Total No. of Questions : 4]

SEAT No. : ____

PC-1208

[Total No. of Pages : 3

[6327]-1

S.Y. B.Sc.

MATHEMATICS

MT-231 : Calculus of several Variables

(2019 Pattern) (Credit System) (Semester - III) (23111)

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 × 1 = 5]**

a) Find the domain of the function $f(x,y)=\sqrt{2x-y}$.

b) Show that $\lim_{(x,y)\to(0,0)} \frac{x^2-y^2}{x^2+y^2}$ does not exist.

c) Find the first order partial derivatives of the function $f(x, y) = y^5 - 3xy$.

d) Verify that $f(x, y) = x^2y + 2xy^2 + 5y^3$ is homogeneous function of degree 3.

e) Find the critical point of the function $f(x, y) = x^2 + xy + y^2 + y$.

f) State Clairaut's theorem.

g) Evaluate $\int_0^3 \int_1^2 x^2 y\, dy\, dx$.

P.T.O.

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

i) If $f(x, y)$ is a function of two variables, write the formulas for $f_x(x, y)$, $f_y(x, y)$, $f_{xx}(x, y)$, $f_{xy}(x, y)$ and $f_{yy}(x, y)$.

ii) Define the limit of a function of two variables. When does $\lim_{(x,y)\to(a,b)} f(x,y)$ not exist?

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

i) Sketch the level curves of the function $f(x, y) = 6 – 3x – 2y$ for the values $k = – 6, 0, 6, 12$.

ii) Find $\lim_{(x,y)\to(0,0)} \frac{3x^2y}{x^2+y^2}$, if it exists.

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

i) Define Laplace's equation, wave equation and harmonic functions.

ii) 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 $\frac{dz}{dt} = \frac{\partial f}{\partial x}\frac{dx}{dt} + \frac{\partial f}{\partial y}\frac{dy}{dt}$.

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

i) If $z = x^2y^3$, $x = s\cos t$, $y = s\sin t$, use the chain rule to find $\frac{\partial z}{\partial s}$.

ii) Find the absolute maximum and minimum values of $f(x, y) = x^2 + y^2 – 2x$ on the set D, a closed triangular region with vertices (2, 0), (0, 2) and (0, –2).

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

i) Write the method of Lagrange multipliers with one constraint.

ii) State Fubini's theorem. Write the formula for change of Cartesian coordinates to polar coordinates in a double integral.

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

i) Evaluate

$$\iint_D y^2 dA,$$

where D = $\{(x, y) / -1 \le y \le 1, -y - 2 \le x \le y\}$

ii) Evaluate

$$\int_0^2 \int_0^{z^2} \int_0^{y-z} (2x - y)\,dx\,dy\,dz$$

⌘⌘⌘

Total No. of Questions : 4]

SEAT No. :

PC-1209

[Total No. of Pages : 2

[6327]-2

S.Y.B.Sc.

MATHEMATICS

MT-232 (A) : Numerical Methods and its Applications

(2019 Pattern) (CBCS) (Semester - III) (23112 A) (Paper - II)

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

a) Evaluate $\sqrt{102}-\sqrt{101}$ correct upto four significant figures.

b) If the correct value of "e" is 2.71828 and approximate value is 2.7183. Then find Absolute error of "e".

c) State simpson's $(\frac{1}{3})^{rd}$ rule.

d) Evaluate $\Delta 2\ (e^x)$, take h = 1.

e) Write Runge - Kutta second order formula for $\frac{dy}{dx} = f\ (x, y), y(x_0)\, y_0$

f) Evaluate $\int_0^2 y\, d\, x$ by Trapezoidal rule, Where y(0) = 0, y(1) = 1, y(2) =8.

g) Find $\Delta^2\, y_0$, where y_0 = –3, 4, = 3, y_2 = 11.

P.T.O.

Q2) a) Attempt any ONE of the following. **[5]**

i) Write the rules for round - off the number to significant figures.

ii) Explain Runge - Kutta fourth order mehtod.

b) Attempt any ONE of the following. **[5]**

i) Find y_5 and y_6 when $y_0 = 9$, $y_1 = 18$, $y_2 = 20$, $y_3 = 24$ and third order difference being constant.

ii) Evaluate the value of $\sqrt{142}$ using Newton - Raphson method correct upto three decimal places.

Q3) a) Attempt any ONE of the following. **[5]**

i) Derive Newton - Gregory backward difference interpolation formula.

ii) Derive general quadrature formula for numerical integration.

b) Attempt any ONE of the following. **[5]**

i) Find the real root of the equation $x^2 - 3x + 1 = 0$ by Regula Falsi method (two iterations).

ii) Evaluate $\int_0^6 x^2\,dx$ by simpson's $\left(\frac{3}{8}\right)^{th}$ rule, take $h = 1$.

Q4) a) Attempt any ONE of the following. **[5]**

i) Derive simpson's $\left(\frac{3}{8}\right)^{th}$ Rule.

ii) Explain picard's method of successive approximations.

b) Attempt any ONE of the following . **[5]**

i) Using Lagrage's interpolation formula find $f(3)$, given that $f(1) = 2$, $f(2) = 4$ and $f(5) = 32$.

ii) Given $\frac{dy}{dx} = x^2 + y$ with y (0) = 1, h = 0.01, find y(0.02) using Modified Euler's method.

⌘⌘⌘

Total No. of Questions : 4]

SEAT No. : ____

PC-1210

[Total No. of Pages : 3

[6327]-3
S.Y. B.Sc.
MATHEMATICS (Paper - II(B))
MT - 232(B) : Graph Theory
(2019 Pattern) (Credit System) (Semester - III) (23112B)

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

Instructions to the candidates :

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

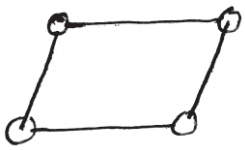
Q1) Attempt any One of the following : **[5]**

a) Draw a 3-regular graph on 2 vertices.

b) What is null graph?

c) What is Path?

d) Is the following graph Euler?



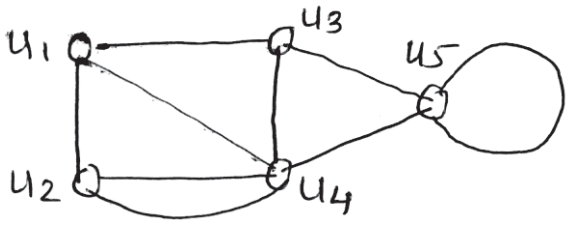
e) A tree has 100 vertices then find the number of edges in it.

f) If T is a binary tree with 11 vertices then find the maximum height of T.

g) What is the edge connectivity of a disconnected graph?

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

i) Construct adjacency matrix of following graph.



ii) If G is self complementary graph on n vertices then prove that n must be of the type $4k$ or $4k + 1$, Where k is an integer.

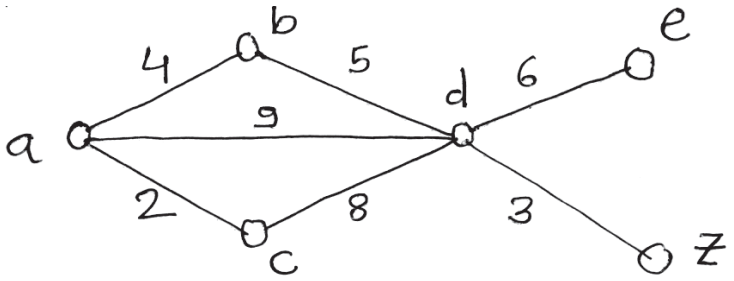
OR

P.T.O.

b) Attempt any One of the following : **[5]**

i) Determine whether the degree sequence
6, 5, 5, 4, 3, 3, 2, 2, 2 is graphical.

ii) Apply Dijkstra's algorithm to the graph given below and find the shortest path from a to z



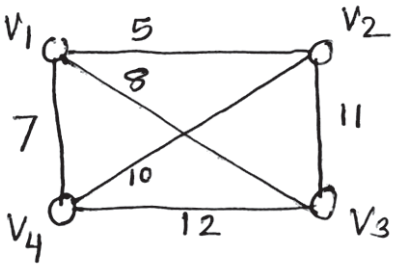
Q3) a) Attempt any One of the following : **[5]**

i) Prove that number of vertices in a binary tree is always odd.

ii) In a tree T, prove that there is one and only one path between any two vertices.

b) Attempt any One of the following : **[5]**

i) Solve the following travelling salesman problem.



ii) Let G be a graph with 10 vertices and 12 edges. Let T be a Spanning tree of G. Find the number of branches and chords of G w.r.t. T.

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

i) Let G be a connected graph with n vertices and e edges then prove that $\lambda(G) \leq \left[\frac{2e}{n}\right]$, where $[x]$ denotes the greatest integer not greater than x.

ii) Construct a graph G with
$K(G) = \lambda(G) = \delta(G) = 3$

b) Attempt any One of the following : **[5]**

i) Represent the expression $(2a + 3b)^7 (x + 4)^3$ using binary tree. Also write this expression in Prefix notation.

ii) Draw a graph $K_{4,5}$. Find vertex and edge connectivity of given graph $K_{4.5}$.

▽▽▽▽

Total No. of Questions : 5]

SEAT No. : ____

PC-1211

[Total No. of Pages : 2

[6327]-4
S.Y. B.Sc.
PHYSICS - I
PHY - 231 : Mathematical Methods in Physics - I
(2019 Pattern) (CBCS) (Semester - III) (23121) (Paper - I)

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) ***Figures to the right indicate full marks.***
5) ***Use of calculator is allowed.***

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

a) If $Z = i + i^2$, obtain real and imaginary part of complex number.

b) What is ordinary differential equation.

c) What do you mean by unit vector?

d) What is Argand diagram?

e) Obtain divergence of position vector $\bar{r} = x\hat{i} + y\hat{j} + z\hat{k}$.

f) State order and degree of the following differential equation

$$\left(\frac{d^2y}{dx^2}\right)^3 + \frac{dy}{dx} + xy^2 = 0.$$

Q2) a) Answer the following :

i) Explain addition of two complex numbers by using Argand diagram. **[3]**

ii) Show that $\vec{\nabla} \times \vec{\nabla}\varphi = 0$. **[3]**

OR

What is scalar triple product? Show that the scalar triple product represents the volume of parallelopiped. **[6]**

b) Find percentage error in the area of ellipse when an error of 1% is made in measuring it's major and minor axes. **[4]**

P.T.O.

Q3) a) Answer the following :

i) Explain the term field, scalar field and vector field. **[3]**

ii) Find the area of a triangle having vertices of P(1, 3, 2), Q(2, –1, 1), R(–1, 2, 3). **[3]**

OR

If $F = x^2y + xy^2 - axy$, find F_{xx}, F_{yy} and F_{xy}, F_{yx}. **[6]**

b) Determine the values of x and y, if $x + iy = \left(1 + i\sqrt{3}\right)^4$. **[4]**

Q4) a) Answer the following :

i) Given that : $\vec{a} \cdot \vec{b} = \vec{a} \cdot \vec{c}, \vec{a} \times \vec{b} = \vec{a} \times \vec{c}$ and $\vec{a}$ is a non-zero vector. Show that $\vec{b} = \vec{c}$. **[3]**

ii) Prove that the vector $\vec{A} = 3yz\hat{i} + zx\hat{j} + 4xy\hat{k}$ is Solenoidal. **[3]**

OR

Show that the point $x = 0$ is regular singular point of Bessel differential equation

$$x^2 \frac{d^2y}{dx^2} + x\frac{dy}{dx} + (x^2 - n^2)y = 0$$ **[6]**

b) Obtain the approximate value of $\sqrt{(2.99)^2 + (3.99)^2}$ using total differential equations. **[4]**

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

a) Express $\frac{1+2i}{1-3i}$ in the polar form.

b) State any three partial differential equations which occour in Physics.

c) Show that $\vec{\nabla} \cdot \vec{\nabla}\phi = \nabla^2\phi$.

d) Show that the equation

$df = (y^2 - y + 2xy)dx + (x^2 - x + 2xy)dy$ is an exact differential equation.

e) Obtain the quadratic equations whose roots are $(1 + i)$ and $(1 - i)$.

f) Find the angle between $\vec{A} = 2\hat{i} + 2\hat{j} - \hat{k}$ and $\vec{B} = 6\hat{i} - 3\hat{j} + 2\hat{k}$.

▽▽▽▽

Total No. of Questions : 5]

SEAT No. : ____

PC-1212

[Total No. of Pages : 4

[6327]-5

S.Y. B.Sc.

PHYSICS

PHY-232(A) : ELECTRONICS

(2019 Pattern) (CBCS) (Semester - III) (Paper - II) (23122A)

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) ***Question 2 to 5 carry equal marks.***
4) ***Use of calculator is allowed.***
5) ***Figures to the right indicate full marks.***

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

a) State maximum power transfer theorem.

b) What are different configuration of transistor?

c) Draw the symbol of UJT.

d) What is meant by input offset voltage of Op-Amp?

e) Give any two advantages of negative feedback.

f) Convert binary number $(11101)_2$ to decimal number.

Q2) **Answer the following :**

a) Explain input and output characteristics of common - emitter configuration of a transistor. **[6]**

OR

With circuit diagram, explain collector to base bias method of transistor biasing. Give it's advantages.

b) Draw the circuit diagram of op-Amp as an inverting amplifier and derive equation for it's gain. **[4]**

P.T.O.

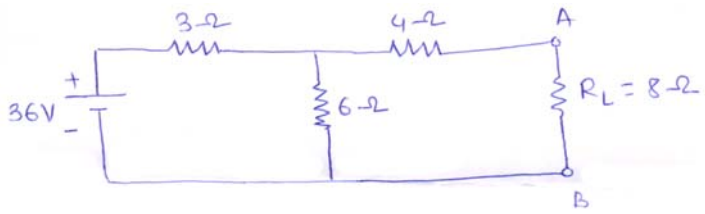
Q3) **Answer the following :**

a) Draw and explain the circuit diagram for op-Amp as an adder. Derive the necessary formula. **[6]**

OR

Discuss the phase shift oscillator with circuit diagram using IC 741.

b) Thevenize the following circuit and calculate the load current I_L through load resistor R_L. **[4]**

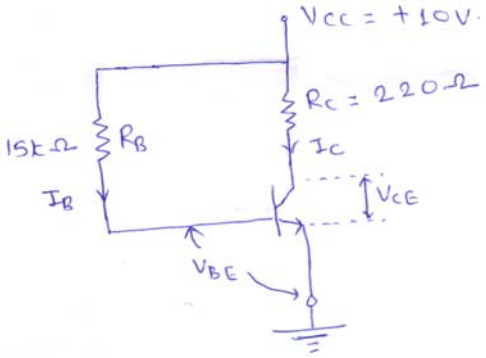


Q4) **Answer the following :**

a) i) Explain AND gate with symbol and truth table. **[3]**

ii) Describe d.c load line using common emitter amplifier circuit. **[3]**

b) Find V_{CE} and I_C for the following circuit. Give $\beta = 50$, $V_{BE} = 0.6V$. **[4]**



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

a) State Nortons theorem. How to nortonize a given circuit (Write steps' only).

b) Explain construction of UJT.

c) State and Prove Demorgan's theorem.

d) Draw pin diagram of IC 741.

e) State different types of feedback circuit. Draw circuit of voltage series feedback.

f) Simplify the expression using Boolean algebra.
AB + A(B+C) + B(B + C)

⌘⌘⌘

Total No. of Questions : 5]

PC-1212

[6327]-5
S.Y. B.Sc.
PHYSICS
PHY-232(B) : INSTRUMENTATION
(2019 Pattern) (CBCS) (Semester - III) (Paper - II) (23122B)

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) ***Question 2 to 5 carry equal marks.***
4) ***Use of calculator and logtable is allowed.***
5) ***Figures to the right indicate full marks.***

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

a) What is sensitivity of an instrument?

b) What is signal conditioning

c) State Seebeck Effect.

d) State two common combinations of metals used in a thermocouple.

e) Draw circuit symbol of op-amp.

f) One Pascal is how many bar pressure?

Q2) **Answe the following questions :**

a) What are the functional elements of a typical measurement system? Explain basic functional elements with block diagram. **[6]**

OR

Write a short note on 'Thermal element as a first order system of measurement'.

b) When input voltage of an instrument changes from 10V, to 12V the corresponding output Voltage changes from 50V to 60V. What will be the sensitivity of the instrument. **[4]**

P.T.O.

Q3) **Answer the following questions :**

a) What are displacement transducers? Explain the constructional features of linear and rotary potentiometer. **[6]**

OR

What is piezoelectric effect? Explain what is a piezoelectric transducer? State its applications.

b) State working principle of LVDT. Calculate the core displacement if output voltage developed across terminal of LVDT is 1.5V. The sensitivity of LVDT is 2mV/mm. **[4]**

Q4) **Answer the following Questions :**

a) What are elastic transducers? Explain the construction and working of spiral and helical Bourdon tube. **[6]**

OR

What is sample and hold circuit? With the help of a block diagram explain the working of a sample and hold circuit.

b) Calculate the gain of a non-inverting amplifier when input resistance at the inverting terminal is 10 kΩ and feedback resistance is 200 kΩ. If the feedback resistance is doubled, what is the change in voltage gain. **[4]**

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

a) Bonded strain gauge

b) Buffer amplifier

c) Thermocouple

d) Cantilever beam

e) Standards of measurement

f) Hysteresis

⌘⌘⌘

Total No. of Questions : 5]

SEAT No. : ____

PC-1213

[Total No. of Pages : 2

[6327]-6
S.Y. B.Sc.
CHEMISTRY
CH-301: Physical and Analytical Chemistry
(2019 Pattern) (CBCS) (Semester - III) (23131)

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) **Write any five of the following :** **[5]**

a) Define Absolute error.

b) What is chemisorption?

c) Define order of reaction.

d) Define the term Neutralization point.

e) What is a rate of reaction?

f) Define Neutralization curve.

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

i) Explain the methods of expressing precision.

ii) Give the direct and indirect method of preparation of standard solution.

iii) What is activation energy? Describe any one method for determination of activation energy.

b) For the certain reaction the rate constant K is 2.46×10^{-5} at 273K and 1.63×10^{-3} at 303K, calculate energy of activation of the reaction. **[4]**

(Given: R = 1.987 cal deg^{-1} $mole^{-1}$)

P.T.O.

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

i) What factors affects the amount of gas adsorbed by solid?

ii) Write a note on titration of Strong Acid vs Srtong Base titration.

iii) Derive expression for the rate constant of a first order reaction.

b) For a gaseous reaction, $2HI \rightarrow H_2+I_2$, the half life periods are 40hours and 10 hours, when the initial concentrations of hydrogen iodide are 5 mole lit^{-1} and 20 mole lit^{-1} respectively, calculate the order of reaction. **[4]**

Q4) a) **Write any two of the following :** **[6]**

i) Derive the equation for second order reaction with equal initial concentration.

ii) What is EDTA? Explain two types of EDTA titrations.

iii) Explain Mohr's method for the determination of Chloride and Bromide ions in neutral solution.

b) Calculate the pH of the solution after addition of 26 ml of 0.1N NaoH to 25ml 0.1N HCl during the titration. **[4]**

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

a) Discuss the collision theory of bimolecular reaction.

b) Explain the term standard deviation and Relative Standard deviation.

c) What is standard solution? Explain the terms primary and secondary standard substances.

d) Give any two applications of Adsorption.

e) Explain neutralization curve for weak acid and strong base titration.

f) Define Accuracy and explain Relative error.

Total No. of Questions : 5]

SEAT No. :

PC-1214

[Total No. of Pages : 3

[6327]-7

S.Y. B.Sc.

CHEMISTRY

CH - 302 : Inorganic and Organic Chemistry

(CBCS 2019 Pattern) (Semester - III) (23132) (Paper - II)

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 the right indicate full marks.***

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

a) Calculate the bond order of HF molecule.

b) Define bonding molecular orbital.

c) Define double salt.

d) Draw the structure of Naphthalene.

e) Define Anti-Markovinkov's rule.

f) Why alcohols have higher boiling point than corresponding alkane?

Q2) **a) Attempt any <u>two</u> of the following :** **[6]**

i) Sketch the Π molecular orbitals from the p-p combination of orbitals.

ii) Draw the energy level diagram for carbon molecule and calculate bond order.

iii) What is Friedel Craft alkylation? How is it carried out by using different alkylating agents.

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

i) What are alkyl halide? Give its classification with suitable example.

ii) What do you mean by primary and secondary valency?

P.T.O.

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

i) Distinguish between atomic orbital and molecular orbital?

ii) Explain the bonding in F_2 molecule on the basis of MOT.

iii) Explain Reimer-Tiemann reaction with suitable example.

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

i) Why neon molecule does not exists?

ii) Identify the products 'A' and 'B'.

$$CH_3 - CH_2 - Br \xrightarrow[\text{Alcohol}]{KOH} (A) \xrightarrow{H_2/Ni} (B)$$

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

i) Explain LCAO Principle

ii) What is SN^1 reaction? Discuss the mechanism of SN^1 reaction with suitable example.

iii) What are alcohols? How will you prepare ethyl alcohol from

I) Ethyl Chloride

II) Acetaldehyde

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

i) Calculate bond order 'NO' molecule.

ii) Identify products 'A' and 'B'

$$CH_3 - \underset{\displaystyle Cl}{\underset{|}{CH}} - CH_2 - CH_3 \xrightarrow[aq]{KOH} (A) \xrightarrow[H_2SO_4]{K_2Cr_2O_7} (B)$$

Q5) **Attempt any <u>four</u> the following :** **[10]**

a) Distinguish between bonding and antibonding MO.

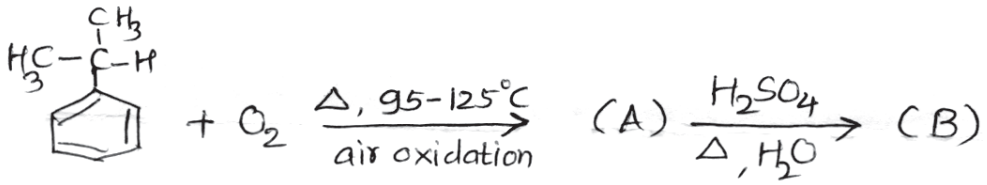
b) Give the IUPAC names of the followings

i) $K_4[Fe(CN)_6]$

ii) $Fe(CO)_5$

iii) $Li[AlH_4]$

c) Identify the reaction product 'A' and 'B"



d) Explain nitration phenol with suitable example.

e) Write note on Aromaticity.

f) What are phenols? What is the action of following reagent on phenol

I) Br_2/Water

II) Conc. H_2SO_4/25°C

▽▽▽▽

Total No. of Questions : 5]

SEAT No. :

PC1215

[Total No. of Pages :2

[6327]-8

S.Y.B.Sc.(Regular)

BOTANY

BO-231 : Taxonomy of Angiosperms and Plant Ecology

(CBCS 2019 Pattern) (Semester- III) (23141) (Paper-I)

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

Instructions to the candidates:

1) ***Question one 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 diagrams wherever essential.***

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

a) What is long form of APG?

b) Write name of fruit in family Annonaceae.

c) Write any two objectives of taxonomy.

d) Define synecology.

e) What are halophytes?

f) What is alpha diversity?

Q2) a) Write distinguishing characters, floral formula & economic importance of family Brassicaceae. **[6]**

b) Write adaptive internal features of hydrophytes. **[4]**

Q3) a) What is binomial nomenclature? Write its advantages. **[6]**

b) Write merits & limitations of Bentham & Hooker's system of classification. **[4]**

P.T.O.

Q4) a) What is concept of hotspots of diversity? Comment on various hotspot of diversity in India. **[6]**

b) Describe economic importance of family Solanaceae. **[4]**

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

a) Concept of systematics.

b) Flower of Amaryllidaceae.

c) Rank and ending of taxa names.

d) Transect method

e) Classification of Xerophytes.

f) Wetland ecosystem.

Total No. of Questions : 5]

SEAT No. :

PC-1216

[Total No. of Pages : 2

[6327]-9
S.Y. B.Sc.
BOTANY
BO-232 : Plant Physiology
(2019 Pattern) (CBCS) (Semester - III) (Paper - II) (23142)

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

Instructions to the candidates:

1) ***Question 1 is compulsory.***
2) ***Attempt any three questions from Q2 to Q5.***
3) ***Questions 2 to 5 carry equal marks.***
4) ***Figures to right indicate full marks.***
5) ***Draw neat labelled diagrams wherever necessary.***

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

a) Define transpiration.

b) Write role of water in photosynthesis.

c) Define plant physiology.

d) What is Scarification?

e) Define Vernalization.

f) What is Symbiotic nitrogen fixation?

Q2) a) Explain External and Internal factors affecting rate of transpiration. **[6]**

b) What is seed dormancy? Describe any three types of seed dormancy. **[4]**

Q3) a) What is nitrogen fixation? Explain non-symbiotic nitrogen fixation. **[6]**

b) Explain transpiration pull theory of ascent of sap. **[4]**

P.T.O.

Q4) a) What is photoperiodism? Explain applications of photoperiodism? **[6]**

b) Describe factors affecting rate of water absorption. **[4]**

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

a) Exudation

b) Stomatal transpiration

c) Applications of plant physiology

d) Factors affecting ascent of sap

e) Ammonification

f) Significance of seed dormancy

Total No. of Questions :5

SEAT No. : ____

PC-1217

[Total No. of Pages : 2

[6327]-10
S.Y. B.Sc. (Regular)
ZOOLOGY
ZO-231: Animal Diversity - III
(CBCS) (2019 Pattern) (Paper -I) (Semester - III) (23151)

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

Instructions to the candidates :

1) ***Q.1 is compulsory.***
2) ***Solve any THREE questions from Q2 to Q5.***
3) ***Question from 2 to 5 carries equal marks.***

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

a) Give one character of protochordata.

b) Write one example of Agnatha.

c) What is yolk sac placenta in Scoliodon?

d) Write one example of Hemichordata.

e) What is siphon in Scoliodon?

f) Write any one function of cerebrum.

Q2) a) Describe internal structure of heart of Scoliodon. **[6]**

OR

Write the general characters of sub-phylum vertebrata.

b) Give the salient features of class Amphibia. **[4]**

Q3) a) Describe any two types of scales in fishes. **[6]**

OR

Sketch and label female reproductive system of Scoliodon.

b) Give external characters of Scoliodon. **[4]**

P.T.O.

Q4) a) Describe the brain of Scoliodon. **[6]**

OR

Give the salient features of cephalochordata.

b) Describe the digestive glands in Scoliodon. **[4]**

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

a) Homocercal fin

b) Origin and Ancestry of chordates

c) Economic importance of Scoliodon

d) Food and feeding mechanism of Scoliodon

e) Parental care in Apoda

f) Holobranch in Scoliodon

Total No. of Questions : 5]

SEAT No. :

PC-1218

[Total No. of Pages : 2

[6327] - 11
S.Y.B.Sc.
ZOOLOGY (Theory)
ZO-232: Applied Zoology - I
(2019 Pattern) (CBCS) (Semester - III) (Regular) (23152) (Paper - II)

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

Instructions to the candidates:

1) ***Q.No. 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 deflossing.

b) What is biological name of blister beetle?

c) Define mounting

d) What is pesticide?

e) Define Reeling

f) Define biological control

Q2) a) Describe marks of identification, nature of damage and control measures of Rice weevil. **[6]**

OR

Explain bed cleaning methods of silkworm.

b) Explain knapsac sprayer. **[4]**

P.T.O.

Q3) a) Describe life cycle of Bombyx mori **[6]**

OR

Describe life cycle of mango stem borer.

b) What are biotechnological and biomedical applications of silk. **[4]**

Q4) a) Explain harvesting methods of mulberry. **[6]**

OR

Explain mechanical and pheromenal control measures of pests.

b) Describe any two methods of pruning. **[4]**

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

a) Eri silkworm

b) Nature of damage caused by Rat

c) Stiffing

d) Damage caused by jowar stem borer

e) Pebrine disease of silkworm

f) Veterinary pest

Total No. of Questions : 5]

SEAT No. : ____

PC-1219

[Total No. of Pages : 2

[6327] - 12
S.Y.B.Sc.
GEOLOGY
GL-211: Structural Geology
(2019 Pattern) (Semester - III) (23161)

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

Instructions to the candidates:

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

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

a) What are mylonites?

b) Define structural geology.

c) What is plunging fold?

d) Draw diagram of reverse fault.

e) Brunton compass.

f) Brittle Deformation.

Q2) **Answer the following :**

a) Determination of top of bed by primary sedimentary structures. **[6]**

b) Define shear zone. Give the types of shear zone. **[4]**

P.T.O.

Q3) **Answer the following :**

a) What is rock deformation? Explain mechanism of plastic deformation. **[6]**

b) Write definition and concept of stress and strain. **[4]**

Q4) **Answer the following :**

a) Define folds. Explain parts of folds. **[6]**

b) Define Joints. Give geometric classification of joints. **[4]**

Q5) **Write short notes (any four) :** **[10]**

a) Fore and back bearing

b) Rake and plunge

c) Genetic types of fractures

d) Effect of fault on disrupted strata

e) Throw and Heave

Total No. of Questions : 5]

SEAT No. :

PC-1220

[Total No. of Pages : 2

[6327] - 13
S.Y. B.Sc.
GEOLOGY
GL-212: Palaeontology
(23162 B) (2021 Credit Pattern) (Regular) (Semester - III) (Paper - II)

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

Instructions to the candidates:

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

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

a) Define Index fossil.

b) Define Stromatolites.

c) Name the periods of Mesozoic Era.

d) Draw a neat labeled diagram of Pelecypoda shell.

e) Define regular and irregular echinoids.

f) Enlist any four ornamentation features of gastropoda shell.

Q2) **Answer the following :**

a) Explain modes of preservation of fossils. **[6]**

b) Explain uses of microfossils. **[4]**

P.T.O.

Q3) **Answer the following :**

a) Differentiate between the Brachiopod & Lamellibranch shells. **[6]**

b) Explain Geological Time Scale **[4]**

Q4) **Answer the following :**

a) Describe the morphology of hard parts of Ostracod with neat labeled diagrams. **[6]**

b) Write a note on conditions necessary for fossilisation. **[4]**

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

a) K-T boundary extinction

b) Septa in corals

c) Fossils and post environment

d) Instruments needed for the fossil collection.

e) Apical disc of Echinus

f) Identification of the male & female carapace in Ostracods,

Total No. of Questions : 4]

SEAT No. : ____

PC-1221

[Total No. of Pages : 2

[6327]-14
S.Y. B.Sc.
STATISTICS
ST-231 : Discrete Probability Distributions and Time Series
(2019 Pattern) (Semester - III) (23171)

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.***
4) ***Symbols and abbreviations have their usual meanings.***

Q1) Attempt each of the following :

a) Choose the correct alternative in each of the following : **[1 each]**

i) If $X \rightarrow NB(K, p)$ then which of the following statement is true

A) Mean < Variance B) Mean > Variance

C) Mean = Variance D) Mean $\neq$ Variance

ii) If $(X_1, X_2, ... X_K) \rightarrow MD(n, p_1, p_2, ..., p_K)$ then rank of variance covariance matrix is

A) K – 1 B) K

C) K + 1 D) K + 2

iii) In time series analysis the exponential smoothing method helps to

A) remove trend

B) estimate exponenetial trend

C) estimate logarithmic trend

D) smoothout the fluctuations

P.T.O.

b) State whether each of the following statement is true or false : **[1 each]**

i) If $(X_1, X_2, X_3) \rightarrow MD\left(5, \frac{1}{4}, \frac{2}{4}, \frac{1}{4}\right)$ then corr $(X_1, X_3) = \left(\frac{5}{4}\right)$

ii) If $X_T \rightarrow P(\lambda)$ truncated below at X = 0 then $E(X_T) = \frac{\lambda}{1-e^{-\lambda}}$

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

a) Derive the expression for mean and variance of NB(K, p).

b) Define truncated probability distribution. State the p.m.f. of binomial distribution truncated at X = 0. Also state its mean and one real life situation.

c) Distinguish between seasonal variation and cyclical variation.

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

a) State the p.m.f. of NB(K, p) and derive its m.g.f.

b) State the joint m.g.f. of multinomial distribution of K dimensional r.vector $(X_1, X_2, ... X_K)$. Hence find the marginal distribution of X_i and state its mean and variance.

c) Explain the method of exponential smoothing of estimating the trend values in time series.

Q4) Attempt any one of the following :

a) i) Estimate the trend by using 4 yearly moving average method for the following time series. **[7]**

Year	2000	2001	2002	2003	2004	2005	2006	2007
Sales (in '000 Rs)	90	100	102	93	104	109	102	114

ii) Suppose $X_T \rightarrow P(5)$ truncated below at X = 0 Find $P(1 \leq X_T < 3)$ **[3]**

b) i) If $(X_1, X_2, ... X_K) \rightarrow MD(n, p_1, p_2, ... p_K)$, then find the conditional distribution of X_i given $X_i + X_j = r$. **[7]**

ii) Write a note on irregular variations. **[3]**

Total No. of Questions : 4]

SEAT No. : ____

PC-1222

[Total No. of Pages : 3

[6327]-15
S.Y. B.Sc.
STATISTICS
ST-232 : Continuous Probability Distributions
(2019 Pattern) (Semester - III) (23172)

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.***
4) ***Symbols and abbreviations have their usual meaning.***

Q1) Attempt each of the following :

A) Choose the correct alternative in each of the following : [1 each]

i) $M_x(t)$ denotes moment generating function (m.g.f.) of random variable X of then m.g.f. of $2x + 5$ is

a) $e^{2t} M_x(5t)$ b) $e^{-2t} M_x(5t)$

c) $e^{5t} M_x(2t)$ d) $e^{-5t} M_x(2t)$

ii) Mode of exponential distribution with parameter α is

a) α b) 0

c) $\frac{1}{\alpha}$ d) α^2

iii) For $n(\mu,\sigma^2)$ distribution the third order central moment is

a) 0 b) > 0

c) μ d) σ^2

B) State whether each of the following is true or false : [1 each]

i) If X and Y are continuous independent random variables then $E(Y|X) = E(Y)$.

ii) $N(\mu,\sigma^2)$ distribution is mesokurtic distribution.

P.T.O.

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

a) If random variable X has distribution function

$F(x) = 1 - e^{-4x}$, $x \geq 0$

$= 0$, otherwise

find i) $f(x)$

ii) $E(x)$

iii) $E(x^2)$

b) Obtain the moment generating function of $N(\mu,\sigma^2)$ distribution. Hence obtain it's mean.

c) Joint probability density function of random vector (x,y) is

$f(x,y) = (x + y)$, $0 < x, y < 1$

find ∇ ar $(x + y)$

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

a) Probability density function of random variable x is given as,

$f(x) = k\, x(1 - x)^2$, $0 < x < 1$

$= 0$, otherwise

find i) k

ii) $E(x^r)$

iii) Var (x)

b) If x and y are independent random variables with joint probability density function

$f(x,y) = e^{-x-y}$, $x > 0, y > 0$

$= 0$, otherwise

find i) distribution function of $\frac{x}{y}$

ii) $E\left(\frac{x}{y}\right)$

c) $x \rightarrow N(1, 1)$, $y \rightarrow N(2,4)$ and x and y are independent random variables. Find

i) $p(2x + y > 3)$

ii) $p(3x - 2y < 10)$

Q4) Attempt any one of the following :

a) i) If $x \rightarrow U(a, b)$ Find distribution function of $y = x - a$ and $Z = \frac{x-a}{b-a}$ **[5]**

ii) Obtain moment generating function of exponential distribution with parameter α. Hence find its mean **[5]**

b) i) Obtain mean deviation about mean for standard normal distribution. **[4]**

ii) Define cumulant generating function of random variables x. State the relation between 4^{th} cumulant and 4^{th} order central moment. **[4]**

iii) If $E(y|x) = 3x + 4$ and $E(x) = 0$ find $E(y)$. **[2]**

♦ ♦ ♦

Total No. of Questions : 5]

SEAT No. : ____

PC1223

[Total No. of Pages : 2

[6327]-16

S.Y. B.Sc. (Regular)

GEOGRAPHY

GG-231: Environmental Geography - I

(CBCS 2019 Pattern) (Semester - III) (23181)

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 carries equal marks.***
4) ***Use of map stencil is allowed.***

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

a) Define Ecosystem.

b) Write any two components of Natural Environment.

c) What is Environmental Determinism?

d) Give any two effects of climate change on environment.

e) Name the mountain ranges belongs to Narmada project.

f) Who was the main leader of silent valley Movement?

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

i) Describe 'Equatorial Ecosystem'.

ii) Explain remedial measures of Energy crisisin India.

iii) Explain different effects of Noise pollution.

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

i) Explain the concept of Energy Flow in detail.

ii) Explain different effects of water pollution.

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

i) Explain the chipko movement in brief.

ii) Explain different effects of Nuclear pollution.

iii) Explain 'River Ecosystem' with examples.

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

i) Explain Air pollution in detail.

ii) Give an account of human life in Desert Region.

P.T.O.

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

i) Explain the structure of an Ecosystem.

ii) Describe possibilism.

iii) Explain the role of leaders in 'Narmada Bachao Andolan'.

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

i) Explain Energy crisis in India.

ii) Explain human activities in coastal region.

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

a) Significance of Environmental Geography.

b) Trophic Level.

c) Effects of climate change.

d) Causes of ozone Depletion.

e) Save silent valley Movement.

f) Neo - determinism.

ⓘⓘⓘⓘ

Total No. of Questions : 5]

SEAT No. : ____

PC1224

[Total No. of Pages : 2

[6327]-17
S.Y.B.Sc. (Regular)
GEOGRAPHY
GG-232 : Geography of Maharashtra (Physical - I)
(CBCS 2019 Pattern) (Semester - III) (Paper - II) (23182)

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) ***Question 2 to 5 carry equal marks.***
4) ***Use of map stencil in allowed.***

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

a) How many districts were included under Bombay Presidency of British territory?

b) What do you mean by Perennial river?

c) What is meant by catchment area of the river?

d) Define the term 'Monsoon'.

e) What is the average rainfall of the drought prone region in Maharashtra.

f) What do you mean by soil?

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

i) Explain the Deccan trap.

ii) Give any three distinct physiographic features of Konkan coastal lowland.

iii) Describe the Attributes of Agroforestry.

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

i) Explain the characteristics of Monsoon in Maharashtra.

ii) Describe the formation and distribution of Black cotton soil in Maharashtra.

P.T.O.

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

i) Explain the location and extent of the state of Maharashtra.

ii) Give a brief overview of the Godavari river in Maharashtra.

iii) Explain the importance of monsoon in Maharashtra.

b) Answer the following questions in 150 words. (any one) **[4]**

i) Give an account of Administrative divisions of Maharashtra.

ii) Explain the causes deforestation in Maharashtra.

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

i) Explain the geological structure of Maharashtra.

ii) Give a brief overview of the Bhima river in Maharashtra.

iii) Explain the rainfall distribution in Maharashtra.

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

i) Give the differentiating characteristics of west and East flowing rivers in Maharashtra.

ii) Give an account of social forestry.

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

a) The Bahaman Empire

b) The Maratha Empire

c) The Westernghats

d) Break of monsoon in Maharashtra.

e) Temperature distribution in Maharashtra.

f) Global Warming.

❋ ❋ ❋

Total No. of Questions : 5]

SEAT No. : ____

PC1225

[Total No. of Pages : 2

[6327]-18

S.Y. B.Sc. (Regular)

MICROBIOLOGY

MB-231: Medical Microbiology and Immunology

(CBCS 2019 Pattern) (Semester - III) (23191)

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 carries equal marks.***
4) ***Draw neat labelled diagrams wherever necessary.***
5) ***Figures to the right indicate full marks.***

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

a) Which antigens are present on the red blood cells of 'B' blood group person?

b) Enlist the cells involved in acquired immune response.

c) What is the temperature range for the growth of Staphylococcus aureus?

d) Give any two examples of active immunization.

e) What is epidemic?

f) State true or false - Diabetes is commonest predisposing factor associated with candida infection.

Q2) a) Describe the following (Any two) **[6]**

i) LD_{50}

ii) Rh blood group system

iii) Antibiotic misuse

b) Elaborate on: different types of immunity. **[4]**

Q3) a) Explain the following (Any two) **[6]**

i) Attenuated vaccines

ii) Laboratory diagnosis of Escherichia coli.

iii) Clinical features of candidiasis

b) Write the morphological, cultural and biochemical characteristics of Staphylococcus aureus. **[4]**

P.T.O.

Q4) a) Describe the following (Any two) **[6]**

i) Passive immunization

ii) MRSA

iii) Laboratory diagnosis of UTI

b) Fathers blood group is 'A' and mothers blood group is 'O'. What would be the possible blood groups of their children? **[4]**

Q5) Write short notes on (Any four) **[10]**

a) Virulence

b) Immunogenicity

c) Anatomical barriers of innate immunity

d) Enterotoxigenic E . coli

e) Macrophages

f) Characteristics of dermatophytes

ⓘⓘⓘⓘ

Total No. of Questions :5

SEAT No. : ____

PC-1226

[Total No. of Pages : 2

[6327]-19
S.Y. B.Sc.
MICROBIOLOGY
MB-232: Bacterial Physiology & Fermentation Technology (23192) (Regular) (CBCS) (2019 Pattern) (Paper - II) (Semester - III)

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

Instructions to the candidates :

1) ***Q.1 is compulsory.***
2) ***Solve any <u>THREE</u> questions from Q2 to Q5.***
3) ***Question from 2 to 5 carries equal marks.***
4) ***Draw neat labelled diagrams wherever necessary.***
5) ***Figures to the right indicate full marks.***

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

a) What are ribozymes? Write one example.

b) Define - Respiration.

c) Phosphoglycerate mutase belongs to _____ class of enzymes.

d) Write name of two microorganisms used in industrial production of organic acids.

e) What is secondary metabolites? Write two examples.

f) Human growth hormones are produced by using recombinant DNA technology - State True/False.

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

i) Describe crowded plate technique.

ii) Explain lock & key model of mechanism of enzyme action,

iii) Write advantages of continuous fermentation.

b) Explain biochemical reactions of preperatory phase of glycolysis. **[4]**

P.T.O.

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

i) Explain effect of substrate concentration on enzymes activity.

ii) Write principles of secondary screening.

iii) Describe significance of glycolysis.

b) Explain methods used for preservation & maintainance of industrialy important strains. **[4]**

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

i) What are prosthetic groups? Write it's examples & roles.

ii) Explain amphibolic nature of TCA.

iii) Describe monitoring & Control of pH during fermentation.

b) Draw flow sheet for production of cheege. **[4]**

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

a) Hydrolases

b) Substrate level phosphorylation

c) Allosteric inhibitors

d) Advantages of biofertilizers

e) Impellers & Spargers

f) Carbon sources in fermentation media.

Total No. of Questions : 5]

SEAT No. : ____

PC1227

[Total No. of Pages : 2

[6327]-20

S.Y. B.Sc. (Regular)

NANOSCIENCE AND NANOTECHNOLOGY

NS-231: Physical Techniques for Synthesis of Nanomaterials

(2019 Pattern) (Semester - III) (23261)

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 carries equal marks.***
4) ***Draw neat & labelled diagrams wherever necessary.***
5) ***Figures to the right indicate full marks.***

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

a) Define sputter deposition?

b) What is ultrasonic folliation?

c) Give any two applications of Nanoparticles.

d) Which major nanoparticles are synthesiyed by using plant extract.

e) Give the two method of physical vapour deposition techniques.

f) Draw neat labelled diagram for Ball milling.

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

i) Explain factory affecting Biological synthesis of Nanoparticles.

ii) Explain Ball milling Techniques.

b) Explain in detail mechanical Exfoliation using scotch tape. **[4]**

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

i) Explain synthesis of Gold and silver nanoparticles by plant extract.

ii) Explain laser irradiation in liquids.

b) Explain Electric arc - deposition technique. **[4]**

P.T.O.

Q4) a) Attempt any one of the following. **[6]**

i) Explain synthesis of copper and copper oxide nanoparticals by using plant extract.

ii) Explain Ion - beam deposition technique.

b) Explain Vaccume evaporation technique. **[4]**

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

a) Laser - Assisted exfoliation.

b) Metallorganic chemical Vapour deposition.

c) Plasma inhanced chemical Vapour deposition.

d) Explain R-F- Sputtering.

e) Molecular beam epitaxy.

f) Ultrasonic folliation.

ⓘⓘⓘⓘ

Total No. of Questions : 5]

SEAT No. : ____

PC-1228

[Total No. of Pages : 2

[6327]-21
S.Y.B.Sc.
NANOSCIENCE AND NANOTECHNOLOGY
NS 232: Properties & Nanomaterials
(Physical, Chemical, Optical & Magnetic)
(2019 Pattern) (Semester - III) (Paper - II) (23262)

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) ***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 scattering?

b) What is diamagnetic material?

c) What is mean by electroluminescence?

d) Define hydrophilicity.

e) What is mean by antiferromagnetism?

f) What is immunohistochemistry?

P.T.O.

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

a) What is luminescence? Explain Electroluminescence in brief.

b) With neat labeled diagram explain scanning Electron Microscopy.

B) Explain the terms hydrophobicity and hydrophilicity. **[4]**

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

a) With block diagram explain photoluminescence spectroscopy.

b) What are the paramagnetic substances?

B) Explain types of hardness measurement test. **[4]**

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

a) With neat labeled diagram explain X-ray fluorescence spectroscopic method.

b) Explain Giant Magnetoresistance in brief.

B) Explain gastrointestinal tract. **[4]**

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

a) Colossal magnetoresistance.

b) Quantum size effect

c) Surface plasmon resonance

d) Blue shift and red shift

e) Fluorescent materials

f) Friction of materials

Total No. of Questions : 5]

SEAT No. :

PC-1229

[Total No. of Pages : 2

[6327]-22
S.Y.B.Sc.
EL- 231: Communication Electronics
(2019 Pattern) (Semester - III) (Paper - I) (23221)

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

a) Define the term communication.

b) What is frequency modulation?

c) List the different types of radio receiver.

d) Give the full form of : i) PCM ii) PPM

e) What is MODEM?

f) State Sampling Theorem.

Q2) Answer the following :

a) i) If superheterodyne receiver uses IF of 455 KHz for receiving frequency of 2000 KHz. What is the frequency of local oscillator **[2]**

ii) Explain in brief types of communication. **[4]**

b) Compare serial communication and parallel communication. **[4]**

P.T.O.

Q3) Answer the following :

a) i) Determine signal to noise ratio, If signal power is 1.5 μV and noise power is 0.2 μV. **[2]**

ii) Define amplitude modulation and derive equation of AM wave **[4]**

b) Explain PAM generator with the help of block diagram. **[4]**

Q4) Answer the following :

a) i) List the advantages of digital communication over analog communication. **[2]**

ii) Explain PWM generator with the help of block diagram. **[4]**

b) Explain in brief need of modulation. **[4]**

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

a) Write a short note on siplex and duplex communication.

b) Define following term in case of FM.

i) Frequency Deviation

ii) Carrier swing.

c) Draw diode modulator of AM circuit and show its waveform.

d) Compare AM and FM.

e) Write relation between bit rate and band rate

f) Explain in short concept of ASK.

Total No. of Questions : 5]

SEAT No. : ____

PC-1230

[Total No. of Pages : 2

[6327]-23

S.Y. B.Sc.

ELECTRONIC SCIENCE

EL-232 : Digital System Design

(23222) (2019 Pattern) (Semester - III) (Paper - II) (Regular)

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

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

a) Which gate is used for event detector?

b) What is difference between analog data and digital data?

c) Draw state diagram of MOD-5 counter.

d) What do you mean by full adder circuit?

e) Define excitation table.

f) How many voltage comparators are required to design 4 bit flash ADC?

Q2) a) Answer the following :

i) Define any two specifications of DAC. **[2]**

ii) Explain 3 bit binary up counter with diagram. **[4]**

b) Calculate conversion time and average conversion time of 10 bit counter ADC with 1MHz clock frequency. **[4]**

Q3) a) Answer the following :

i) State and explain classification of logic family. **[2]**

ii) Obtain the logical expression for segment b of BCD to 7 segment decoder to drive common Anode. **[4]**

b) Explain CMOS inverter with circuit diagram. **[4]**

P.T.O.

Q4) a) Answer the following :

i) Give two advantages of k Map over Boolean algebra. **[2]**

ii) Explain MOD-5 counter with timing diagram. **[4]**

b) Explain 4 bit ripple carry adder with diagram. **[4]**

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

a) Explain counter type ADC

b) Write the steps to design combinational logic circuit.

c) 'R-2R ladder is better than resistive divider method DAC' Comment.

d) Write a short note on feaquency measurement system.

e) Describe state table and state diagram.

f) Explain 3 - bit updown counter with diagram.

❖❖❖

Total No. of Questions : 5]

SEAT No. :

PC-1231

[Total No. of Pages : 2

[6327]-24

S.Y.B.Sc.

PSYCHOLOGY

Psychology of Adjustment

(2019 Pattern) (Semester - III) (23201) (Paper - I)

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) ***Question from 2 to 5 carry equal marks.***

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

a) Define loneliness.

b) What is conflict.

c) Write the meaning of coping.

d) Define Adjustment.

e) State the components of communication process.

f) Name the parenting styles.

Q2) a) Evaluate the family life cycle. **[6]**

OR

Describe the various types of Interpersonal conflict.

b) Elaborate the approaches to study human behaviour. **[4]**

Q3) a) Discuss the roots of happiness. **[6]**

OR

Explain the supers model of career Development.

b) Examine the various sources of loneliness. **[4]**

P.T.O.

Q4) a) Investigate the various techniques to improve academic performance. **[6]**

OR

Explain the relationship between technology and communication.

b) Analyze the dimensions of child rearing. **[4]**

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

a) Causes of job stress.

b) Marital Adjustment

c) Conflict management style

d) Authoritarian parenting

e) Symptoms of Loneliness.

f) Nature of Adjustment.

⌘⌘⌘

Total No. of Questions :5

SEAT No. : ____

PC-1232

[Total No. of Pages : 2

[6327]-25
S.Y. B.Sc.
PSYCHOLOGY
Research Methods in Behavioural Science
(2019 Pattern) (Semester - III) (Paper - II) (23202)

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

Instructions to the candidates :

1) ***Q.1 is compulsory.***
2) ***Solve any <u>THREE</u> questions from Q2 to Q5.***
3) ***Questions from 2 to 5 carries equal marks.***

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

a) Define interview.

b) What is research report?

c) Define sampling.

d) State the types of research.

e) What is the meaning of element in sampling.

f) State the steps of report writing.

Q2) a) What are the factors influencing decision of sampling. **[6]**

OR

Explain the advantages and disadvantages of psychological tests.

b) Elaborate the data collection process of research. **[4]**

Q3) a) Discuss the process of experimental research. **[6]**

OR

Examine the application of information technology in research.

b) Analyze the advantages and disadvantages of non-experimental research. **[4]**

P.T.O.

Q4) a) Compare the interview and case study method of data collection. **[6]**

OR

Sketch the structure of research report.

b) Distinguish between probability and nonprobability sampling. **[4]**

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

a) Importance of Research.

b) Participative observation.

c) Steps in research.

d) Need of sampling.

e) Important concepts of sampling.

f) Need of interpretation.

Total No. of Questions : 5]

SEAT No. :

PC-1233

[Total No. of Pages : 2

[6327]-26
S.Y. B.Sc. (Environmental Science)
EVS-231 : ECOLOGY AND ECOSYSTEM
(2019 Pattern) (Semester - III) (23241)

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

Instructions to the candidates:

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

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

a) Define the term Ecosystem.

b) Give any 2 examples of Micronutrients.

c) What is meant by Ecological Niche?

d) Define - primary productivity in an Ecosystem.

e) What is meant by standing crop.

f) Define the term community.

Q2) a) Write short note on Characteristics of a community. **[6]**

b) Explain the mechanism of succession. **[4]**

Q3) a) Write short note on Types of Ecological pyramids with a neat labelled diagram. **[6]**

b) Write short note on - Ecological classification based on Taxonomic affinity. **[4]**

Q4) a) Explain Nitrogen cycle with a neat labelled diagram. **[6]**

b) Write short note on Population Characteristics. **[4]**

P.T.O.

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

a) Y - shaped or 2 channel energy flow model in Energy flow.

b) Human impact on Biogeochemical cycle.

c) Levels of organization in an Ecology.

d) Food web with an example.

e) Ecotone and edge effect.

f) Types of food chain.

Total No. of Questions :5

SEAT No. : ____

PC-1234

[Total No. of Pages : 2

[6327]-27
S.Y. B.Sc.
ENVIRONMENTAL SCIENCE
EVS-232: Natural Resources Conservation and Management
(2019 Pattern) (Paper - 2) (Semester - III) (23242)

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

Instructions to the candidates :

1) ***Q.1 is compulsory.***
2) ***Solve any <u>THREE</u> questions from Q2 to Q5.***
3) ***Question No. 2 to 5 carries equal marks.***

Q1) **Attempt any FIVE of the following:**

a) What is mean by resources? **[1]**

b) What is water logging? **[1]**

c) Enlist any two types of natural resources. **[1]**

d) What are mineral Resources? **[1]**

e) What is soil degradation? **[1]**

f) What is HYV? **[1]**

Q2) **Answer the following :**

a) Describe various problems associated with natural resources. **[6]**

b) Write note on ground water pollution. **[4]**

Q3) **Answer the following :**

a) Describe functions of forest. **[6]**

b) Write note on soil erosion. **[4]**

P.T.O.

Q4) **Answer the following :**

a) Explain in detail of watershed management. **[6]**

b) Write note on green revolution in India. **[4]**

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

a) What are the needs of mineral resources?

b) Rain water Harvesting-explain in short.

c) What is deforestation? Enlist any two causes of deforestation.

d) Write short note on plastic pollution.

e) What is mining?

f) What is energy resources?

Total No. of Questions : 4]

SEAT No. : ____

PC-1235

[Total No. of Pages : 2

[6327]-28
S.Y.B.Sc.
Defence and Strategic Studies
DS 201: Science, Technology & National Security
(2019 Pattern) (Semester - III) (23231)

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

Instructions to the candidates:

1) ***A1l questions are compulsory***
2) ***Figures to the right indicate full marks.***

Q1) **Define the following questions :** **[5 × 1 = 5]**

1) Write the Concepts of Science, Technology.
2) What is Armament Technology?
3) Define 'Military Technology'
4) What is 'Space Vehicles'
5) What are military capabilities?

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

1) Communications & Information Technology
2) Contemporary threats.
3) Impact of Science on Warfare

P.T.O.

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

1) What is State the role of Technology and Conduct of Warfare?

2) Explain in detail Impact of Science & Technology on Warfare.

3) Explain The impact of Science & Technology in National Security

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

1) Explain the relevance of Science & Technology in National Security.

2) State the proliferation of weapons of mass destruction.

Total No. of Questions : 4]

SEAT No. : ____

PC-1236

[Total No. of Pages : 2

[6327]-29
S.Y. B.Sc.
DEFENCE AND STRATEGIC STUDIES
DS 202: Military Geography & Geopolitics
(2019 Pattern) (Semester - III) (23232)

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

Instructions to the candidates:

1) ***A1l questions are compulsory***
2) ***Figures to the right indicate full marks.***

Q1) **Define the following questions :** **[1 × 5 = 5]**

1) Define physical geography.
2) Define Geopolitics.
3) What is Topography
4) Define State.
5) Define Nation.

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

1) Grand Strategy,
2) Buffer States
3) No Man Land.

P.T.O.

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

1) Explain the Meaning & Concepts of Military advantage of peace.

2) State the Sea Power Theory.

3) Explain the Organic Theory of a State.

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

1) Explain in detail Problems of Land-Locked and Buffer States.

2) Explain in detail Strategic Features of the Gulf.

Total No. of Questions : 4]

SEAT No. :

PC-1237

[Total No. of Pages : 2

[6327]-30

S.Y. B.Sc.

DEFENCE AND STRATEGIC STUDIES

DS - 203 : Contemporary Warfare

(2019 Pattern) (Semester - III) (23233)

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 × 1 = 5]**

a) Define Conflict.

b) Define Internal Security.

c) What is national economic performance?

d) Define Energy Security.

e) What is Irregular Warfare

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

a) Warfare

b) Cooperation in science and technology

c) Terrorism

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

a) Explain the Meaning, Concept of Contemporary Warfare.

b) State the India and USA relations.

c) India & China relations.

P.T.O.

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

a) Discuss in detail Terrorism and Insurgency in Asia.

b) Explain in detail the technological base that underpins advanced military capabilities.

⌘⌘⌘

Total No. of Questions : 3]

SEAT No. :

PC-1238

[Total No. of Pages : 1

[6327]-31

S.Y. B.Sc. (Computer Science) (Biotechnology)/BCA)

LA-231: ABILITY ENHANCEMENT COMPULSORY COURSE (AECC) - II

English

(2019 Pattern) (Semester - III) (23321)

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

Instructions to the candidates:

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

Q1) **Attempt any ONE out of the following in about 150-200 words. [15]**

a) How does RK Narayan portray the concept of memeory and death in the story "A Shadow".

b) Write a note on the central theme of the poem 'Where the Mind is without Fear'.

Q2) **Attempt any Two out of the following in about 50-80 words. [10]**

a) Puja introduces her sister to her classmates. write a dialogue for this situation.

b) Rajiv requestes Arun to help him in decorating the stage for a dance programme. write a dialogue for this situation.

c) Arpita apologizes to her teacher for not submitting the project in time. Frame a dialogue for this situation.

Q3) **Attempt any TWO out of the following in about 50-80 words. [10]**

a) Invite a job application letter for the post of a software developer.

b) Write a note on the Do's and Dont's of group discussion.

c) Write any five tips for making presentation.

Total No. of Questions : 3]

SEAT No. :

PC-1239

[Total No. of Pages : 2

[6327]-32

S.Y. B.Sc. (Regular)

MARATHI (मराठी)

AECC-IIB : उपयोजित मराठी

(2019 Pattern) (CBCS) (Semester - III) (Theory) (23331)

वेळ : 2 तास] *[एकूण गुण : 35*

सूचना : *1)* *सर्व प्रश्न सोडविणे आवश्यक आहेत.*

2) *उजवीकडील अंक पूर्ण गुण दर्शवितात.*

प्रश्न 1) अ) खालीलपैकी कोणत्याही पाच प्रश्नांची उत्तरे 20 शब्दांत लिहा. **[5]**

i) भाषेची व्याख्या लिहा.

ii) भाषिक संपर्क म्हणजे काय?

iii) मुद्रित माध्यमे कोणती ते सांगा?

iv) फेसबुकचा शोध कोणी लावला?

v) साहित्याची भाषा कशी असावी?

vi) प्रशासनिक भाषा कशी असावी?

vii) नवसमाजमाध्यमे कोणकोणती आहेत ते सांगा?

ब) खालीलपैकी कोणत्याही दोन प्रश्नांची उत्तरे लिहा. **[10]**

i) अर्ज कसा लिहावा? याची नियमावली सांगा.

ii) कर्तव्य रजेच्या अर्जाचा नमुना लिहा.

iii) वसतिगृहात प्रवेश मिळण्यासाठीचा प्राचार्यांना अर्ज लिहा.

P.T.O.

प्रश्न 2) खालीलपैकी कोणत्याही दोन प्रश्नांची उत्तरे लिहा. **[15]**

अ) माहितीपटासाठी संहितालेखन कसे करावे?

ब) स्तंभलेखनाचे वैशिष्ट्ये सांगून एक उदाहरण द्या.

क) वृत्तपत्रीय लेख लिहिताना कोणती काळजी घ्यावी?

प्रश्न 3) खालीलपैकी कोणत्याही एका प्रश्नाचे उत्तर लिहा. **[5]**

अ) ट्विटर वापरताना कोणती काळजी घ्याल?

ब) फेसबुक या समाजमाध्यमाचे स्वरूप विविध मुद्दयांच्या आधारे स्पष्ट करा.

Total No. of Questions : 3]

SEAT No. :

PC-1240

[Total No. of Pages : 2

[6327]-33

S.Y. B.Sc.

HINDI (हिंदी)

AECC-II C : हिंदी काव्य तथा कहानी साहित्य

(2019 Pattern) (Credit System) (Semester - III) (23341)

पाठ्यपुस्तक : साहित्य संगम, सं.प्रो. डॉ. सदानंद भोसले

समय : 2 घंटे] *[पूर्णांक : 35*

सूचनाएँ : 1) सभी प्रश्न अनिवार्य हैं ।

2) दाहिनी ओर लिखे अंक प्रश्न के पूर्णांक हैं ।

प्रश्न 1) निम्नलिखित में से किन्हीं दो प्रश्नों के उत्तर लिखिए : **[15]**

अ) कवि नागार्जुन ने अकाल के अभावग्रस्त दिनों का वर्णन कैसे किया है?

ब) कवि दुष्यंत कुमार ने राजनीतिज्ञों के झूठे वायदों पर व्यंग्य किया है, ''कहाँ तो तय था चिरागाँ हर एक घर के लिए'' कविता के आधार पर स्पष्ट कीजिए ।

क) 'इसको भी अपनाता चल' कविता का सारांश अपने शब्दो में लिखिए ।

ड) 'पालतू कुत्ता' कविता में औरत की सामाजिक स्थिति का वर्णन कैसे किया है?

इ) कवि ने घर के प्रति निहित लगाव को कैसे अभिव्यक्त किया है?

प्रश्न 2) निम्नलिखित में से किन्हीं दो प्रश्नों के उत्तर लिखिए : **[15]**

अ) 'उसने कहा था' कहानी के बालक – बालिका की बालसुलभ भावनाओं का वर्णन कीजिए ।

ब) सेठ बनारसी दास भिखारिन का धन वापस क्यों देना चाहते हैं?

क) 'ककडी की कीमत' कहानी में चित्रित समस्या पर प्रकाश डालिए ।

ड) 'कप्तान' कहानी देशभक्ति की भावना जगाती है, स्पष्ट कीजिए ।

इ) 'बदबू' कहानी में चित्रित दलित जीवन की त्रासदी कैसे उजागर हुई है?

P.T.O.

प्रश्न 3) निम्नलिखित में से किसी एक प्रश्न का उत्तर लिखिए : **[5]**

अ) 'उसने कहा था' कहानी के लहनासिंह के चरित्र पर प्रकाश डालिए ।

ब) 'इसको भी अपनाता चल' कविता में कवि ने भाईचारे और प्रेम का संदेश दिया है, स्पष्ट कीजिए ।

⌘⌘⌘

Total No. of Questions : 4]

SEAT No. :

PC-1241

[Total No. of Pages : 2

[6327]-34
S.Y. B.Sc.
SANSKRIT
AECC - IV E : Gīrvaṇabhārati
गीर्वाणभारती (निवडक वेचे)
(2019 Pattern) (Credit System) (Semester - III) (23351)

Time : 2 Hours] *[Max. Marks : 40*

Instructions : 1) All questions are compulsory.

सूचना : सर्व प्रश्न सोडविणे अनिवार्य आहेत.

2) Figures to the right indicate full marks.

उजवीकडील अंक प्रश्नाचे पूर्ण गुण दर्शवितात.

***Q1)* Write an answer in 2-4 lines on the following questions.** **[16]**

पुढील प्रश्नांची दोन ते चार ओळीत उत्तरे लिहा.

i) From which original text, lesson 'उपदेशप्रबन्धः' has taken?
'उपदेशप्रबन्धः' हा पाठ कोणत्या मूळ ग्रंथातून घेतली आहे?

ii) Which उपनिषद् is associated to सामवेद?
सामवेदाशी संबंधित उपनिषद् कोणते?

iii) Who is the husband of सुकन्या?
सुकन्येचा पती कोण?

iv) Which are the आश्रमs in Indian tradition?
भारतीयपरंपरेतील आश्रम कोणते?

v) Who was the Son of जबाला?
जबालाचा मुलगा कोण होता?

vi) Who is the Adviser of ज्योतिष्मान् पाद?
ज्योतिष्मान् पाद पादाचा उपदेशकर्ता कोण?

vii) Who is the author of 'अभिज्ञानशाकुन्तलम्'?
'अभिज्ञानशाकुन्तलम्' नाटकाचा रचयिता कोण?

viii) From which original text, lesson 'सत्यकामजाबालकथा' has taken?
'सत्यकामजाबालकथा' हा पाठ कोणत्या मूळ ग्रंथातून घेतला आहे?

P.T.O.

Q2) Write notes (any two) : **[8]**

टीपा लिहा. (कोणतात्याही दोन)

i) **सत्यकामः**

ii) **शतपथब्राह्मणम्**

iii) **शकुन्तला**

Q3) Write short notes (any two) : **[8]**

टीपा लिहा. (कोणतात्याही दोन)

i) **स्तोत्रवाङ्मयम्**

ii) **रामायणम्**

iii) **विनयात् संसाधयेत् कार्यम्**

Q4) Explain the summary of the lesson '**सत्यकामजाबालकथा**'. **[8]**

'सत्यकामजाबालकथा' या पाठाचा सारांश लिहा.

OR /**किंवा**

Explain the summary of the lesson '**छायाग्राहिसत्त्वम्**'.

'छायाग्राहिसत्त्वम्' या पाठाचा सारांश लिहा.

▽▽▽▽

Total No. of Questions : 5]

SEAT No. : ____

PC1242

[Total No. of Pages : 2

[6327]-36

S.Y. B.Sc. (Regular) (Vocational)

COMPUTER HARDWARE AND NETWORK ADMINISTRATION

CHNA-231: Operating System and Diagnostics Tools

(CBCS 2019 Pattern) (Semester - III) (Paper - III) (23871)

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

Q1) Solve any five of the following. **[5×1=5]**

a) Which is better NTFS or FAT?

b) What is FAT?

c) What are the uses of Ms Word?

d) What is a computer virus?

e) Define internet.

f) What are the different types of operating system?

Q2) a) i) What is LAN? Write its advantages. **[2]**

ii) What is difference between SCSI and SSD? **[4]**

b) Draw the block diagram of modem and explain it. **[4]**

Q3) a) i) What is DOS and write it's Features? **[2]**

ii) Differentiate 32-bit OS and 64-bit OS. **[4]**

b) Explain the installation process of new graphics card. **[4]**

P.T.O.

Q4) a) i) List different operating system troubleshooting issues in computer system. **[2]**

ii) Explain multi boot operating system in brief. **[4]**

b) What are the different safety and preventive maintenance tools of computer system. **[4]**

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

a) Antivirus.

b) MS Power point.

c) Corel DRAW.

d) Wireless LAN.

e) Red Hat Linux.

f) Internet.

ⓘⓘⓘⓘ

Total No. of Questions :5

SEAT No. : ____

PC-1243

[Total No. of Pages : 2

[6327]-37

S.Y. B.Sc. (Vocational)

COMPUTER HARDWARE & NETWORK ADMINISTRATION

CHNA - 232 : Microprocessor & Interfacing - I

(23872) (2019 Pattern) (Semester - III) (CBCS)

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

Instructions to the candidates :

1) ***Q.1 is compulsory.***
2) ***Solve any <u>THREE</u> questions from Q2 to Q5.***
3) ***Question 2 to 5 carry equal marks.***

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

a) Write any two conditional flag's in flag register.

b) Define Accuracy of DAC.

c) Name any two Non - Intel processors.

d) Define transducer? List any two.

e) What is Cache Memory?

f) Write full form of USB?

Q2) **Answer the following questions:**

a) i) Write any two features of 8086 microprocessor. **[2]**

ii) Define seeback effect. Explain working of thermocouple. **[4]**

b) Calculate analog output voltage for R-2R Ladder with input of 1101. Consider logic 0 = 0 v & logic 1 = 10 volts. **[4]**

P.T.O.

Q3) **Answer the following questions:**

a) i) What is DAC. List different types of DAC. **[2]**

ii) Write features of core is processor. **[4]**

b) Explain LVDT with appropriate diagram. **[4]**

Q4) **Answer the following questions:**

a) i) Write the full-form of (I) SATA (II) HDMI **[2]**

ii) Describe methods of parallel data transfer with timing diagrams. **[4]**

b) Explain 2 - bit flash ADC. **[4]**

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

a) USB 2.0 and USB 3.0

b) Bus architecture

c) DOS and BIOS interrupt

d) LDR (Light dependent resistor)

e) Software interrupts

f) Computer based design and development tools.

Total No. of Questions :5

SEAT No. : [ ]

PC-1244

[Total No. of Pages : 2

[6327]-38

S.Y. B.Sc. (Vocational) (Biotechnology)

VBT - 211 : Cell Biology & Microbial Genetics

(2019 Pattern) (CBCS) (Semester - III) (Paper - III) (23571)

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

Instructions to the candidates :

1) ***Q.1 is compulsory.***
2) ***Solve any <u>THREE</u> questions from Q2 to Q5.***
3) ***Question from 2 to 5 carries equal marks.***

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

a) Define Plant cell.

b) Give one function of Golgi complex.

c) Name any two types of cell junctions.

d) What are DNA transposons.

e) What was transforming principle.

f) What are components of cell membrane.

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

i) Draw and labell components of Animal cell.

ii) Explain cell theory and postulates of cell theory.

iii) What is cell signalling? Add a note on Apoptosis.

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

i) Explain in detail discovery of transformation.

ii) Comment on Generalized & specialized transduction.

P.T.O.

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

i) Explain in detail different types of conjugation.

ii) Explain in detail concept of membrane transport.

iii) Draw and explain in detail structure of nucleus.

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

i) Explain in detail Gap junction and Desmosomes as types of cell junction molecules?

ii) Explain in detail fluid mosaic model?

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

i) Explain in detail components of cell membrane with functions.

ii) Add a note Lederberg & Tatums experiment.

iii) What are Immunoglobulin superfamily molecules.

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

i) What is homologus recombination. Draw holiday model for homologus recombination.

ii) What are mobile DNA elements. Discuss their role in Prokaryotic organisms.

Q5) **Write short note on any four:** **[10]**

a) Conjugation

b) Specialized Transduction

c) Plasmodesmata

d) Integrins

e) Extra celluar matrix

Total No. of Questions : 5]

SEAT No. : ____

PC-1245

[Total No. of Pages : 2

[6327] - 39
S.Y. B.Sc. (Vocational)
BIOTECHNOLOGY
VBT 212: Molecular Biology
(CBCS) (2019 Pattern) (Semester - III) (23572)

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 molecular biology.

b) What do you understand by phosphodiester bond?

c) What is meant by nucleosome?

d) Define telomeres.

e) Enlist any two post translational modifications.

f) Define the term : Renaturation of DNA.

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

a) Explain the steps involved in initiation of translation in prokaryotes.

b) Describe any one level of eukaryotic genome organization in detail.

c) Explain the steps involved in elongation of replication in prokaryotes.

B) Describe the structure of eukaryotic m-RNA in detail. **[4]**

OR

Distinguish between DNA and RNA.

P.T.O.

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

a) Explain the concept of Wobble hypothesis.

b) Write a short note on oxidising agents.

c) Explain the inhibitors of translation in eukaryotes.

B) Write a short note on 3'poly adenylation process of eukaryotic mRNA. **[4]**

OR

Distinguish between transcription and replication of DNA.

Q4) A) Answer any two of the following: **[6]**

a) Write a short note on ubiquitination.

b) Give the functions of DNA gyrase, SSB proteins and DNA primase in replication of DNA in prokaryotes.

c) Define the terms: Genome and linking number. Give the formula for calculating linking number.

B) Enlist the proteins involved in nucleotide excision repair mechanism. Give their role in nucleotide excision repair mechanism. **[4]**

OR

Write a short note on mismatch repair mechanism.

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

a) Features of replication of DNA.

b) Central dogma of molecular biology.

c) Features of Watson and Crick model of DNA.

d) Role of pre-RC in eukaryotic initiation of replication.

e) Mutations caused by UV rays

f) Features of translation.

Total No. of Questions : 5]

SEAT No. : ____

PC-1246

[Total No. of Pages : 2

[6327] - 40
S.Y. B.Sc. (Vocational)
SEED TECHNOLOGY
ST 2.1: Hybrid Seed Production
(2019 CBCS Pattern) (Semester - III) (Paper - III) (2 Credits) (23891)

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 question 5 carry equal marks.***

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

a) Inbreeding depression

b) Enlist types of apomixis

c) Define cytoplasmic male sterility

d) What is hand pollination?

e) What is roughing?

f) Define seed rate

Q2) a) What is hybrid seed production? Comment on its applications. **[6]**

b) Comment on genetic basis of heterosis. **[4]**

P.T.O.

Q3) a) Define male sterility write a note on cytoplasmic genetic male sterility. **[6]**

b) Discuss homomorphic self incompatibility. **[4]**

Q4) a) Describe the process of hybrid seed production in sunflower w.r.t source of seed, land requirement isolation distance, cultural practices, roughing, harvesting and threshing. **[6]**

b) Comment on sowing, row spacing w.r.t hybrid seed production. **[4]**

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

a) Emasculation

b) Use of genetic male sterility

c) Variety and its types

d) Plant protection in Jowar

e) Pollen storage

f) Applications of hybrid seed production

Total No. of Questions :5

SEAT No. :

PC-1247

[Total No. of Pages : 2

[6327]-41
S.Y. B.Sc. (Vocational)
SEED TECHNOLOGY
ST - 2.2 : Seed Testing
(2019 CBCS Pattern) (2 Credits) (Semester - III) (Paper - II) (23892)

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

Instructions to the candidates :

1) ***Q.1 is compulsory.***
2) ***Solve any <u>THREE</u> questions from Q2 to Q5.***
3) ***Questions 2 to 5 carries equal marks.***

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

a) What is seed testing.

b) Define service seed sample

c) Define a normal seedling

d) What is seed vigour?

e) Enlist any two equipments used in seed testing

f) What is the use of digital moisture meter

Q2) a) Discuss the importance and history of seed testing. **[6]**

b) Comment on ISTA. **[4]**

Q3) a) Comment on service and certification seed samples. **[6]**

b) Discuss purity components in brief. **[4]**

P.T.O.

Q4) a) Write the principles of seed sampling. **[6]**

b) Write the procedure of germination testing w.r.t paper method. **[4]**

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

a) International seed testing association

b) Official seed sample

c) ODV test

d) Moisture testing

e) Seed evaluation w.r.t normal and abnormal seedlings

f) Heterogenecity test

Total No. of Questions : 5]

SEAT No. : ____

PC-1248

[Total No. of Pages : 4

[6327]-46
S.Y. B.Sc./B.Com./B.A
ENVIRONMENTAL STUDIES AWARENESS
(2019 Pattern) (CBCS) (Semester - III) (AECC-I)

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

Instructions to the candidates:

1) ***Que. 1 is compulsory.***
2) ***Attempt any Three questions from Q.2 to Q.5.***
3) ***Q.2 to Q.5 carry equal marks.***

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

a) What is mean by Environmental science?

b) Write any Two goals of sustainable development.

c) What is mean by Deforestation.

d) Enlist levels of Biodiversity.

e) What is the main source of energy in ecosystem?

f) Why is environment important?

Q2) **Answer the following :**

a) Explain in detail Environmental studies scope & importance. **[6]**

b) What is the importance of natural resources? **[4]**

Q3) **Answer the following :**

a) What is the energy Flow in the ecosystem? **[6]**

b) How to protect the environment? **[4]**

P.T.O.

Q4) **Answer the following :**

a) Explain in detail Forest ecosystem. **[6]**

b) Why do we need to protect our ecosystem? **[4]**

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

a) Hydrosphere

b) Wind energy

c) Soil erosion

d) Biofuel

e) Mineral Resources

f) Food resources.

Total No. of Questions : 5]

PC-1248

[6327]-46
S.Y. B.Sc./B.Com./B.A
ENVIRONMENTAL STUDIES AWARENESS
(2019 Pattern) (CBCS) (Semester - III) (AECC-I)
(मराठी रूपांतर)

वेळ : 2 तास] *[एकूण गुण : 35*

सूचना : *1)* *प्रश्न क्र. 1 अनिवार्य आहे.*

2) *प्रश्न क्र. 2 ते 5 मध्ये कोणतेही तीन प्रश्न सोडवा.*

3) *प्रश्न क्र. 2 ते 5 यांना समान गुण आहेत.*

प्रश्न 1) खालीलपैकी कोणतेही पाच प्रश्न सोडवा. **[5]**

अ) पर्यावरण म्हणजे काय?

ब) शाश्वत विकासाची कोणतेही दोन उद्दिष्टे लिहा.

क) जंगलतोड म्हणजे काय?

ड) जैवविविधता परिसंस्थेतील आनुवांशिक प्रणाली पातळी लिहा.

इ) परिसंस्थामध्ये ऊर्जेचा स्त्रोत कोणता आहे?

फ) पर्यावरण का महत्वाचे आहे?

प्रश्न 2) खालील प्रश्नाची उत्तरे लिहा.

अ) पर्यावरणाची व्याप्ती व महत्व थोडक्यात स्पष्ट करा. **[6]**

ब) नैसर्गिक संसाधनांचे महत्व काय आहे? **[4]**

प्रश्न 3) खालील प्रश्नांची उत्तरे द्या.

अ) परिसंस्थेतील ऊर्जाप्रवाह स्पष्ट करा. **[6]**

ब) पर्यावरणाचे रक्षण कसे करावे? **[4]**

प्रश्न 4) खालील प्रश्नांचे उत्तरे द्या.

अ) वन परिसंस्थेचे तपशीलवार वर्णन करा. **[6]**

ब) आपल्याला आपल्या परिसंस्थेचे संरक्षण करण्याची आवश्यकता का आहे? **[4]**

प्रश्न 5) थोडक्यात टिपा लिहा (कोणतेही चार) **[10]**

अ) जलावरण

ब) पवनऊर्जा

क) मृदा धूप

ड) जैवइंधन

इ) खनिज संसाधने

फ) अन्न संसाधने

Total No. of Questions :5

SEAT No. :

PC-1249

[Total No. of Pages : 2

[6327]-47
S.Y. B.Sc.
GEOLOGY
GL - 212 : Principles of Stratigraphy & Sedimentation
(2019 Pattern) (Semester - III) (23162 A)

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

Instructions to the candidates :

1) ***Q.1 is compulsory.***
2) ***Solve any THREE questions from Q2 to Q5.***
3) ***Question from 2 to 5 carries equal marks.***

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

a) Define Biostratigraphy.

b) Conglomerate.

c) Define Sedimentary Environment.

d) Enlist Chronostratigraphy units.

e) Graded bedding.

f) What is lamination.

Q2) **Answer the following :**

a) Define weathering. Explain chemical & mechanical weathering. **[6]**

b) Define stratigraphy. Enlist stratigraphic procedure on ouctrop for stratigraphic data collection. **[4]**

Q3) **Answer the following :**

a) Enlist penecontemporeous sedimentary structures. Explain any two if them. **[6]**

b) Define sedimentary texture. Explain clastic and Non-Clastic texture. **[4]**

P.T.O.

Q4) **Answer the following :**

a) What is argillaceous sedimentary rock explain mudstone and shale. **[6]**

b) Explain derivation of sediments referring to source of sediments. **[4]**

Q5) **Write a note on any four:** **[10]**

a) Competence and capacity of sediment transportation.

b) What is sandstone?

c) Imporatnce of stratigraphy.

d) Enlist continental sedimentary environment. Explain any one of them.

e) Ripple Marks.

f) Tracks and Trails.