

   c) State the role of civil society in Tackling security challenges

Q4) Answer in details (any one) **[10]**

   a) Explain in detail India and South Asian Problems and Prospects

   b) Discuss in brief the concept of National Power and National Security

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[5822] - 128
First Year B.Sc.
DEFENCE AND STRATEGIC STUDIES
DS - 102 : Evolution of Defence Organization in India
(2019 Pattern) (Semester - I) (11232) (paper - I)

Time : 2 Hours]　　　　　　　　　　　　　　　　　　　*[Max. Marks : 35*
Instructions to the candidates:
　　1)　All questions are compulsory.
　　2)　Figures to the right indiacte full marks.

Q1) Define the following questions.　　　　　　　　　　　　　　**[5]**
　　a)　State the role of central Reserve Police Force (CRPF).
　　b)　Define Intelligence.
　　c)　Explain the Organization setup of Indian Air Forces.
　　d)　Explain the Structure of Indian Army.
　　e)　Define National Security.

Q2) Write short notes on (any two)　　　　　　　　　　　　　　**[10]**
　　a)　National Security Guard (NSG).
　　b)　Indo - Tibetan Border Police (ITBP)
　　c)　Coast Guard.
　　d)　Indian Navy.

Q3) Attempt the following questions (any two)　　　　　　　　　**[10]**
　　a)　Discuss the Objective of Higher Defence Organization.
　　b)　Explain the India's Nuclear Doctrine.
　　c)　Explain the functions of Chiefs of staff committee.
　　d)　Discuss the functions of Assam Rifle (AR).

Q4) Answer in details (any one)　　　　　　　　　　　　　　　**[10]**
　　a)　Explain the functions of Border Security Force (BSF).
　　b)　Discuss the power of president in relation to the armed forces.

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[5822]-129

F.Y. B.Sc.

DEFENCE AND STRATEGIC STUDIES

DS - 103 : India and its Neighbours

(2019 Pattern) (Semester - I) (11233)

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 questions: **[5]**

a)   What do you mean by landlocked countries?

b)   What do you mean by foreign policy?

c)   Define Maritime security.

d)   Define Bureaucracy.

e)   What do you mean by public opinion.

Q2) Write short notes on (any two): **[10]**

a)   India - Myanmar relations.

b)   India - Russia relations.

c)   India - United States relations.

Q3) Attempt the following questions (any two): **[10]**

a)   Explain the India - China border issues.

b)   Explain the India - Maldives relations.

c)   State the Indian role of Bhutan Development.

Q4) Answer in details (any one): **[10]**

a)   Explain India and Sri Lanka relation with special reference to ethnic crisis.

b)   Explain India and Bangladesh relation with special reference to Tin Bigha Corridor.

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[5822]-130
F.Y. B.Sc.
RESTRUCTURING PATTERN
Foundation Course : RE - A-FC - 101
(2019 Pattern) (Semester - I) (Paper - I) (11601)

Time : 2 Hours]   *[Max. Marks : 35*
Instructions to the candidates:
 1) *All questions are compulsory.*
 2) *Figures to the right indicate full marks.*
 3) *Section-A : Theory & Section-B: Practical based activity.*

SECTION - A

Q1) Write short notes on any three of the following in each 150 words.   **[15]**
 a) Nationalism
 b) Socialism
 c) Liberty
 d) Globalization
 e) Privatization

Q2) Write the answer of any one in following questions in 150 words.   **[5]**
 a) Write a brief note on farmer movement in Maharashtra.
 b) Explain the challenges facing liberalization.

SECTION - B

Q3) Solve any one of the following for the given data.   **[5]**
 a) Calculate the percent male population and sex ratio of the Nashik district tahsils for the given data (Supplement - I).

Sr.No.	Name of the Tahsil	Male Population	Female Population	Total Population
1	Nashik	922060	833431	1755491
2	Igatpuri	128999	124514	253513
3	Sinnar	180001	166389	346390
4	Niphad	254768	238483	493251
5	Yevla	139990	131156	271146

(Source : Nashik District Census Handbook - 2011)

OR

P.T.O.

b) Calculate the sex ratio and percent female population of the Nashik district tahsils for the given data (Supplement - II)

Sr. No.	Name of the Tahsil	ST Male Population	ST Female Population	Total Scheduled Tribe Population
1	Nashik	94667	88317	182984
2	Igatpuri	51851	50757	102608
3	Sinnar	23711	22538	46249
4	Niphad	48544	47266	95810
5	Yevla	14582	14489	29071

(Source : Nashik District Census Handbook - 2011)

Q4) Solve any one of the following the given data and interpret the same.   **[10]**

a) Calculate the following demographic characteristics of the given data of Nashik district Tahsils-2011 and interpret the same. (supplement - III)

i) Population density of 2001

ii) Population density of 2011

iii) Sex ratio of 2011

OR

b) Calculate the following demographic characteristics of the given data of Nashik district Tahsils-2011 and interpret the same. (supplement - III)

i) Female percent population

ii) Male percent population,

iii) Population Growth rate of 2001 to 2011.

Sr. No.	Name of the Tahsil	Area	ST Population in 2001	ST Population in 2011	Scheduled Tribe Male and Female Population in 2011		
					Male	Female	Total
1	Niphad	1053.65	79751	95810	48544	47266	95810
2	Sinnar	1352.61	35456	46249	23711	22538	46249
3	Igatpuri	846.32	86370	102608	51851	50757	102608
4	Trimbake-shwar	874.70	106315	135078	67836	67242	135078
5	Deola	568.00	21354	30115	15344	14771	30115

(Source : Nashik District Census Handbook 2001 and 2011)

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F.Y. B.Sc.
RESTRUCTURING PATTERN
Foundation Course : RE - A-FC - 101
(2019 Pattern) (Semester - I) (Paper - I) (11601)

(मराठी रूपांतर)

वेळ : *2 तास]*   *[एकूण गुण : 35*

सूचना :–   *1)*   सर्व प्रश्न सोडविणे आवश्यक आहे.

        2)   उजवीकडील अंक गुण दर्शवितात.

        3)   विभाग–अ: थेअरी व विभाग–ब: प्रॅक्टीकल

विभाग – अ

प्र.1) खालील टिपा प्रत्येकी 150 शब्दांत लिहा. (कोणतेही तीन)   **[15]**

    अ)   राष्ट्रवाद

    ब)   समाजवाद

    क)   स्वातंत्र्य

    ड)   जागतिकीकरण

    इ)   खाजगीकरण

प्र.2) खालीलपैकी कोणत्याही एका प्रश्नाचे उत्तर 150 शब्दांत लिहा. (कोणताही एक)   **[5]**

    अ)   महाराष्ट्रातील शेतकरी चळवळीवर थोडक्यात टीप लिहा.

    ब)   उदारीकरणा समोरील आव्हाने स्पष्ट करा.

विभाग – ब

प्र.3) खालीलपैकी कोणताही एक प्रश्न दिलेल्या सांख्यिकी माहितीच्या आधारे सोडवा.   **[5]**

    अ)   दिलेल्या नाशिक जिल्ह्यातील तालुक्यांच्या लोकसंख्या आकडेवारीवरून पुरूष लोकसंख्या टक्केवारी व लिंग प्रमाण काढा. (परिशिष्ट – I)

Sr.No.	Name of the Tahsil	Male Population	Female Population	Total Population
1	Nashik	922060	833431	1755491
2	Igatpuri	128999	124514	253513
3	Sinnar	180001	166389	346390
4	Niphad	254768	238483	493251
5	Yevla	139990	131156	271146

(Source : Nashik District Census Handbook - 2011)

किंवा

ब) दिलेल्या नाशिक जिल्ह्यातील तालुक्यांच्या लोकसंख्या आकडेवारीवरून लिंग प्रमाण व स्त्री लोकसंख्या टक्केवारी काढा. (परिशिष्ट – II)

Sr. No.	Name of the Tahsil	ST Male Population	ST Female Population	Total Scheduled Tribe Population
1	Nashik	94667	88317	182984
2	Igatpuri	51851	50757	102608
3	Sinnar	23711	22538	46249
4	Niphad	48544	47266	95810
5	Yevla	14582	14489	29071

(Source : Nashik District Census Handbook - 2011)

प्र.4) खालीलपैकी कोणताही एक प्रश्न दिलेल्या सांख्यिकी माहितीच्या आधारे सोडवा व त्याचे स्पष्टीकरण करा. **[10]**

अ) दिलेल्या नाशिक जिल्ह्यातील तालुक्यांच्या लोकसंख्या आकडेवारीवरून खालील लोकसंख्याशास्त्रीय वैशिष्ट्ये मोजा व त्यांचे स्पष्टीकरण द्या. (परिशिष्ट – III)

    i)   लोकसंख्या घनता - 2001

    ii)   लोकसंख्या घनता - 2011

    iii) लिंग प्रमाण - 2011

किंवा

ब) दिलेल्या नाशिक जिल्ह्यातील तालुक्यांच्या लोकसंख्या आकडेवारीवरून खालील लोकसंख्याशास्त्रीय वैशिष्ट्ये मोजा व त्यांचे स्पष्टीकरण द्या. (परिशिष्ट – III)

    i)   स्त्री लोकसंख्या टक्केवारी

    ii)   पुरूष लोकसंख्या

    iii) लोकसंख्या वाढीचा दर: 2001 ते 2011.

Sr. No.	Name of the Tahsil	Area	ST Population in 2001	ST Population in 2011	Scheduled Tribe Male and Female Population in 2011		
					Male	Female	Total
1	Niphad	1053.65	79751	95810	48544	47266	95810
2	Sinnar	1352.61	35456	46249	23711	22538	46249
3	Igatpuri	846.32	86370	102608	51851	50757	102608
4	Trimbacke-shwar	874.70	106315	135078	67836	67242	135078
5	Deola	568.00	21354	30115	15344	14771	30115

(Source : Nashik District Census Handbook 2001 and 2011)

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F.Y.B.Sc. (Vocational)
COMPUTER HARDWARE AND NETWORK ADMINISTRATION
CHNA - 111 : Essentials of Computer - I
(2019 Pattern) (Semester - I) (Paper - I) (11871)

Time : 2 Hours]
Instructions to the candidates:
1) *Q.1 is compulsory.*
2) *Solve any three questions from Q.2 to Q.5.*
3) *Q. 2 to Q. 5 carry equal marks.*

[*Max. Marks : 35*

Q1) Solve any five of the following. **[5]**

 a) Define scanner?

 b) What is BIOS?

 c) List different Input devices of computer.

 d) Define Interrupts.

 e) What is Device Controller.

 f) Write full form of : MICR & ALU.

Q2) a) Draw block diagram of computer system and Explain it. **[6]**

OR

 Draw block diagram of OFF line UPS and Explain it.

 b) Explain the working of DOT matrix printer. **[4]**

Q3) a) Explain structure of BUS in CPU. **[6]**

OR

 Explain working of mouse in details.

 b) Explain the generations of microprocessors. **[4]**

Q4) a) Explain Input output operations of microprocessor. **[6]**

OR

b) What is main and Auxiliary memory.

b) Explain the working of laser printer. **[4]**

Q5) Write short notes on any FOUR of the following:- **[10]**

a) Write a note on Instruction cycle in microprocessor.

b) Write a short note on touch screen.

c) What is digitizer.

d) Write a note on Bluetooth.

e) Explain working of Joystick.

f) What is USB?

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F.Y.B.Sc. (Vocational)
COMPUTER HARDWARE AND NETWORK ADMINISTRATION
CHNA - 112 : Computer Organisation - I
(2019 Pattern) (Semester - I) (Paper - II) (11872)

Time : 2 Hours]   *[Max. Marks : 35*
Instructions to the candidates:
1) *Q.1 is compulsory.*
2) *Solve any three questions from Q.2 to Q.5.*
3) *Question 2 to 5 carry equal marks.*

Q1) Solve any five of the following.   **[5]**

     a)   Define compiler.

     b)   What is need of operating system.

     c)   What is BIOS?

     d)   What is POST?

     e)   Explain Internal Commands of DOS.

     f)   Write notes on LINUX Operating system.

Q2) a)   Explain the architecture of 8086.   **[6]**

                                    OR

         Explain the difference between Simulator and Emulator.

     b)   What are the advantages of Windows operating system.   **[4]**

Q3) a)   Explain flow chart with example.   **[6]**

                                    OR

         Explain control panel settings of windows.

     b)   Compare Hardware and Software.   **[4]**

Q4) a) Write notes on system software.   **[6]**

                              OR

    Explain Desktop in windows.

 b) Explain any two Instructions of 8086.   **[4]**

Q5) Write short notes on any FOUR of the following:-   **[10]**

 a) Write notes on ANDRUID operating system.

 b) Define the function of BIU of 8086.

 c) Define Editor.

 d) Define PHABLET.

 e) Define Application Software.

 f) Explain RTOS.

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F.Y.B.Sc. (Vocational)
BIOTECHNOLOGY
VBt - 111 : Biological Chemistry
(2019 CBCS Pattern) (Semester - I) (11571)

Time : 2 Hours]   *[Max. Marks : 35*
Instructions to the candidates:
  1) *Q.1 is compulsory.*
  2) *Solve any three questions from Q.2 to Q.5.*
  3) *Q. 2 to Q. 5 carry equal marks.*
  4) *Draw neat labelled diagrams wherever necessory.*

Q1) Solve any 5 of the following.   **[5]**

   a)   Give any 2 examples of reducing sugars.

   b)   Define titration curve.

   c)   Give any 2 examples of phospholipids.

   d)   Name any two covalent interactions.

   e)   Give any one function of thiamine.

   f)   Define molarity.

Q2) a)   Answer any two of the following.   **[6]**

   i)   What are biomolecules? Give any two functions of biomolecules in biological systems.

   ii)   Explain the Le-Chaterlier's principle.

   iii) Give any three properties of water.

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

   i)   The molecular weight of NaOH is 40. How will you prepare 100ml, 2m solution of NaOH.

   ii)   You hove 50X stock solution of buffer. How will you prepare 100ml, 1 X working solution of buffer.

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

         i)   Classify carbohydrates with the help of examples.

        ii)   Give any two functions each of the following.

             Vitamins :- Vitamin A, Folic acid, Vitamin - B_{12}.

       iii)   Classify lipids with the help of examples.

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

         i)   Give any four functions of lipids.

        ii)   Give any four functions of carbohydrates.

Q4) a)   Answer any two of the following.   **[6]**

         i)   Classify amino-acids on the basis of nutrition.

        ii)   Explain the concept of mutarotation.

       iii)   Describe halogenation reaction of lipids.

    b)   Give any two functions of Vitamin E and Vidtamin D.   **[4]**

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

    a)   Hydrogen bond.

    b)   pH, pK and their significance.

    c)   Normality and Molality.

    d)   Inversion of Sugars.

    e)   Steroids

    f)   Structure of hemoglobin.

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[5822] - 134
F.Y.B.Sc. (Vocational)
BIOTECHNOLOGY
VBt- 112 : Biotechnology : Concepts and Applications
(CBCS 2019 Pattern) (Semester - I) (Paper - II) (11572)

Time : 2 Hours]   *[Max. Marks : 35*
Instructions to the candidates:
　1) Question 1 is compulsory.
　2) Solve any three questions from Q2 to Q5.
　3) Questions 2 to 5 carry equal marks.
　4) Neat diagram must be drawn wherever necessary.
　5) Figures to the right indicates full marks.

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

　a)　Define GMO.

　b)　What are Probiotics?

　c)　Give the composition of biogas.

　d)　What is Medical Biotechnology?

　e)　Give any 1 important milestone in history of biotechnology.

　f)　Give two examples of functional foods.

Q2) a)　Attempt any two from the following: **[6]**

　　i)　Write a short note on Nutraceuticals.

　　ii)　Discuss the important applications of Biotechnology in day to day life.

　　iii)　Explain the concept of Biosensors.

　b)　Define Biofertilizers. Discuss the types of Biofertilizers with examples.**[4]**

Q3) a)　Attempt any two from the following: **[6]**

　　i)　Explain the role of biotechnology in Vaccine production.

　　ii)　Write a short note on Single Cell protein.

　　iii)　Discuss the types of biofuels.

　b)　Define biotechnology. Discuss the different branches of biotechnology.**[4]**

P.T.O.

Q4) a)   Attempt any two from the following: **[6]**

   i)   Discuss the applications of Biotechnology in Agriculture.

   ii)   Write a short note on Stem cells and regenerative medicine.

   iii) Discuss the Opportunities in Biotechnology in Industry.

   a)   Define Bioremediation. Mention its types & add a note on its applications.
                                                                                 [4]

Q5) Attempt any four from the following.   **[10]**

   a)   Comment on role of Biotechnology in food safety.

   b)   What are Prebiotics? Give examples.

   c)   Comment on herbicide resistant plants.

   d)   What is the role of biotechnology in disease diagnosis.

   e)   Comment on the bioreactors used in waste water treatment.

   f)   Explain the term 'Bt cotton'.

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[5822]-135

F.Y. B.Sc. (Vocational)
SEED TECHNOLOGY
ST - 1.1 : Morphology
(2019 New Pattern) (Semester - I) (Paper - I) (11891)

Time : 2 Hours]   *[Max. Marks : 35*

Instructions to the candidates:

   1)   Q.1 is compulsory.

   2)   Solve any three questions from Q.2 to Q.5.

   3)   Questions 2 to 5 carry equal marks.

Q1) Solve any five of the following.   **[5]**

   a)   Define megasporangium.

   b)   Enlists parts of typical flower.

   c)   What is grafting?

   d)   Define fertilization.

   e)   Give types of endosperm.

   f)   What are orthodox seeds?

Q2) a)   Describe flowers of Fabaceae and liliaceae.   **[6]**

                                    OR

        Explain development of male gametophyte.

   b)   Give difference between seed and grain.   **[4]**

Q3) a)   Comment on process of fertilization in angiosperm.   **[6]**

                                    OR

        Describe types of pollination.

   b)   Explain structure of ovule.   **[4]**

Q4) a) Give an account of capsule and schizocarpic fruits. **[6]**

<div align="center">OR</div>

Discuss types embryo.

b) Comment on flower of solanaceae. **[4]**

Q5) Write short notes on any four of the following. **[10]**

a) Cutting and budding.

b) L.S. of typical flower.

c) Advantages and disadvantages of self pollination.

d) Self pollinated crop species.

e) Apomixis.

<div align="center">⌘⌘⌘</div>

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F.Y.B.Sc. (Vocational)
SEED TECHNOLOGY
ST - 1.2 : Plant Breeding and Testing for Cultiviar Genuineness
(New 2019 Pattern) (Semester - I) (Paper - II) (11892)

Time : 2 Hours]   *[Max. Marks : 35*

Instructions to the candidates:

    1)   *Q.1 is compulsory.*

    2)   *Solve any three questions from Q.2 to Q.5.*

    3)   *Questions 2 to 5 carry equal marks.*

Q1) Solve any five of the following.   **[5]**

    a)   Define pureline selection.

    b)   What is distant hybridization?

    c)   Define totipotency.

    d)   What is clone?

    e)   Define induced mutation.

    f)   What is mass selection?

Q2) a)   Explain history of plant breeding in India.   **[6]**

<div align="center">OR</div>

        Give an account of hybridization procedure for bajara.

    b)   Comment on merits and demerits of plant introduction.   **[4]**

Q3) a)   Discuss applications of mutation breeding.   **[6]**

<div align="center">OR</div>

        Explain procedure for mass selection.

    b)   Comment on advantages and disadvantages of mass selection.   **[4]**

Q4) a)   Explain procedure for clonal selection.   **[6]**

OR

Give an account of somaclonal variation.

b)   Comment on difficulties in hybridization.   **[4]**

Q5) Write short notes on any four of the following.   **[10]**

a)   Selection and Evaluation.

b)   Electrophoresis.

c)   Anther culture.

d)   Characters of pureline selection.

e)   Peroxidase test.

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[5822]-137

F.Y. B.Sc. (Vocational)

INDUSTRIAL MICROBIOLOGY

1 MB - 111 : Introduction to Industrial Microbiology and Microorganisms

(2019 Pattern) (Semester - I) (Paper - I) (Theory) (11821)

Time : 2 Hours]   *[Max. Marks : 35*

Instructions to the candidates:

   1)   *Q.1 is Compulsory.*

   2)   *Solve any three questions from Q.2 to Q.5.*

   3)   *Questions 2 to 5 carry equal marks.*

Q1) Solve any five of the following.   **[5]**

   a)   Define GMP.

   b)   State an example of industrially important proteobacteria.

   c)   What is a trademark?

   d)   Define process of validation in product development.

   e)   State examples for probiotic bacteria.

   f)   _____ is an antibiotic producer.

Q2) a)   Describe :   **[6]**

     i)   What are Intellectual properties? List and describe different types of intellectual properties

                OR

     ii)   Support and suspended culture.

   b)   Write short note on :   **[4]**

     Role of microbiologist in microbiological industry.

Q3) a)   Explain :   **[6]**

     i)   Detailed process of fermentation.

                OR

     ii)   Development of pharmaceutical product.

   b)   Write short note on :   **[4]**

     Characteristics of industrially important microorganisms.

Q4) a) Discuss : **[6]**

       i) WHO classification of microorganisms on the basis of hazard.

<div align="center">OR</div>

      ii) Approach for isolation of industrially important microorganisms.

   b) Write short note on : **[4]**

      Preservation of microorganisms.

Q5) Write short notes on any four of the following. **[10]**

   a) 16 SrRNA and Carl Woose system of classification.

   b) Concept of GRAS.

   c) Culture collection centre.

   d) Draw well-labelled diagram for Bioreactor.

   e) Obsolescence.

   f) Importance of Fungi in industrial microbiology.

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F.Y.B.Sc. (Vocational)
INDUSTRIAL MICROBIOLOGY
IMB - 112 : Introduction to Industrial Process and Economics
(2019 Pattern) (CBCS) (Semester - I) (Paper - II) (11822)

Time : 2 Hours]   *[Max. Marks : 35*

Instructions to the candidates:

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

Q1) Solve any five of the following.   **[5]**

   a) Explain the term 'seed investment.

   b) What is 'exit route'?

   c) What is the role of private investors?

   d) Write examples of any two microorganisms used for production of recombinant proteins.

   e) Why strain improvement is needed?

   f) Define 'Metabolic engineering'.

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

     i) Explain the concept of market need in biotechnology company.

     ii) How are the facilities integrated in biotechnology company?

     iii) Explain the process of strain design with help of a suitable example.

     iv) Write importance of process design optimization.

   b) Explain criteria for design of a fermentation process in details.   **[4]**

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

     i) Explain the concept of competitive advantage'.

     ii) Describe various type of strategies used in process of stain improvement.

     iii) How operating cost estimates are calculated for a biotechnology company?

     iv) Explain the role of scientific advisory board in management.

   b) Write applications of biotechnology in food industry.   **[4]**

P.T.O.

Q4) a) Answer any three of the following: **[6]**

i) Explain with help of flow diagram hierarchical structure of biotechnology company.

ii) Give significance of business plan in a biotechnology company.

iii) Describe 'due diligence' in details.

iv) With help of flow-chart describe the process of strain selection.

b) Describe the significance of design of biotechnology process in its commercial success. **[4]**

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

a) Scientific creativity.

b) Investment in biotechnology.

c) Design exercise.

d) Concept of Biotechnology company.

e) Capital cost estimates.

f) Criteria for optimization of a fermentation process.

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F.Y. B.Sc. (Vocational)

ELECTRONIC EQUIPMENT MAINTENANCE

VOC - EEM - 111 : Maintenance of Domestic Equipments - A (Heating appliances)

(CBCS 2019 Pattern) (Semester - I) (Paper - I) (11811)

Time : 2 Hours]   *[Max. Marks : 35*

Instructions to the candidates:

   1)   *Q1 is compulsory.*

   2)   *Solve any three questions from Q2 to Q5.*

   3)   *Q. No. 2 to Q. No. 5 carry equal marks.*

Q1) Attempt any five of the following.   **[5]**

   a)   What are different terminals of MOSFET?

   b)   What is forward voltage drop of Silicon diode?

   c)   If "No heating" indicator lamp is off, what would be the cause?

   d)   What is the range of frequency of microwave oven?

   e)   What is typical output current of transformer in microwave oven?

   f)   What type of keyboard microwave consists of?

Q2) a)   Answer the following.   **[6]**

      i)   How electromagnetic waves cook food?

      ii)   When door of microwave is closed where power reaches first?

   b)   Explain the parts of Geyser.   **[4]**

Q3) a)   answer the following.   **[6]**

      i)   What is use of nicrome wire? What is it's composition?

      ii)   What is cause if water dripping problem persists in geyser?

   b)   What are the advantages of using tankless water heater?   **[4]**

Q4) a)   Answer the following.   **[6]**

   i)   What are types of induction cooker?

   ii)   What are safety rules while using microwave oven?

b)   What are the differences in induction cooking and microwave cooking?**[4]**

Q5) Write short notes on any four of the following.   **[10]**

a)   Advantages of induction cooker technology.

b)   Magnetron.

c)   Troubleshorting steps of microwave oven.

d)   Working of Induction Cooker.

e)   Working of Thermostat in Geysor.

f)   Features of induction Cooking.

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F.Y.B.Sc. (Vocational)
ELECTRONIC EQUIPMENT MAINTENANCE
VOC - EEM- 112 : Elements of Electronic Equipment Design - A
(PCB Techniques)
(2019 CBCS Pattern) (Semester - I) (Paper - II) (New) (11812)

Time : 2 Hours]　　　　　　　　　　　　　　　　　　　　*[Max. Marks : 35*
Instructions to the candidates:
　　1)　Question 1 is compulsory.
　　2)　Solve any three questions from Que. 2 to 5.
　　3)　Questions 2 to 5 carry equal marks.

Q1) Attempt any Five of the following.　　　　　　　　　　　　　**[5]**

　　a)　How to choose PCB material?

　　b)　What is routing topology?

　　c)　What is solderability?

　　d)　How to solder QFN type IC by hand?

　　e)　How to solder surface mount resistor?

　　f)　What is lead free soldering?

Q2) a)　Attempt the following:　　　　　　　　　　　　　　　　**[6]**

　　　　i)　Mention the tips for successful soldering.

　　　　ii)　What are the parameters which requires attentions while recycling a
　　　　　　PCB?

　　b)　Explain with a neat diagram temperature controlled soldering iron.　**[4]**

Q3) a)　Attempt the following:　　　　　　　　　　　　　　　　**[6]**

　　　　i)　What are the factors affecting PCB cost?

　　　　ii)　Draw a flow diagram for sequence of steps required for drawing of
　　　　　　network?

　　b)　Write a short note on SMD work station.　　　　　　　　　**[4]**

Q4) a)   Attempt the following: **[6]**

       i)   Enlist the precautions taken while soldering.

      ii)   What are the steps in PCB designing?

    b)   Mention accessories used for soldering. Explain their functions.   **[4]**

Q5) Attempt any four of the following.   **[10]**

    a)   State different parts of layout & explain their use.

    b)   How to decide the shape of PCB antenna for perticular frequency?

    c)   Explain different types of soldering techniques.

    d)   Distinguish between through hole and surface mount technology.

    e)   Discuss the problems with hot air soldering.

    f)   Explain types of soldering joints

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