Total No. of Questions : 4]

SEAT No. : ____

P965

[Total No. of Pages : 3

[6054]-201

S.Y. B.Sc. (Regular)

MATHEMATICS

MT-241 : LINEAR ALGEBRA

(2019 Pattern) (CBCS) (Semester-IV) (24111)

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

Instructions to the candidates:

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

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

a) Find the solution set of $7x-5y = 3$.

b) Let W_1, and W_2 be any two subspaces of vector space V then. Write the condition under which $W_1 \cup W_2$ is a subspace of V.

c) Determine whether the set {(1, 0, 0), (0, 1, 1), (1, 1, 1), (0, –2, 3)} is linearly dependent in $\mathbb{R}^3$.

d) Write standard basis of $M_{2\times2}(\mathbb{R})$, set of all 2×2 matrices with real entries.

e) Define dimension of a vector space.

f) Let $T : \mathbb{R}^2 \to \mathbb{R}^3$ be multiplication by matrix A. Determine whether T has an inverse where. $A = \begin{bmatrix} 6 & -3 \\ 4 & -2 \end{bmatrix}$

g) Let $T : \mathbb{R}^2 \to \mathbb{R}^2$ be a linear transformation defined by $T(x, y) = (0, y + 2)$. Determine whether T is linear transformation.

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

i) Let $S=\{u_1, u_2....u_r\}$ be set of vectors in $\mathbb{R}^n$. If $r > n$ then prove that set S is linearly dependent.

ii) Let W_1 and W_2 be any two subspaces of vector V then prove that $W_1 \cap W_2$ is subspace of V.

P.T.O.

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

i) Solve the following system by Gaussian elimination method.

$x + y + 2z = 9$

$2x + 4y - 3z = 1$

$3x + 6y - 5z = 0$

ii) Solve the following system.

$2x + y - 4z + 3w = 0$

$y + 3z - 2w = 0$

$2x + 3y + 2z - w = 0$

$-4x - 3y + 5z - 4w = 0$

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

i) Let V be n dimensional vector space and $S = \{v_1, v_2, ...v_r\}$ be linearly independent set in V then prove that S can be extended to a basis $S^1 = \{ v_1, v_2, ...v_r, v_{r+1}, ...v_n\}$ of V.

ii) If $A_{m\times n}$ and $B_{n\times p}$ are two matrices then prove that rank

$(AB) \leq \min \{\text{rank } (A), \text{rank } (B)\}$.

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

i) Find a basis and dimension for the solution space of following linear system.

$x + y - z = 0$

$-2x - y + 2z = 0$

$-x + z = 0$

ii) Determine whether the set $\{(1, 2, -3), (1, -3, 2) (2, -1, 5)\}$ is basis of $\mathbb{R}^3$.

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

i) Let $T_1 : U \to V$ and $T_2 : V \to W$ be two linear transformations then prove that the composite transformation $T_2 \circ T_1 : U \to W$ is a linear transformation.

ii) Prove that a function $T : V \to W$ is a linear transformation if and only if $T(k_1 u_1 + k_2 u_2) = k_1, T(u_1) + k_2 T(u_2)$, for any vectors u_1 and u_2 in V and scalars k_1 and k_2.

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

i) Let $T : \mathbb{R}^3 \to \mathbb{R}^2$ be a linear transformation defined by $T(x, y, z) = (3x + y + z, x - 3y - z)$. Find the matrix of T w.r.t the bases $B=\{(1,1,1), (-1,0,1), (0,0,1)\}$ and $B^1=\{(1, 2) (-1, 1)\}$ of $\mathbb{R}^3$ and $\mathbb{R}^2$ respectively.

ii) Find basis and dimension of range of linear transformation $T : \mathbb{R}^3 \to \mathbb{R}^3$. Given by $T(x, y, z) = (x + y + 2z, x + z, 2x + y + 3z)$.

Total No. of Questions : 4]

SEAT No. : ____

P-966

[Total No. of Pages : 3

[6054]-202

S.Y. B.Sc.

MATHEMATICS

MT-242(A) : Vector Calculus

(2019 Pattern) (CBCS) (Semester - IV) (24112A)

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) Evaluate $\lim_{t\to 0}[e^{-t}\cos\bar{i} + e^{-t}\sin\bar{j} + e^{-t}\bar{k}]$.

b) Find the speed along the curve $\bar{r}(t) = (1+2t)\bar{i} + (1+3t)\bar{j} + (4-6t)\bar{k}$ from $t = 0$ to $t = 1$.

c) Define flow integral of a vector field along a curve C.

d) Evaluate $\int_C (x+y-z)\,dx$ along the curve $\bar{r}(t) = t\bar{i} - \bar{j} + t^2\bar{k}$, $0 \le t \le 1$.

e) State Green's theorem in the plane in normal form.

f) Give parametric representation of the cone $Z = \sqrt{x^2+y^2}, 0 \le z \le 1$.

g) Show that the vector field $\bar{F} = (x+y-z)\bar{i} + (2x-y+3z)\bar{j}$ is solenoidal.

Q2) a) Attempt any <u>one</u> of the following : **[5]**

i) If $\bar{r}(t)$ is a differentiable vector function of t and the length of $\bar{r}(t)$ is constant then prove that $\bar{r}.\dfrac{d\bar{r}}{dt} = 0$.

ii) If $\bar{F}$ is a vector field and C is any closed curve in a region D then prove that the field $\bar{F}$ is conservative if and only if $\oint_C \bar{F}.d\bar{r} = 0$.

P.T.O.

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

i) Find the arclength parameter of the curve $\bar{r}(t) = 4\cos t\bar{i} + 4\sin t\bar{j} + 3t\bar{k}$ from the point $t = 0$.

ii) Find the unit tangent vector $\bar{\mathrm{T}}$, principal unit normal vector $\bar{\mathrm{N}}$ for the plane curve, $\bar{r}(t) = (\cos t + t\sin t)\bar{i} + (\sin t - t\cos t)\bar{j}, t > 0$.

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

i) State Green's theorem in the plane in tangential form and use it to find counter clock wise circulation for the field $\bar{F} = (x + y)\bar{i} - (x^2 + y^2)\bar{j}$ where C is the triangle bounded by $y = 0$, $x = 1$ and $y = x$.

ii) Let C be a smooth curve joining the point A to the point B in the plane and is parametrized by $\bar{r}(t)$. Let f be a differentiable function with a continuous gradient vector $\bar{\mathrm{F}} = \nabla f$ on a domain D containing C. Then prove that $\int_C \bar{\mathrm{F}}.dr = f(\mathrm{B}) - f(\mathrm{A})$.

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

i) Find the workdone by the force field $\bar{\mathrm{F}} = x\bar{i} + 3xy\bar{j} - (x + z)\bar{k}$ over the curve $\bar{r}(t) = (1 - t)\bar{i} + (4 + t)\bar{j} + (2 - t)\bar{k}$, $0 \le t \le 1$.

ii) Integrate $\mathrm{G}(x, y, z) = x^2$ over the cone $z = \sqrt{x^2 + y^2}, 0 \le z \le 1$.

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

i) Define the curl of a vector field $\bar{\mathrm{F}}$ and determine whether the field $\bar{F} = \left(4y^2 + \frac{3x^2y}{z^2}\right)\bar{i} + \left(8xy + \frac{x^3}{z^2}\right)\bar{j} + \left(11 - \frac{2x^3y}{z^3}\right)\bar{k}$ is conservative.

ii) Define surface integral of a scalar function and evaluate $\iint_S 6xy\, dS$ where S is the portion of the plane $x + y + z = 1$ that lies in the first octant and is in the front of the yz - plane.

b) Attempt any <u>one</u> of the following : **[5]**

i) Use the divergence theorem to evaluate $\iint_S \bar{F}.\bar{n}d\sigma$ where $\bar{F} = (3x + z)\bar{i} + (y^2 - \sin xz)\bar{j} + (xz + ye^x)\bar{k}$ and S is the surface of the box $0 \le x \le 1$, $0 \le y \le 3$, $0 \le z \le 2$.

ii) State stoke's theorem and use it to evaluate $\iint_S curl\bar{F}.\bar{n}d\sigma$ where $\bar{F} = xz\bar{i} + yz\bar{j} + xy\bar{k}$, such that S is the part of the sphere $x^2 + y^2 + z^2 = 4$ that lies in the cylinder $x^2 + y^2 = 1$ above $x - y$ plane.

⌘⌘⌘

Total No. of Questions : 4]

SEAT No. : ____

P-967

[Total No. of Pages : 3

[6054]-203

S.Y. B.Sc.

MATHEMATICS (Paper - II)

MT-242(B) : Dynamical Systems

(2019 Pattern) (CBCS) (Semester - IV) (24112B)

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

Instructions to the candidates:

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

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

a) Write the following second order differential equation as a system of first order differential equation $x'' + ax' + bx = 0$.

b) If trace of matrix A is - 1 and determinant of matrix A is - 54, then determine the nature of the eigenvalues.

c) Find the rank of the matrix A, where $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 6 \\ 3 & 6 & 9 \end{bmatrix}$.

d) Find characteristic equation of the matrix $\begin{bmatrix} 5 & 4 \\ 1 & 2 \end{bmatrix}$.

e) Find all equilibrium points for the differential equation $x' = 2x - x^2$.

f) State whether the equation $x' = x^3 - x$ is autonomous.

g) Find the general solution of the system $\frac{dx}{dt} = ax(t)$.

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

i) Prove that a square matrix A is invertible if and only if $\lambda = 0$ is not an eigenvalue of A.

ii) Suppose A is $n \times n$ matrix and if A is diagonalizable then prove that A has n linearly independent eigenvectors.

P.T.O.

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

i) Find the eigenvalues and eigen vectors of the matrix $A = \begin{bmatrix} 3 & 0 \\ 8 & -1 \end{bmatrix}$.

ii) For the differential equation $x' = g(x) = x - x^3$, find all equilibrium solutions and determine if they are sinks, sources or neither. Also sketch the phase line.

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

i) Suppose that $V = (V_1, V_2)$ and $W = (W_1, W_2) \in \mathbb{R}^2$. Then show that vectors V and W are linearly independent if and only if det $\begin{pmatrix} v_1 & w_1 \\ v_2 & w_2 \end{pmatrix} \neq 0$.

ii) Suppose that V_0 is an eigenvector for the matrix A with associated eigenvalue λ, then prove that the function $X(t) = e^{\lambda t} v_0$ is a solution of the system $X' = AX$.

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

i) Find the straight line solutions of X' = AX where $A = \begin{bmatrix} 1 & 3 \\ 1 & -1 \end{bmatrix}$.

ii) Find the canonical form of matrix A, where $A = \begin{bmatrix} 1 & 1 \\ -1 & 3 \end{bmatrix}$

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

i) Prove that the 2 × 2 matrix T is invertible if and only if det (T) ≠ 0.

ii) Prove that, $\frac{d}{dt}(\exp(tA)) = A\exp(tA) = \exp(tA).A$.

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

i) Find the exponential form of the matrix $A = \begin{bmatrix} 2 & 2 \\ 5 & -1 \end{bmatrix}$.

ii) Identify whether the equilibrium point (0, 0) is a sink, source, center, saddle or spiral of X' = AX if matrix $A = \begin{bmatrix} -3 & -2 \\ 5 & 2 \end{bmatrix}$.

⌘⌘⌘

Total No. of Questions : 5]

SEAT No. :

P-968

[Total No. of Pages : 2

[6054]-204

S.Y. B.Sc. (Semester - IV)

PHYSICS - I

PHY - 241 : Oscillations, Waves and Sound

(2019 Pattern) (CBCS) (24121) (Paper - I)

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

Instructions to the candidates :

1) ***Question 1 is compulsory.***
2) ***Solve any 3 questions from Q.2 to 5.***
3) ***Questions 2 to 5 carry equal marks.***
4) ***Use of calculators is allowed.***
5) ***Figures to the right indicate full marks.***

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

a) Define angular simple harmonic motion.

b) Define quality factor.

c) State the condition of critically damped motion in L.C.R. series circuit.

d) The equation of forced oscillations of an oscillator is given as

$$4\left(\frac{d^2x}{dt^2}\right)+3\left(\frac{dx}{dt}\right)+36x=2.7\sin(3t)$$

where all quantities are expressed in SI unit. Determine the amplitude.

e) The volume of the space in a hall is 1000 m^3. The total surface area of absorbers present is 100 m^2 in open window units. Determine the reverberation time for the hall.

f) Define threshold of audibility.

Q2) a) Set up the differential equation for damped electrical oscillations and hence obtain an expression for the frequency of oscillations. **[6]**

OR

a) Derive the condition for amplitude resonance and obtain amplitude at resonance, for forced oscillations. Also find quality factor at resonance. **[6]**

b) Explain electrical method to obtain the Lissajous figures. **[4]**

P.T.O.

Q3) a) Prove that the velocity of longitudinal waves propagating through a medium of density ρ and bulk modulus of elastity k is given by

$$C = \sqrt{\frac{k}{\rho}}.$$ **[6]**

OR

a) Prove the relation $\frac{d\lambda}{\lambda} = -\frac{Cs}{C}$ where dλ is the change in wavelength and Cs is velocity of source. **[6]**

b) The equation of damped motion is given as $2\left(\frac{d^2x}{dt^2}\right) + 12\left(\frac{dx}{dt}\right) + 50x = 0$.

Find the frequency of damped oscillations. **[4]**

Q4) a) Give an analytical treatment for composition of two S.H.M.s perpendicular to each other and having their frequency in the ratio 1:2. Discuss the case when the phase difference is π/2. **[6]**

OR

a) Show that the rate of absorption of energy is equal to the rate of dissipation of energy in case of forced oscillator. **[6]**

b) A longitudinal disturbance generated by an earthquake travels 1000 km in 2 minutes. If the average density of rock is assumed to be 2800 km/m^3. Calculate the bulk modulus of the rock. **[4]**

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

a) Sound Intensity

b) Stable equilibrium

c) Log decrement

d) Forced oscillations

e) S-waves

f) Reverberation time

□□□

Total No. of Questions : 5]

SEAT No. :

P-969

[Total No. of Pages : 2

[6054]-205
S.Y. B.Sc. (Semester - IV)
PHYSICS
PHY-242 : Optics (Paper - II)
(CBCS) (2019 Pattern) (24122)

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

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

a) What do you mean by principal point?

b) What do you mean by aberration?

c) State Law of Malus.

d) Two thin lenses of focal lengths 10 cm and 6 cm are placed co-axially at a certain distance apart. Calculate the distance between the lenses if these lenses form an achromatic combination.

e) Define magnifying power of a compound microscope.

f) State the causes of spherical aberration.

Q2) a) Derive lens equation for a thin lens. **[6]**

OR

Show that refraction at single curved surface obeys an equation

$$\frac{\mu_2}{v} - \frac{\mu_1}{u} = \frac{\mu_2 - \mu_1}{R}$$

b) Explain the stokes treatment of the phase change on reflection of light. **[4]**

P.T.O.

Q3) a) Define Magnifying power of simple microscope. Draw neat ray diagram and show that maximum magnifying power of simple microscope is $\left(1+\frac{D}{f}\right)$ **[6]**

OR

Explain Brewster's law and described how it can be used to produce the plane polarized light.

b) A parallel beam of light of wavelength 5.890×10^{-5} Å is incident on a thinfilm of refractive index 1.5, such that the angle of refraction into the film is 60°. Calculate the smallest thickness of the film which will make it appear dark by reflection. **[4]**

Q4) a) Explain construction and working of Hugen's eye-piece with neat ray diagram. **[6]**

OR

Prove that for a combination of two thin lenses of focal lengths f_1 and f_2 separated by a distance x, the focal length of the combination is given by $\frac{1}{f}=\frac{1}{f_1}+\frac{1}{f_2}-\frac{x}{f_1 f_2}$.

b) Find polarizing angle for light incident from water to glass and glass to water if refractive index of glass and water is 1.54 and 1.33 respectively. **[4]**

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

a) Cardinal points

b) Coma Aberration

c) Polaroid

d) Any two methods to reduce spherical aberrations

e) Ray leigh's criteria for resolution

f) Describe Astigmatism. How it is minimized?

Total No. of Questions : 5]

SEAT No. :

P-970

[Total No. of Pages : 2

[6054]-206

S.Y. B.Sc. (Semester - IV)

CHEMISTRY

CH-401 : Physical and Analytical Chemistry

(2019 Pattern) (CBCS) (24131) (Paper - I) (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 5.***
3) ***Questions 2 to 5 carry equal marks.***
4) ***Use of calculators and log tables are allowed.***

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

a) What is mean by Phase?

b) Define chemical potential.

c) A solution of vitamin D_2 shows 80% transmittance at λ 264nm, what is the Absorbance of solution?

d) If the length of conductivity cell is 1.80cm and area of cross section of the cell is 4.0 cm^2. Calculate cell constants.

e) What is eluent?

f) Define critical solution temperature.

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

i) What is Monovariant, bivariant and non-variant system?

ii) What is Azeotropic Mixtures? Give it's examples.

iii) What is equivalent conductance and specific conductance?

b) Discuss the construction and working of photovoltaic cell. **[4]**

P.T.O.

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

i) Explain the method of purification of water by ion exchange chromatography.

ii) Explain the phase diagram of water system.

iii) Explain the upper consolute temperature with suitable example.

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

i) Calculate the molar absorptivity of 1.4×10^{-5}M solution having 0.25 absorbance, when placed in 1.0cm path length curette.

ii) The resistance of 0.025N KCl solution at 26°C is 260 ohm, calculate the conductance of the solution.

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

i) Derive the expression of phase rule.

ii) Define chromatography and Give in brief, classification of chromatography.

iii) Discuss with the help of neat diagram the effect of temperature on solubilities of triethylamine - water system.

b) 0.5N solution of a salt surrounding two plates of electrodes, 1.0cm a part and 0.25cm^2 in area, was found to offer a resistance of 475 ohms, calculate the equivalent conductance of the solution. **[4]**

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

a) Application of Henry's Law

b) Effect of impurity on critical solution temperature of partially miscible liquids.

c) Photomultiplier Tube

d) Cation exchange resins.

e) Types of Absorption chromatography.

f) Conductometric titrations of weak Acid-weak base.

□□□

Total No. of Questions : 5]

SEAT No. : ____

P971

[Total No. of Pages : 2

[6054]- 207
S.Y. B.Sc. (Regular)
CHEMISTRY
CH - 402 : Inorganic and Organic Chemistry (Paper-II)
(2019 Pattern) (CBCS) (Semester - IV) (24132)

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

a) What is optical isomerism?

b) What is the magnetic moment of d^1 configuration?

c) Which d-orbitals are triply degenerate?

d) What is Cannizzaro's reaction?

e) How carboxylic acid prepared using dry ice?

f) Draw the structure of 3- amino hexane.

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

i) Explain and draw the geometrical isomerism in $[Ma_2bc]$ type of complex.

ii) Write any three assumptions of VBT.

iii) Calculate CFSE of Cr^{2+} ion in weak octahedral Field. (At. No. Cr = 24)

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

i) Draw conformational isomers of 1, 1 - dimethyl cyclohexane comment on the stability and optical activity.

ii) Explain Locking of conformation.

P.T.O.

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

i) What are amines? How they are classified?

ii) What are aldehydes? Explain aldol reaction with suitable example.

iii) Give any two methods of preparation of aldehyde.

b) State and explain Jahn-Teller theorem with suitable example. **[4]**

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

i) Distinguish between inner and outer orbital complexes.

ii) Give the classification of carboxylic acid?

iii) Explain perkin condensation.

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

Calculate CFSE for d^6 ion in weak and strong octahedral field.

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

a) Enlist the factors affecting the magnitude of 10 Dq.

b) Write note on spectrochemical series.

c) What is the hybridisation and geometry of $[FeF_6]^{3-}$ and calculate magnetic moment value.

(At. No. Fe = 26).

d) Identify the product 'A' and 'B' and rewrite the reaction.

$$\xrightarrow[\text{Conc.}H_2SO_4]{\text{Conc.}HNO_3} (A) \xrightarrow{Sn/Hcl} (B)$$

e) Explain Baeyer's strain theory.

f) What are esters? How ethyl acetate prepared from

i) Acetic acid

ii) Acetyl chloride.

◀▶ ◀▶ ◀▶

Total No. of Questions : 5]

SEAT No. : ____

P972

[Total No. of Pages : 2

[6054]-208

S.Y.B.Sc. (Regular)

BOTANY

BO - 241 : Plant Anatomy and Embryology

(CBCS 2019 Pattern) (Semester - IV) (24141) (Paper - I)

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 Questions 5 carry equal marks.***
4) ***Figures to right indicate full marks.***

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

a) Write any two applications of Anatomy in physiology.

b) What are motor cells?

c) What is Anatomy?

d) Define Embryology.

e) What is cross pollination?

f) What is ategmic ovule?

Q2) a) Describe the process of anomalous secondary growth in Dracarna stem. **[6]**

b) What is endosperm? Explain different types of endosperm. **[4]**

Q3) a) Describe the development of tetrasporic embryo sac. **[6]**

b) Explain the process of normal secondary growth in Dicot stem. **[4]**

P.T.O.

Q4) a) What is microsporogenesis? Explain any two types of microspore tetrads. **[6]**

b) Describe the structure and functions of epidermis. **[4]**

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

a) Incompressibility

b) Structure and functions of cambium

c) Lenticel

d) Porogamy

e) Tapetum

f) Double fertilization

Total No. of Questions : 5]

SEAT No. :

P973

[Total No. of Pages : 1

[6054]-209
S.Y.B.Sc. (Regular)
BOTANY - II
BO - 242 : Plant Biotechnology (Theory) (Paper-II)
(CBCS 2019 Pattern) (Semester - IV) (24142)

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

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

a) Define Biogas.
b) What is cellular totipotency?
c) Define SCP.
d) What is explant?
e) Give any two scope of biotechnology.
f) What is bioremediation?

Q2) a) Describe concept of proteomics and its types. **[6]**
b) Explain importance of SCP. **[4]**

Q3) a) Explain protoplast fusion and its applications. **[6]**
b) Describe concept of Biodiesel. **[4]**

Q4) a) Describe concept of plant genetic engineering and its applications in insect pest resistance. **[6]**
b) Write applications of tissue culture in haploid production. **[4]**

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

a) Scope of plant biotechnology.
b) Inoculation.
c) Plasmid vector.
d) Microbial remediation.
e) Data retrieval tools.
f) Non - renewable energy sources.

✡ ✡ ✡

Total No. of Questions : 5]

SEAT No. :

P-974

[Total No. of Pages : 2

[6054]-210
S.Y. B.Sc. (Semester - IV)
ZOOLOGY
ZO-241 : Animal Diversity - IV (Paper - I)
(CBCS) (2019 Pattern) (24151) (Theory)

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.***

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

a) Give any two examples of non poisonous snake.

b) Write any one example of class Metatheria.

c) Give scientific name of Rat.

d) Give any one example of insectivorous beak.

e) Write name of any two digestive glands of Rat.

f) Define thecodont.

Q2) a) Describe in brief desert adaptations in Reptiles. **[6]**

OR

Describe the symptoms of cobra bite. Add a note on first aid treatment.

b) Describe internal structure of ear of Rat. **[4]**

Q3) a) Describe central nervous system of Rat. **[6]**

OR

Describe alimentary canal of Rat.

b) Describe anatomical adaptations of class Aves. **[4]**

Q4) a) Sketch and label V.S. of eye of Rat. **[6]**

OR

Sketch and label the internal structure of heart of Rat.

b) Describe causes of migration in birds. **[4]**

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

a) Viper snake

b) Habit and habitat of Rat

c) Functions of blood of Rat

d) Duck billed platypus

e) Sexual dimorphism in Rat

f) Latitudinal migration in birds

Total No. of Questions : 5]

SEAT No. : ____

P975

[Total No. of Pages : 2

[6054]-211

S.Y.B.Sc. (Regular)
ZOOLOGY
ZO-242 : Applied Zoology-II
(2019 Pattern) (CBCS) (Paper-II) (Semester-IV) (24152)

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.***

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

a) What is fresh water fishery?

b) Define supersedure.

c) What is rearing pond?

d) Give the uses of hive tool.

e) Give biological name of Bombay duck.

f) State any two names of Honey bee diseases.

Q2) a) Describe round dance and wag-tail dance in honey bees. **[6]**

OR

Describe drying and canning methods of fish preservation.

b) Describe protozoan disease in honey bee. **[4]**

Q3) a) Describe dol net and cast net. **[6]**

OR

Describe the life cycle of Honey bee.

b) Describe winter season management in bee keeping. **[4]**

P.T.O.

Q4) a) Describe the uses of honey and bees wax. **[6]**

OR

Describe the uses of fish meal and liver oil.

b) Describe habit and habitat of Labeo. **[4]**

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

a) Dinghi.

b) Harvesting methods of mackerel.

c) Damage caused by wax moths.

d) Uses of pollen.

e) Marine fishery.

f) Bee veil.

● ● ●

Total No. of Questions : 5]

SEAT No. : ____

P 976

[Total No. of Pages : 2

[6054] - 212

S.Y.B.Sc. (Regular)

GEOLOGY

GL - 221 : Global Tectonics and Geodynamics of The lithosphere

(2019 Pattern) (Credit System) (Semester - IV) (24161)

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.***
4) ***Neat diagrams must be drawn wherever necessary.***

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

a) Lithosphere

b) Name two cratons of India

c) Low velocity zone

d) Riff valley

e) Name discontinuity between mantle and core

f) Geotherms

Q2) Answer the following.

a) Explain mechanism and application of sea-floor spreading. **[6]**

b) Explain shield and platform. **[4]**

Q3) Answer the following.

a) Define Isostacy. Explain concept of Isostacy. **[6]**

b) Describe continental and oceanic crust. **[6]**

P.T.O.

Q4) Answer the following.

a) Tectonic settings of Mid-oceanic Ridge. **[6]**

b) Explain characteristic features of plate boundary. **[4]**

Q5) Write a note on (any 4) **[10]**

a) Ocean floor

b) Continental drift

c) Physical properties of mantle

d) Draw wilcon cycle

e) Direct observations in exploration of earth's interior

Total No. of Questions : 5]

SEAT No. :

P-977

[Total No. of Pages : 2

[6054]-213

S.Y. B.Sc.

GEOLOGY (Paper - II)

GL:222 - ENVIRONMENTAL GEOLOGY AND GEOGENIC DISASTERS

(2019 Pattern) (Semester - IV) (24162) (Credit System)

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

Instructions to the candidates:

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

Q1) Answer the following question in 2-3 line (ANY FIVE) One mark each : **[5]**

a) Define natural hzard

b) What is meant by bio-geochemical cycles?

c) Define meteorological drought

d) What is Minamata disease?

e) Define flood

f) Define socio-geological environment

Q2) Answer the following

a) What is meant by droughts? Explain different types of droughts. **[6]**

b) Define Air pollution. Explain remedial measures. **[4]**

Q3) Answer the following

a) Explain significance of Geology in Disaster management plan for Earthquakes. **[6]**

b) Explain inorganic pollutants. **[4]**

P.T.O.

Q4) Answer the following

a) Explain heavy metal pollution and its remedial measures. **[6]**

b) Explain Water quality parameters. **[4]**

Q5) Write short notes on any FOUR (2.5 marks each) : **[10]**

a) Arsenic poisoning

b) Scope of Environmental Geology

c) Building code

d) Fluorosis

e) Avalanches

f) Richter scale

⌘⌘⌘

Total No. of Questions : 4]

SEAT No. :

P978

[Total No. of Pages : 3

[6054]-214
S.Y. B.Sc. (Regular)
STATISTICS
ST-241 : Tests of Significance and Statistical Methods
(2019 Pattern) (CBCS) (Semester - IV) (Paper - I) (24171)

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

Instructions to the candidates:

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

Q1) Attempt each of the following:

A) In each of the following cases, choose the correct alternative: **[1 each]**

a) $100(1-\alpha)\%$ confidence interval for population mean μ when population variance is known

i) $\left(\overline{X} - z_{\alpha/2}\frac{\sigma^2}{n},\ \overline{X} + z_{\alpha/2}\frac{\sigma^2}{n}\right)$

ii) $\left(\overline{X} - z_{\alpha/2}\frac{\sigma}{n},\ \overline{X} + z_{\alpha/2}\frac{\sigma}{n}\right)$

iii) $\left(\overline{X} - z_{\alpha/2}\frac{\sigma}{\sqrt{n}},\ \overline{X} + z_{\alpha/2}\frac{\sigma}{\sqrt{n}}\right)$

iv) $\left(\overline{X} - z_{\alpha/2}\frac{\sigma^2}{\sqrt{n}},\ \overline{X} + z_{\alpha/2}\frac{\sigma^2}{\sqrt{n}}\right)$

b) The following death rate is used for the comparison of the mortality of the two populations A and B

i) Crude Death Rate ii) Specific Death Rate

iii) Infant Death Rate iv) Standardized Death rate

P.T.O.

c) The range in which partial correlation coefficient lies is

i) $-\infty$ to ∞ ii) 0 to 1

iii) -1 to 1 iv) 0 to ∞

B) In each of the following, state whether the given statement is true or false. **[1 each]**

a) $X_{1.23}$ is called as residual of order 2.

b) Infant mortality rate is the number of deaths of children under 1 years of age per 1000 lives of birth.

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

a) The mean height obtained from a sample of size 100 taken randomly from a population is 160 cm. If the standard deviation of height of population is 8 cm. Test whether the mean height is 163 cm. against the alternative that it is less than 163 cm.

b) Show that $R^2_{1.23} = b_{12.3}\, r_{12}\frac{\sigma_2}{\sigma_1} + b_{13.2}\, r_{13}\frac{\sigma_3}{\sigma_1}$

c) Customers arrive at a certain petrol pump in pune in a Poisson process with an average time of 5 minutes between arrivals. The time interval between services at the petrol pump follow exponential distribution and the mean time taken to service a vehicle is 2 minutes.

i) Find the probability that the pump is busy.

ii) What would be expected queue length?

iii) What is expected length of the system.

iv) Find the probability that there are 3 customers in the system.

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

a) Explain the terms:

i) Type I error

ii) Type II error

iii) Level of significance

iv) Critical region

v) One tailed hypothesis

b) If $X_1=Y_1+Y_2$, $X_2=Y_2+Y_3$, $X_3=Y_3+Y_1$ where Y_1, Y_2, Y_3 are mutually uncorrelated variables with mean zero and unit standard deviation. Find the multiple correlation coefficient between X_1 and (X_2, X_3).

c) Calculate Total Fertility rate (T.F.R.) and Gross Reproduction Rate (G.R.R) by considering proportion of female births as 0.48, for the following data:

Age-group	15-19	20-24	25-29	30-34	35-39	40-44
Population (in thousand)	16	26	21	18	11	11
Age-S.F.R.	60	285	322	260	125	10

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

a) i) Explain briefly, the large sample test for testing $H_0 : \mu_1 = \mu_2$ against $H_1 : \mu_1 \neq \mu_2$, where μ_1 and μ_2 are population means from which the two independent samples are drawn. It is assumed that the population variances are known. **[6]**

ii) Explain the following terms:

Customer, calling population, waiting time and time spent in the system. **[4]**

b) i) A random sample of 200 bolts manufactured by machine A and 100 bolts manufactured by machine B showed that 19 and 5 defective bolts respectively. Is machine B better than A? **[5]**

ii) Define crude death rate and standardized death rate. Explain direct method of standardization. **[5]**

Total No. of Questions : 4]

SEAT No. : ____

P-979

[Total No. of Pages : 2

[6054]-215

S.Y. B.Sc.

STATISTICS

ST-242 : Sampling Distribution and Exact Tests

(2019 Pattern) (CBCS) (Semester - IV) (Paper - II) (24172)

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

Instructions to the candidates :

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

Q1) Attempt each of the following :

a) In each of the following cases, choose the correct alternative :**[1 each]**

i) Let $X \rightarrow G(2, 3)$ then distribution of random variable $Y = \frac{x}{2}$ is

A) G(2, 3/2) B) G(1, 3)

C) G(4, 3) D) G(1, 3/2)

ii) If mode of χ^2 random variable is 8 then it's variance is :

A) 6 B) 10

C) 20 D) 16

iii) If $X \rightarrow F(5, 5)$ then median of X is

A) 1 B) 2

C) 5 D) 3/7

b) In each of the following, state whether the given statement is true or false : **[1 each]**

i) The t-distribution is symmetric about 1.

ii) For test based on t-distribution, the value of the test statistics cannot be negative.

P.T.O.

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

a) State and prove the additive property of gamma distribution, also state the distribution of sample mean $\overline{X}$.

b) If a r.v.t. follows t-distribution with n degrees of freedom then find distribution of $Y=\frac{1}{1+\frac{t^2}{n}}$.

c) Describe the test procedure for testing $H_0 : \sigma_1^2 = \sigma_2^2$ against $H_0 : \sigma_1^2 \neq \sigma_2^2$.

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

a) Show that mode of F-distribution with n_1 and n_2 d.f. is, $\frac{n_2(n_1-2)}{n_1(n_2+2)}, n_1 > 2$.

b) Define χ^2 variate with n degrees of freedom. Find it's mean and variance.

c) Identify the distribution of a r.v.X if it's m.g.f is $M_X(t)=\left(1-\frac{t}{1/2}\right)^{-20}$ where t < 1/2, also find the median and mode of X.

Q4) Attempt any **one** of the following :

a) i) Let $X_1, X_2, \ldots\ldots\ldots X_{10}$ be independent and identically distributed N(20,20) variates. Calculate **[5]**

$$P\left[\sum_{i=1}^{8}(X_i-20)^2 \geq 190.48\right]$$

ii) Explain paired t-test along with the assumptions made. **[5]**

b) i) Let $\overline{X}$ and S^2 be the mean and variance of a random sample of size 25 from N(3, 100) distribution.

Evaluate $P(0 < \overline{X} < 6, 55.2 < S^2 < 145.6)$ **[5]**

ii) Let t_{25} follows Student's t-distribution with 25 degrees of freedom find '*k*' such that $P(-k < t_{25} < k) = 0.3$. **[2]**

iii) State the inter-relations among normal, chi-square, t and f-distribution. **[3]**

□□□

Total No. of Questions : 5]

SEAT No. :

P-980

[Total No. Of Pages : 2

[6054]-216
S.Y.B.Sc.
(GEOGRAPHY)
Gg. 241: Envornmental Geography - II
(Semester-IV) (2019 Pattern) (CBCS) (Paper-I) (24181)

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

Instructions to the candidates :

1) ***Question 1 is compulsory.***
2) ***Attempt any three questions from Q.No.2 to Q. No.5.***
3) ***Question No. 2 to question No. 5 carry equal marks.***
4) ***Use of map stencil is allowed.***

Q1) **Answer the following questions in 20 words. (any Five) :** **[5]**

a) Write any two effect of soild waste.

b) What is sustainable development?

c) Write any two causes of deforestation.

d) Write the objectives of environmental management.

e) Define Environment Impact Assessment.

f) Write the need of to study the environmental geography.

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

i) Describe the nature of Environment Impact Assessment.

ii) Explain any two environmental policies in developing countries.

iii) Write any three principles of environmental protection in the stockholm conference.

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

i) Describe the importance of water conservation with respect to Ganga action plan.

ii) Explain 33 crore tree plantation programm in Maharashtra with respect to environmental protection and conservation.

P. T. O

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

i) Explain the adhoc method of Environment Impact assessment.

ii) Describe the aspects of environmental management.

iii) Describe the concept water conservation with their importance.

b) Answer the following questions in 150 words. (any One) : [4]

i) Explain the various activities of tiger conservation in India.

ii) Define environmental planning with their principles.

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

i) Explain the steps in Environment Impact Assessment.

ii) Write the provisions made in Forest conservation Act - 1980.

iii) Describe the concept 'Solid waste managemnet'.

b) Answer the following questions in 150 words. (any One) : [4]

i) Explain the role of Government in environmental conservation in India.

ii) Explain in detail KYOTO Protocol - 1997.

Q5) **Write short note on the following (any Four): [10]**

a) Sustainable development Summit, New york-2015

b) Delphi method

c) Environmental protection Act-1986

d) Importance of Environment Impact Assessment

e) Approaches of environmental management

f) Energy conservation.

Total No. of Questions : 5]

SEAT No. :

P981

[Total No. of Pages : 2

[6054]-217
S.Y.B.Sc.
GEOGRAPHY
Gg - 242 : Geography of Maharashtra (Human) - II
(2019 Pattern) (CBCS) (Semester - IV) (24182) (Paper- II)

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

Instructions to the candidates:

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

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

a) Write the names of two food crops.

b) Enlist two names of religions in Maharashtra.

c) Which crop is known as white gold?

d) Write two names of express highways in Maharashtra.

e) Which is the costlier way of transportation?

f) What is meant by rural to urban migration?

Q2) a) Describe the following questions. (any two) **[6]**

i) Describe interstate migration in Maharashtra.

ii) Explain Bajra as a major food crop in Maharashtra.

iii) Discuss Electronic media in Maharashtra.

b) Write answers of the following questions (any two). **[4]**

i) Discuss problems of sugarcane industry in Maharashtra.

ii) Explain cotton as a cash crop.

iii) Discuss major transportation projects in Maharashtra.

Q3) a) Give explaination of the following questions (Any Two). **[6]**

i) Explain problems of wine industry in Maharashtra.

ii) Explain the types of migration in Maharashtra.

iii) Discuss metro development in Maharashtra.

b) Give reasons of the following questions (any two). **[4]**

i) Why sugarcane is cash crop in Maharashtra?

ii) Why water ways are cheapest way of transport?

iii) How agro-based industries have prospects?

P.T.O.

Q4) a) Discuss the following questions (Any Two). **[6]**

i) Discuss the problems of sugarcane industry in Maharashtra.

ii) Which are the rail roletes in Maharashtra?

iii) How communication in Maharashtra is developed?

b) Write answers of the following questions (Any Two). **[4]**

i) Discuss distribution of cotton industry in Maharashtra.

ii) Which Geographical factors are required for Rice crop?

iii) Write the development of Air transport in Maharashtra.

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

a) Express highways.

b) Cotton as a cash crop.

c) Disadvantages of Air transport.

d) Migration.

e) Population in Maharashtra.

f) MIDC

✡ ✡ ✡

Total No. of Questions : 5]

SEAT No. : ____

P-982

[Total No. of Pages : 2

[6054]-218

S.Y. B.Sc.

MICROBIOLOGY

MB - 241 : Bacterial Genetics

(2019 Pattern) (CBCS) (Semester - IV) (24191)

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.***

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

a) Enlist any two properties of genetic code.

b) What is the role of enzyme ligase in DNA replication?

c) Define transcription.

d) The _____ site on the ribosome is where an incoming aminoacyl -tRNA binds during translation.

e) What is a mutation? Give any one example of mutagenic agent.

f) B-DNA is a _____ handed helix.

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

i) Describe the isolation of mutants using replica plate technique.

ii) Describe the different bonds involved in DNA structure.

iii) Describe the semi conservative mode of replication.

b) Diagrammatically describe the Rho-independent termination of transcription. **[4]**

P.T.O.

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

i) Explain the importance of oric in DNA replication.

ii) Explain the mechanism of rolling circle replication.

iii) Explain the mechanism of spontaneous mutation.

b) Write in details about the properties of plasmids. **[4]**

Q4) a) Discuss the following Any two : **[6]**

i) Discuss the role of different enzymes/proteins involved in DNA replication.

ii) Discuss the outcomes of Avery and macleod experiment.

iii) Discuss the mechanism of action of base analogs in mutations.

b) With neat labelled diagram explain the structure of RNA polymerase. **[4]**

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

a) Ribosomes.

b) Deamination.

c) Resistance plasmids.

d) Pu-ine bases.

e) t-RNA

f) SSB proteins.

Total No. of Questions : 5]

SEAT No. :

P-983

[Total No. of Pages : 2

[6054]-219

S.Y. B.Sc.

MICROBIOLOGY

MB-242: Air, Water and Soil Microbiology

(2019 Pattern) (CBCS) (Semester - IV) (24192)

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) Enlist any two methods of air sanitation.

b) Define Coliforms.

c) In confirmed test of microbiological analysis of water, _____ medium is used.

d) What is humus formation?

e) Enlist any two biocontrol agents.

f) State the difference between symbiosis and parasitism.

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

i) Describe the different chemical methods of air sanitation.

ii) Describe the role of microflora in rhizosphere.

P.T.O.

iii) Describe the applications of membrane filtration technique in water analysis.

b) Describe the importance of indicators on faccal pollution with the help of suitable examples. **[4]**

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

i) Explain the role of aerosols in air-borne infections.

ii) Explain the role of sedimentation in air sampling.

iii) Explain the principle of confirmed test.

b) Write in detail about role of microorganisms in nitrogen cycle. **[4]**

Q4) a) Discuss the following Any two : **[6]**

i) Discuss the role of WHO in determining standards for potability of water.

ii) Discuss in detail the phenomenon of competition with appropriate examples.

iii) Discuss the importance of ventilation.

b) Discuss the process of commensalism as Microbial interaction. **[4]**

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

a) Centrifugation.

b) Air borne infections.

c) Completed test.

d) Composting.

e) Synergism.

f) BIS.

Total No. of Questions : 5]

SEAT No. :

P-984

[Total No. Of Pages : 2

[6054]-220
S.Y. B.Sc.
NANOSCIENCE AND NONOTECHNOLOGY
NS 241: Organic and Polymer Science of Nanomaterials (24261) (Semester-IV) (2019 Pattern) (Paper-I) (Credit System)

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

Instructions to the candidates :

1) ***Question I is compulsory.***
2) ***Solve any Three question from Q.2 to Q.5.***
3) ***Question 2 to 5 carrys 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) Give the name of multawalled nanatubes model.

b) Define the term 'polymer'

c) Give the example of Biopolymers.

d) What is thermoplast polymer.

e) Define 'Nano composites'.

f) What is Graphene:

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

a) Explain in detail the classification of polymer.

b) Give the applications of carbon nanotubes.

b) Explain properties of 'Graphene' **[4]**

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

a) Explain 'Extrinsically conducting polymer'.

b) Give the classification of conducting polymer.

b) Explain the term-Nanocomposites and Nanopillers. **[4]**

Q4) **a) Attempt any One of the following:** **[6]**

a) Explain Growth mechanism of carbon nanotubes.

b) Explain the term cataionic polymerisation.

b) Explain 'Solution polymerisation' and 'Suspension polymerisation'. **[4]**

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

a) Polymer

b) Emulsion Polymerisation

c) Addition polymerisation

d) Carbon Nanotubes

e) Catalyst free growth

f) Interfacial condensation

Total No. of Questions : 5]

SEAT No. :

P985

[Total No. of Pages : 2

[6054]-221

S.Y.B.Sc.

NANOSCIENCE & NANOTECHNOLOGY

NS - 242 : Advanced Techniques for Characterization of Nanomaterials

(2019 Pattern) (Credit System) (Semester - IV) (Paper - II) (24262)

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 & lebeled diagram wherever necessary.***
5) ***Figures to the right indicate full marks.***

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

a) What is the use of lock in amplifier in VSM?

b) Give any two advantages of fluorescence microscopy.

c) What is the principle of FESEM?

d) Enlist the parts of EDAX system.

e) State the principle of DSC analysis.

f) What is mean by DC SQUIDs?

Q2) A) Attempt any ONE of the following. **[6]**

a) Draw the diagram of confocal microscopy. Also give applications of confocal microscopy.

b) Define dimpling process. Give the advantages & disadvantages of TEM.

B) Explain selected Area Electron Diffraction method. **[4]**

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

a) Explain transmission electron microscopy with proper diagram.

b) With neat labeled diagram explain fluorescence microscopy.

B) Write down the applications of SEM. **[4]**

P.T.O.

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

a) With neat labeled diagram explain ESEM. Also give applications of ESEM.

b) Explain the sample preparation for TEM.

B) Explain bright field imaging method. **[4]**

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

a) Elastic & Inelastic interaction.

b) Ion milling process.

c) Principle of confocal microscopy.

d) Applications of DSC analysis.

e) Principle of VSM.

f) Types of SQUIDs.

Total No. of Questions : 5]

SEAT No. : ____

P-986

[Total No. of Pages : 2

[6054]-222

S.Y. B.Sc. (Regular)

ELECTRONIC SCIENCE

EL-241 : Analog Circuit Design

(2019 Pattern) (CBCS) (Semester - IV) (24221)

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

Instructions to the candidates :

1) ***Question 1 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) Define power amplifier.

b) What is an audio amplifier?

c) Give the efficiency of class - B power amplifier.

d) Define Bode - plot.

e) What is op-amp?

f) List the various types of Heat Sink.

Q2) Answer the following.

a) i) Explain the dc load line. **[2]**

ii) Give the classification of power amplifiers. **[4]**

b) Explain adder circuit using OP-AMP. **[4]**

P.T.O.

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

a) i) Discuss the effect of negative feedback on gain control.

ii) With neat labled diagram explain the working of public address system.

b) Design the wein bridge oscillator for frequency fo=1055Hz.

Q4) Answer the following.

a) i) Draw a block diagram of audio amplifier. **[2]**

ii) Explain the working of clas B push-pull amplifier. **[4]**

b) Explain the type of feedback system with block diagram. **[4]**

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

a) Thermal runaway

b) Applications of integrator

c) Small signal amplifier.

d) Cross over distortion.

e) Two stage Amplifier.

f) OP-AMP multivibrator circuit.

Total No. of Questions : 5]

SEAT No. :

P-987

[Total No. of Pages : 2

[6054]-223

S.Y. B.Sc. (Regular)

ELECTRONIC SCIENCE

EL-242 : Microcontroller and Python Programming

(2019 Pattern) (CBCS) (Semester - IV) (24222) (Paper - II)

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 No. 2 to 5 carry equal marks.***

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

a) Define strings in python.

b) Which microcontroller is used in Arduino uno board?

c) List serial pins available in Arduino uno.

d) What is the use of break statement in Python?

e) List any two advantages of function.

f) What is IDE?

Q2) a) Answer the following :

i) Write the structure of Arduino program. **[2]**

ii) Explain in detail arithmatic, relational and modulo operators of Arduino. **[4]**

b) Explain the architecture of at mega328p microcontroller with neat labelled diagram. **[4]**

Q3) a) Answer the following :

i) What are python tuple? **[2]**

ii) Describe flow control structure used in python with suitable example. **[4]**

b) Explain serial communication using Arduino and write Arduino code for the same. **[4]**

P.T.O.

Q4) a) Answer the following :

i) What is the difference between module and packages? **[2]**

ii) List the types of functions used in python. State examples of each type. **[4]**

b) Write a python program for subtraction of two numbers. Write output of the program. **[4]**

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

a) Write a short note on python program architecture.

b) Explain dictionary operations and methods.

c) Write a short note on compound modulo, bitwise OR and bitwise AND operators in Arduino.

d) Write a short note on various data types used in python.

e) Explain if else statement used in python with suitable example.

f) Write a program in Arduino to control the brightness of LED using pwm.

Total No. of Questions : 5]

SEAT No. : ____

P988

[Total No. of Pages : 2

[6054] - 224

S.Y.B.Sc. (Regular)

PSYCHOLOGY

Health Psychology

(2019 Pattern) (Semester - IV) (Paper - I) (24201)

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 from 2 to 5 carry equal marks.***

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

a) Who developed the bio psychosocio model?

b) Define well being.

c) What is catastrophic thinking?

d) Define Eustress.

e) Define optimism.

f) What is the meaning of human virtuls.

Q2) a) Explain the Emotion focused coping pattern. **[6]**

OR

Describe the health protective behaviors.

b) Categorise the various health enhancing behaviors. **[4]**

Q3) a) Discribe the types, causes and treatment of diabetes as a chronic illness. **[6]**

OR

Explain the role of resilience in health & wellbeing.

b) Critically analyze the cognitive component of health. **[4]**

P.T.O.

Q4) a) Examine the problem focused coping pattern. **[6]**

OR

Describe the role of life satisfaction in health.

b) Investigate the sources of stress. **[4]**

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

a) Blood pressure

b) Happiness & health

c) Goals of health psychology

d) Nature of coping

e) Illness management

f) types of stress.

Total No. of Questions : 5]

SEAT No. :

P-989

[Total No. of Pages : 2

[6054]-225

S.Y. B.Sc. (Semester - IV)

PSYCHOLOGY

Psychological Testing and Applications (Paper - II)

(2019 Pattern) (24202) (Credit System)

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

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

a) Define adjustment.

b) What is neuropsychology?

c) Define aptitude.

d) Define projective technique.

e) What is mental Health?

f) Define personality.

Q2) a) How MMPI is used as a personality assessment tool? **[6]**

OR

Explain any two psychological task used for assessment of abnormal behavior.

b) Analyze the various concepts in intelligence testing. **[4]**

Q3) a) Describe any two types of test which assess the family adjustment with their Psychometric properties. **[6]**

OR

Explain the eight subscales of DAT with their psychometric properties.

b) Examine the various aspects of adjustment & values. **[4]**

P.T.O.

Q4) a) Illustrate any two types of projective tests. **[6]**

OR

Describe any one type of intelligence test.

b) What are the goals of a neuropsychological assessment? **[4]**

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

a) BDI

b) Application of Educational Testing.

c) GATB

d) Application of Industrial testing.

e) Marital adjustment scale

f) Application of IQ Testing

□□□

Total No. of Questions : 5]

SEAT No. :

P990

[Total No. of Pages : 2

[6054]-226

S.Y. B.Sc. (Regular)

ENVIRONMENTAL SCIENCE

EVS-241 : Biological Diversity & it's Conservation

(2019 Pattern) (Credit System) (Semester-IV) (24241) (Paper-I)

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

Instructions to the candidates:

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

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

a) Define Biological Diversity.

b) Give any 2 example of Endemism.

c) What is the fullform of

i) NBSAP

ii) PBR

d) What is the aim of beej Bachao Andolan

e) Enlist any 2 Exsite Biodiversity conservation methods.

f) Name # any 2 microorganism used in remediation of Pollution.

Q2) Answer the following.

a) How can Genetic diversity be measured of selected species population.**[6]**

b) Explain the role of wildlife protection Act in conservation of Biodiversity. **[4]**

Q3) Answer the following.

a) Explain with suitable example about Non-Ecological Significance of Biodiversity. **[6]**

b) What are different Myer's Hotspot. Explain there characteristic features. **[4]**

P.T.O.

Q4) Answer the following.

a) Explain the theories of Evolution & Natural selection. **[6]**

b) Write in brief about different Ecosystem. Around the world with there characteristics. **[4]**

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

a) Center of Diversity.

b) Biodiversity Act, 2002.

c) IUCN.

d) Need of Biodiversity Conservation.

e) Genetically modified organisms.

f) Diversity in Domestic species.

❖ ❖ ❖

Total No. of Questions : 5]

SEAT No. :

P-991

[Total No. of Pages : 2

[6054]-227

S.Y. B.Sc. (Semester - IV)

ENVIRONMENTAL SCIENCE

EVS - 242 : Environmental Pollution Control Technology

(2019 Pattern) (Paper - II) (Credit System) (24242)

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) **Attempt any Five of the following :**

a) What is the objectives of secondary wastewater treatment. **[1]**

b) What is Biopesticides. **[1]**

c) Which absorbent is used for monitoring of SO_2. **[1]**

d) What is Leq in sound level. **[1]**

e) Write names of major air pollutants. **[1]**

f) What is mean by forest inventory. **[1]**

Q2) **Attempt the following :**

a) Explain the biological methods to control soil pollution. **[6]**

b) Explain Activated sludge process. **[4]**

Q3) **Attempt the following :**

a) Write the protocol for water quality monitoring. **[6]**

b) What are the physiochemical and biological parameters analyzed for soil quality monitoring. **[4]**

Q4) **Attempt the following :**

a) Explain the noise control techniques. **[6]**

b) Describe the types of plume behaviour. **[4]**

P.T.O.

Q5) **Write a short note on Any Four of the following :**

a) Measurement of individual tree. **[2½]**

b) Chain of custody. **[2½]**

c) Sound absorption. **[2½]**

d) Sedimentation. **[2½]**

e) Primary wastewater treatment. **[2½]**

f) Oxidation pond. **[2½]**

▽▽▽▽

Total No. of Questions : 4]

SEAT No. : ____

P-992

[Total No. of Pages : 2

[6054]-228

S.Y. B.Sc.

DEFENCE & STRATEGIC STUDIES

DS401 : International Security

(2019 Pattern) (Semester - IV) (24231)

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) What is National Interest ?

b) What is a Nation-State?

c) Define Neutrality.

d) What is National Power

e) Define Regionalism.

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

a) North Atlantic Treaty Organization -NATO

b) International Law

c) Non-Alignment

P.T.O.

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

a) Explain National security and deterrence

b) Explain the International Law Nature and Scope.

c) State the conceptual Framework of Global and Regional Environment.

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

a) Describe the Significance of Disarmament and Arms Control in maintaining Peace in the Global and Regional sphere.

b) Explain National security and the war on terror.

Total No. of Questions : 4]

SEAT No. :

P-993

[Total No. of Pages : 2

[6054]-229

S.Y. B.Sc.

DEFENCE AND STRATEGIC STUDIES

DS-402: Defence Economics

(2019 Pattern) (Semester - IV) (24232)

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 is military manpower?

b) Define the Concept of Planning.

c) Define the Concept of Defence.

d) What is Development?

e) Define the Concept of Defence Management.

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

a) Defence Management & Armed Forces.

b) Active troops.

c) Defence economics.

P.T.O.

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

a) Explain the role of the Private Sector in Indian Defence.

b) Explain the military demand for defence of India.

c) State the Types of Budget.

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

a) Explain in detail the Defence and Development.

b) Explain in detail the Nature and Scope of Defence Management.

c) Explain in detail the role of Leadership in Defence Management.

Total No. of Questions : 4]

SEAT No. :

P-994

[Total No. of Pages : 2

[6054]-230

S.Y. B.Sc.

DEFENCE AND STRATEGIC STUDIES

DS-403: Defence Journalism

(2019 Pattern) (Semester - IV) (24233) (Credit System)

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 is campus Journalism?

b) Define Journalism.

c) Define Conflict Management.

d) What is Tenets of Journalism?

e) Define Defence Journalism.

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

a) Media.

b) Defence Journalism.

c) Balanced reporting.

P.T.O.

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

a) Explain the Essential knowledge for a Defence Journalist.

b) State the Current Trends in Defence Journalism.

c) Explain the Role of Defence Journalism in International Security Studies.

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

a) Discuss in detail the Problems, Prospects and Limitations faced by the Defence Journalists.

c) Discuss in detail the Role of Defence Journalism in National Security Studies.

✷ ✷ ✷

Total No. of Questions : 3]

SEAT No. :

P-995

[Total No. Of Pages : 1

[6054]-231

S.Y.B.C.A/B.Sc.(Regular/Computer Science/Biotech/Animation)

English Ability enhancement compulsory course

(2019 Pattern) (Semester-IV) (Credit System)

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

Instructions to the candidates :

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

Q1) **Attempt any one out of the following in about 150-200 words.**

a) Comment on the appropriateness of the title of the short story My Lost Dollar. **[15]**

b) Explain the poem "Stopping by woods on a snowy evening" is about a journey of life

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

a) As a secretanry of college cultural club, draft a notice to the students informing the schedule of cultural week.

b) As an NSS student Co-ordinater, prepare an agenda for planning the regular activities for the next academic year.

c) What is minutes of the meeting.

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

a) Comment on "soft skills increases time possibility of success in one's life".

b) How would you do SWOT/c analysis for the interview.

c) Write a detailed note on goal setting.

Total No. of Questions : 3]

SEAT No. :

P-996

[Total No. of Pages : 1

[6054]-232
S.Y. B.Sc.
MARATHI (मराठी)
AECC - IV B : मराठी कथा दर्शन (Theory)
(2019 Pattern) (CBCS) (Semester - IV) (24331) (Regular)

वेळ : 2 तास] [एकूण गुण : 35

सूचना : 1) सर्व प्रश्न सोडविणे आवश्यक आहेत.

2) उजवीकडील अंक गुण दर्शवितात.

प्र.1) खालीलपैकी कोणत्याही एका विषयावर 300 शब्दांत निबंध लिहा. **[10]**

अ) विज्ञान शाप की वरदान.

ब) सणोत्सवांचे सांस्कृतिक महत्त्व.

क) समाजमाध्यमे आणि आजचा युवक.

प्र.2) खालीलपैकी तीन प्रश्नांची उत्तरे 100 शब्दांत लिहा. **[15]**

अ) 'एक यंत्रमानवाच्या मनाचा शोध' या कथेचे कथानक थोडक्यात लिहा.

ब) 'पुढल्या हाका' या विज्ञान कथेतील वैश्विक शांततेचा संदेश कसा दिला आहे? ते सांगा.

क) हैद्राबाद मुक्तिसंग्रामाची कहाणी '15 ऑगस्ट 1947' या कथेच्या आधारे थोडक्यात लिहा.

ड) 'लिंपण' या कथेतील मानवी वर्तनाची कुरुपता स्पष्ट करा.

इ) 'ओझं' या कथेतील दुष्काळाचे भिषण वास्तव थोडक्यात विशद करा.

प्र.3) खालीलपैकी कोणत्याही एका प्रश्नाचे उत्तर 300 शब्दांत लिहा. **[10]**

अ) 'मारवा' कथेतील आबा आणि रघुनाथ या पिता – पुत्रातील भावसंबंधाचे चित्रण करा.

ब) एक रूपक कथा म्हणून 'कांचनमृग' या कथेचे कथानक सांगा.

♦ ♦ ♦

Total No. of Questions : 3]

SEAT No. :

P-997

[Total No. of Pages : 1

[6054]-233
S.Y. B.Sc.
HINDI (हिंदी)
AECC - IV C : हिंदी काव्य तथा कहानी साहित्य
(2019 Credit Pattern) (Semester - IV) (24341) (Regular)

समय : 2 घंटे] [पूर्णांक : 35

सूचनाएँ : 1) सभी प्रश्न अनिवार्य है।

2) दाहिनी ओर लिखे अंक प्रश्नों के पूर्णांक है।

प्र.1) निम्नलिखित में से किन्हीं दो प्रश्नों के उत्तर लिखिए। **[15]**

अ) 'खूब लड़ी मर्दानी वह तो झाँसीवाली रानी थी' इस पंक्ति के माध्यम से झाँसी की रानी का पराक्रम लिखिए।

ब) हरिवंशराय बच्चन 'मधुशाला' कविता में कौनसा संदेश देते है?

क) कवि भवानीप्रसाद मिश्र गीत क्यों बेचना चाहते है?

ड) रोटी और संसद कविता का उद्देश्य स्पष्ट कीजिए।

इ) 'भूख' कविता के माध्यम से कवि कौनसा संदेश देते है?

प्र.2) निम्नलिखित में से किन्हीं दो प्रश्नों के उत्तर लिखिए। **[15]**

अ) 'पत्नी' कहानी के माध्यम से सुनंदा के मनोभाव पर प्रकाश डालिए।

ब) 'बेटा' कहानी की कथावस्तु लिखिए।

क) 'शर्त' कहानी के माध्यम से दलित चेतना पर प्रकाश डालिये।

ड) अमोल का चरित्र–चित्रण कीजिए।

इ) 'ईश्वर का द्वंद्व' कहानी को कथावस्तु स्पष्ट कीजिए।

प्र.3) निम्नलिखित में से किसी एक प्रश्न का उत्तर लिखिए। **[5]**

अ) 'बेटा' कहानी में चित्रित अनमेल विवाह की समस्या स्पष्ट कीजिए।

ब) 'झाँसी की रानी' कविता में सुभद्राकुमारीजी ने अंग्रेजों की नीती को किस प्रकार व्यक्त किया है?

♦ ♦ ♦

Total No. of Questions : 4]

SEAT No. : ____

P-1469

[Total No. of Pages : 2

[6054]-234

S.Y. B.Sc.

SANSKRIT

AECC-II E : Gīrvaṇabhāratī

गीर्वाणभारती (निवडक वेचे)

(2019 Pattern) (Credit System) (Semester - IV) (24351)

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

Instructions to the candidates :

1) ***All questions are compulsory.***
   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 text, lesson 'लीलावती' has taken?
   'लीलावती' हा पाठ कोणत्या ग्रंथातून घेतली आहे?

ii) Which topics are discussed in आयुर्वेद?
   आयुर्वेदात कोणत्या विषयाची चर्चा केली जाते?

iii) How many types of चुम्बक? State any two of them.
   चुम्बकाचे प्रकार किती आहेत? त्यापैकी कोणतेही दोन लिहा.

iv) State the root and meaning in the word गणित?
   गणित शब्दातील धातू व त्याचा अर्थ लिहा?

v) What is the definition of the word शास्त्र?
   शास्त्र शब्दाची व्याख्या कोय?

vi) Who is the author of नीतिशतकम्?
   नीतिशतकम् या ग्रन्थाचा लेखक कोण?

P.T.O.

vii) Who is the author of 'शिशुपालवधम्'?

'शिशुपालवधम्' महाकाव्याचा रचयिता कोण?

viii) From which text, lesson 'सद्धर्मपुण्डरीक कथा' has taken?

'सद्धर्मपुण्डरीक कथा' हा पाठ कोणत्या ग्रंथातून घेतला आहे?

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

टीपा लिहा (कोणत्याही दोन) :

i) आयुर्वेदः

ii) वनस्पतिशास्त्रम्

iii) जयोतिषम्

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

i) लीलावती

ii) अमरसन्देशः

iii) विवेकभ्रष्टः

Q4) Explain the summary of the lesson 'प्राचीन शास्त्रपरिचयः – (द्वितीयो भागः)' **[8]**

'प्राचीन शास्त्रपरिचयः – (द्वितीयो भागः)' या पाठाचा सारांश लिहा.

OR/किंवा

Explain the lesson 'सुभाषितानि' in your own words.

'सुभाषितानि' हा पाठ तुमच्या भाषेत स्पष्ट करा.

□□□

Total No. of Questions : 4] **SEAT No. :**

P-999 **[Total No. of Pages :2**

[6054]-235
S.Y.B.Sc. (Regular)
AECC-IV D-LANGUAGE : ARABIC FUNCTIONAL
(2019 Pattern) (Credit System) (Semester - IV) (24371)

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

Instructions to the candidates:

1) ***Attempt all questions.***
2) ***Figures to the right side indicate full marks.***

Q1) Translate into Eng./Urdu/Marathi any two of the following Passages:**[10]**

(الف) اَلأُستاذُ جَالِسٌ على الكُرسّى۔اَلوَلَدُوَاقِفٌعَلى الاَرضِ۔اَلْقَلَمُ لَازِمٌ لِكتاَبَة۔وَاَلاتاَبُ لَازِمٌ لِلقِرَاءَ ةِ۔اَلعِلمُ نِعئمَةٌ للاَ لِنسانِ۔اَلّدرسُ سَهْلٌ لِلوَلَدِ۔

(ب) اَللّعبُ ضَرُورىٌّ۔اَلشَّجَرُ كَبيرٌ۔اَلاسِلَامُ دِينٌ۔ اَلادَبُ وَاجبٌ۔اَلدّرسُ سَهْلٌ۔اَلجَمَلُ طَوِيلٌ۔اَلبَيْتُ جَمِيلٌ۔اَلزِّهرُصَغِيرٌ۔

(ج) اَلعِلمُ مُفِيدٌ۔اِلكتابُ عَرَبىٌّ اَلقُرآنُ كِتابٌ۔اَنتَ صَغيرٌ۔اَناكبيرٌ۔اَنتَ وَلَدٌ۔اَنَا وَلَدٌ۔ هَذا كِتابٌ۔ذَالِكَ فَرَسٌ۔ذَالِكَ كَلَبٌ۔هَذا جَمَلٌ۔

P.T.O.

Q2) Translate and explain the following poem "عِيدُالفِطْرِ" in Urdu/Eng./Marathi: **[10]**

عِيدُ الفِطْرِ ۔ يَومُ اَلبَرّ
نَختِمُ فيهِ ۔ صَومَ الشّهَرِ۔
نَلْبَسُ فَرحَاً ۔ حُلَلَ اَلبشِرِ۔
نَرْتَعُ نَلهُو۔ نَلعبُ نَجَرِىَ۔
نُسْعِدُ فِيهِ ۔ اَهْلُ اَلعُسِرِ۔
وَنُجَنِّبهُمْ۔ مَسَّ الضّرُّ۔
قَدْ عَوّدَنَا۔ دِينُ اَلْبِرّ۔
اَنْ نَمْسَهَحُمْ ۔ بِيَدِاليُسَرَ۔
مَرَحىً مَرَحىً ۔ مُسدِىُ الخَيَرِ۔
كُن مِعْواناً۔ لِلمُضطَرِّ۔
وَارحَمْ َتَغْنماً۔ خَيرالاَجرَ۔
عيدُالفطر۔عِيدُالبِنِرّ۔

Q3) Answer the following in Arabic Only: **[10]**

١) مَاذَالِكَ؟
٢) مَنْ هٰذا؟
٣) هَلْ هٰذا كِتابٌ؟
٤) كَيْفَ الزّ هُرُ؟
٥) اَينَ الزّهرُ؟

Q4) Write the Arabic Term of week days, "اَيّامُ الاَسْبوعِ": **[5]**

Total No. of Questions : 5]

SEAT No. :

P-1000

[Total No. Of Pages : 2

[6054]-236
S.Y.B.Sc. (Vocational Paper-III)
Computer Hardware and Network Administration
CHNA. 331: Networking Fundamentals
(Semester-IV) (2019 Pattern) (CBCS) (24871)

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

Instructions to the candidates :

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

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

a) Write the uses & benefits of Network.

b) What is Segment?

c) What is coaxial cable?

d) Define Physical & Logical Topolgy

e) Which types of components use in computer Network

f) Define intranet.

Q2) a) i) Write the advantages of peer to peer network. **[2]**

ii) Explain bus topology in brief. **[4]**

b) What is Transmission media? Explain different types of communication media use in Network. **[4]**

Q3) a) i) What are UTP & STP cables used for? **[2]**

ii) What is a computer network? Explain the basic components of it. **[4]**

b) Wrie the difference between client and server. **[4]**

P. T. O

Q4) a) i) What is media access technique? **[2]**

ii) Explain the uses of google drive & drop box **[4]**

b) What are the advantages of windows server 2008 **[4]**

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

a) Hub

b) Cloud computing

c) Cable crimping

d) Network interface card

e) File server

f) HTTP protocol

Total No. of Questions : 5]

SEAT No. :

P1001

[Total No. of Pages : 2

[6054]-237

S.Y.B.Sc. (Vocational) (Regular)
COMPUTER HARDWARE & NETWORK ADMINISTRATION
CHNA - 332 : Microprocessor & Interfacing - II
(CBCS 2019 Pattern) (Semester - IV) (Paper - IV) (24872)

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

Instructions to the candidates:

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

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

a) Write any two applications of card reader.

b) List different types of controller used in PC.

c) What are ADD ON cards?

d) What is full form of MPEG?

e) Write anyone important function of peripheral controller.

f) Name any two types of operating systems.

Q2) Answer the following.

a) i) Define Active RFID tag and passive RFID tag. **[2]**

ii) Explain concept of Green PC. **[4]**

b) Describe wined and wireless communication protocol. **[4]**

Q3) Answer the following.

a) i) What is printer? Write any two types of printer. **[2]**

ii) Explain memory controller or display adapter. **[4]**

b) Compare Asynchronous and synchronous serial data communications. **[4]**

P.T.O.

Q4) Answer the following.

a) i) What is LAN and WAN? **[2]**

ii) What is Scanner? Explain any one type of scanner. **[4]**

b) Explain speech synthesis. **[4]**

Q5) Write short note on any Four of the following. **[10]**

a) Storage devices

b) MIDI ports

c) Android O.S.

d) BIOS

e) N computing concept

f) Networks on the basis of geographical area covered.

✪ ✪ ✪

Total No. of Questions : 5]

SEAT No. :

P-1002

[Total No. Of Pages : 2

[6054]-238
S.Y.B.Sc. (Vocational)
BIOTECHNOLOGY
24571:VBT-221: Genetic Engineering
(Semester-IV) (2019 Pattern) (Paper-III) (CBCS)

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

Instructions to the candidates :

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

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

a) What do you understand by cloning vectors?

b) Enlist the selectable markers of pBR322 vector.

c) On what basis do proteins get separated in NATIVE PAGE?

d) Name any two types of PCR.

e) What is meant by vector?

f) Enlist any one method of automated DNA sequencing.

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

i) Write a short note on "enzyme cascade reaction in pyrosequencing method".

ii) With the help of examples, explain any three types of plasmids.

iii) Explain any one application of recombinant DNA technology in industry.

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

i) Write a short note on "Type II restriction endonucleases".

ii) Write a short note on "Electroporation technique".

P. T. O

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

i) What is DNA sequencing? Describe the Maxam Gilbert method of DNA sequencing.

ii) Diagrammatically explain the basic steps involved in gene cloning.

iii) With the help of neat and well labelled diagram, describe the YAC vector in detail.

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

i) What are restriction endonucleases? Explain the nomenclature of restriction endonucleases.

ii) With the help of neat and well labelled diagram, explain the procedure of Western blotting.

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

i) Write a short note an biopesticides.

ii) Give any three differences between λ-insertion vectors and λ-replacement vectors.

iii) What is the role of DNA topoisomerases after DNA replication and before DNA replication?

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

i) What is PCR? Describe the basic steps involved in PCR.

ii) With the help of neat and well labelled diagram, explain any one non-radioactive labelling method in detail.

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

a) Role of DNA ligases and restriction endonucl eases in recombinant DNA technology.

b) Any 3 applications of PCR

c) Role of dideoxyribonucleotides and DNA polymerase in sanger's method of DNA sequencing.

d) Applications of southern blotting.

e) Any three features of an ideal vector.

f) Antisense RNA technology.

Total No. of Questions : 5]

SEAT No. :

P1003

[Total No. of Pages : 2

[6054]-239
S.Y.B.Sc. (Regular)
BIOTECHNOLOGY
VBT - 222 : Bioinformatics
(CBCS 2019 Pattern) (Semester - IV) (24572) (Vocational Paper - IV)

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

Instructions to the candidates:

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

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

a) Name any one Nucleic Acid Database.

b) Define bioinformatics.

c) Give full form of PLOS.

d) What is meant by web server Issue?

e) Give one applications of Pfan.

f) Define sequence similarity.

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

a) Comment on History and scope of Bioinformatics.

b) What are Literature databases? Give any three application.

c) What are scoring matrices? Explain with one example.

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

a) Explain in detail BLOSUM series.

b) Explain PDB and NDB as structural database.

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

a) Explain role of bioinformatics in various fields.

b) Explain in detail biomed central.

c) How quering and retrival of sequence databases done.

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

a) Explain in detail basic concepts of derived databases.

b) Explain in detail pubchen as structural database.

P.T.O.

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

a) How extraction of knowledge of databases on Immunology done.

b) Explain in detail key based entrez and SRS.

c) Explain basic concepts of sequence similarity.

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

a) Distinguish between BLAST and FASTA.

b) Explain in detail matrices for Nucleic Acids.

Q5) Answer the following (any four). **[10]**

a) Prosite.

b) Paralogues.

c) NCBI.

d) DDBJ.

e) Eukaryotic specialized Genome Database.

Total No. of Questions : 5]

SEAT No. : ____

P-1004

[Total No. of Pages : 2

[6054]-240

S.Y. B.Sc. (Vocational)

SEED TECHNOLOGY

ST - 2.4 : Vegetable Seed Production

(2019 Pattern) (CBCS) (Semester - IV) (2 Credits) (Paper - III) (24891)

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 seed drying.

b) What is Sexual reproduction?

c) What is CMS?

d) Define self incompatibility.

e) Which types of nursery bed is required for growing onion seedlings?

f) What is the isolation distance for foundation seed production in Okras.

Q2) a) Describe in detail the genetic male sterility. **[6]**

b) Give the objectives of hybridization techniques in vegetable crops. **[4]**

Q3) a) Explain classification of vegetable crops based on plant parts used for consumption. **[6]**

b) Explain bulk method. **[4]**

P.T.O.

Q4) a) Give an detail account of seed production in Okra. **[6]**

b) Explain in detail account of seed production in Onion. **[4]**

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

a) Classification of vegetable crops based on growing season in vegetable crops.

b) Objectives of vegetable seed production.

c) Applications of population improvement.

d) Types of hybridization.

e) Vegetative methods of reproduction in vegetable crops.

f) Progeny selection.

x x x

Total No. of Questions : 5]

SEAT No. :

P1005

[Total No. of Pages : 2

[6054]-241
S.Y.B.Sc. (Regular)
SEED TECHNOLOGY
S.T.2.5 : Seed Quality Control
(2019 CBCS Pattern) (Semester - IV) (2 Credits)
(Vocational Paper - IV) (24892)

Time : 3 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) Give any one principle of field inspection.

b) Define isolation distance.

c) Write any one objective of seed certification agency.

d) Give any one concept of seed quality.

e) Write any two state seed certification agencies.

f) What are the types of seed legislation.

Q2) a) Describe in detail any one type of seed legislation. **[6]**

b) Explain the powers of seed inspector. **[4]**

Q3) a) Describe seed certification agency and its organization. **[6]**

b) Give objectives of field inspection. **[4]**

Q4) a) Explain in detail different classes of seed. **[6]**

b) Describe the method of field inspection with suitable example. **[4]**

P.T.O.

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

a) Responsibilities of seed inspector.

b) Nucleus seed.

c) Central seed certification board.

d) Duties of seed inspector.

e) Central seed testing laboratory.

f) Central seed committee.

Total No. of Questions : 5]

SEAT No. : ____

P-1006

[Total No. of Pages : 2

[6054]-242

S.Y. B.Sc.

INDUSTRIAL MICROBIOLOGY

IMB - 221 : Microbial Fermentations and Down-stream Processing

(2019 Pattern) (CBCS) (Semester - IV) (24821)

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) ***Q2 to Q5 carry equal marks.***

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

a) State the full form of GC-MS.

b) State application of High performance Liquid Chromatography.

c) State limitations of Bioinoculants.

d) State an example of Amylase producer.

e) State application of Reverse osmosis.

f) Which vitamin is produced as a byproduct of streptomycin?

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

i) What is cell disruption? Write its application. Enlist different techniques used for cell disruption.

ii) Draw a flowchart for Ethanol production highlighting important details.

iii) Write a short note on purification of fermented products.

b) Draw a well-labelled diagram depicting Gel Filteration chromatography technique. Discuss principle and applications **[4]**

P.T.O.

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

i) What is centrifugation? How can it be used for downstream processing of fermented products.

ii) Describe I_{on} - exchange chromatography.

iii) Describe sedimentation process for downstream processing of fermented product.

b) Draw a flowchart depicting cheese production. Mention all characteristics for the given process. **[4]**

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

i) Describe principle and application of dialysis.

ii) Discuss any two techniques used for characterization of fermented product.

iii) What is Penicillin? Which microorganism is responsible for commercial production of Penicillin? Name two derivatives of penicillin.

b) Explain Upstream and downstream process of fermentation. **[4]**

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

a) Salting ‘in’ and salting ‘out’.

b) Application and example of single cell protein.

c) Microfiltration.

d) Plate & frame filter.

e) Formulation and packaging of fermented product.

f) Limitations of Distillation.

Total No. of Questions : 5]

SEAT No. :

P-1007

[Total No. of Pages : 2

[6054]-243

S.Y. B.Sc. (Voc. Paper - IV)

INDUSTRIAL MICROBIOLOGY

IMB222: Quality Assurance in Industrial Product

(2019 Pattern) (Semester - IV) (CBCS) (24822)

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 'Quality Assurance' according to the ISO9001.

b) Sixth edition of Indian Pharmacopoeia is published in year _____.

c) State the full form of ISO.

d) Give names of any two methods used for bioassay of penicillin.

e) Enlist the QA tests recommended for tooth paste.

f) Test organism used in sterility test are grown in which media?

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

i) Describe the use of ISI standards.

ii) Describe invitro pyrogen test.

iii) Explain the bioassay used for vitamin B12.

b) Explain IP in detail. **[4]**

P.T.O.

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

i) Describe the process of determining shelf life of single cell protein yeast.

ii) Explain in vivo carcinogenicity test.

iii) Explain the concept of 'Monograph' with suitable example.

b) Describe the pharmaceutical GMP proposed by WHO. **[4]**

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

i) Describe the significance of ISI standards.

ii) Describe the significance of toxicity tests.

iii) Explain the bioassay used for enzyme amylase.

b) Explain AGMARK standards in details. **[4]**

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

a) FPO.

b) BP.

c) Allergen testing of milk products.

d) Bioassay of glutamic acid.

e) FDA.

f) Toxicity tests for solvents.

Total No. of Questions : 5]

SEAT No. :

P-1008

[Total No. of Pages : 2

[6054]-244

S.Y. B.Sc. (Vocational)

ELECTRONIC EQUIPMENT MAINTENANCE

VOC-EEM - 241 : Basic Level Maintenance of Home & Community Equipment

(2019 Pattern) (Semester - IV) (CBCS) (Paper - III) (24311)

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. No. 2 to 5 carry equal marks.***

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

a) Water pump can operate on AC & DC supply. Comment.

b) How impurities are removed from water in water treatment plant?

c) Who made first washing machine?

d) What is nonhydralic elevator?

e) What is ac generator?

f) What is function of pyranometer?

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

i) Describe with neat diagram the function of water pump.

ii) How to maintain water pump routinely?

b) What are the types of water treatment plant? Explain any one of them in details. **[4]**

P.T.O.

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

i) Explain the role of microcontroller in washing machine.

ii) Give in brief the history of development of washing machines.

b) What is the difference between elevator and escalator? Give their application areas. Describe failure - safe operation of elevator. **[4]**

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

i) What are the parts of generator?

ii) Explain the working principle of alternate in generator.

b) What are the basic components of solar plant? Explain storage mechanism in it. **[4]**

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

a) Describe self priming in water pumps.

b) Write in brief about water pumps used in water treatment plant.

c) Describe the function of different safety devices used in elevators.

d) Which features are important in washing machines?

e) How a voltage is controlled in generator?

f) Give a brief account of history of solar power plants.

x x x

Total No. of Questions : 5] **SEAT No. :**

P-1009 **[Total No. of Pages : 2**

[6054]-245

S.Y. B.Sc. (Vocational)

ELECTRONIC EQUIPMENT MAINTENANCE

EEM - 242 : Computer Based Electronic Equipment Design

(2019 Pattern) (Semester - IV) (CBCS) (Paper - II) (24812)

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 5 carry equal marks.***

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

a) What is python?

b) Give the meaning of real time data analysis.

c) What is acronym used for PIP in python?

d) What is Matpolotlib?

e) What is Ethernet?

f) What is CAT 5/5e?

Q2) a) i) What are the basic components of real time analytics software. **[2]**

ii) Mention the differences between CAT-5 and CAT-6 cables? **[4]**

b) Explain computer control interface system with the help of block diagram. **[4]**

P.T.O.

Q3) a) i) Comment - can matplotlib plot real time graphs? **[2]**

ii) Explain BMP 180 barometric sensor in short. **[4]**

b) Compare Ethernet with internet. **[4]**

Q4) a) i) Enlist any four applications of XBee. **[2]**

ii) Explain the steps in XBee configuration? **[4]**

b) Write a short note on components of ECG machine. **[4]**

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

a) The temperature changes of furnace in DTA.

b) Principle of spectrophotometer.

c) BMP 280 sensor.

d) Plotting a graph with matplotlib.

e) Ultrasonic sensor.

f) Essential elements of python programming.

Total No. of Questions : 5]

SEAT No. :

P1010

[Total No. of Pages : 2

[6054]-246

S.Y.B.Com./B.A./B.C.A./B.Sc.(Regular)/B.Sc.(Comp. Sci./Biotech./Animation)

AECC-III : ENVIRONMENTAL AWARENESS

(2019 Pattern) (CBCS) (Semester - IV) (24361)

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

Instructions to the candidates:

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

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

a) What is nuclear Hazard.
b) Give one example of climate change.
c) Write name of one casestudy related to resettlement of persons.
d) Write one effect of landslides.
e) Give any one right related to tribal population.
f) Give one example of Human wildlife conflict.

Q2) Answer the following.

a) Write the effect and control measure of water pollution. **[6]**
b) How population explosion affects the Environment and human health. **[4]**

Q3) Answer the following.

a) Define Global warming. Write in detail the causes of Global warming. **[6]**
b) What are the effects and control measures of Noise Pollution. **[4]**

Q4) Answer the following.

a) Explain "Indian culture help in Environmental conservation". **[6]**
b) Write a short note on Air Act in India. **[4]**

Q5) Write a short note on Any Four of the following. **[10]**

a) Solid waste.
b) Air Pollution.
c) Ozone depletion.
d) Acid Rain.
e) Silent valley movement
f) Over population & Environment.

P.T.O.

Total No. of Questions : 5]

P1010

[6054]-246

S.Y.B.Com./B.A./B.Sc./B.C.A./B.Sc. (Comp. Sci.)/Biotech./Animation (Regular)

AECC-III : ENVIRONMENTAL AWARENESS

(2019 Pattern) (CBCS) (Semester - IV) (24361)

(मराठी रूपांतर)

वेळ : *2* तास] [एकूण गुण : *35*

सूचना :– *1)* प्रश्न क्रं. 1 अनिवार्य आहे.

2) प्रश्न क्रं. 2 ते 5 मध्ये कोणतेही तीन प्रश्न सोडवा.

3) प्रश्न क्रं. 2 ते 5 यांना समान गुण आहेत.

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

अ) आण्विक धोका म्हणजे काय?

ब) वातावरणीय बदलाचे एक उदाहरण लिहा.

क) लोकांच्या पुनर्वसनाशी संबंधित एका केस स्टडीचे नाव लिहा.

ड) भूस्खलनाचा एक परिणाम लिहा.

इ) आदिवासी लोकसंख्येशी संबंधित कोणताही 1 अधिकार लिहा.

फ) मानवी वन्यजीव संघर्षाचे एक उदाहरण द्या.

प्र.*2)* खालील प्रश्नाचे उत्तरे द्या.

अ) जलप्रदूषणाचा परिणाम आणि नियंत्रण उपाय लिहा. **[6]**

ब) लोकसंख्येच्या स्फोटाचा पर्यावरण आणि मानवी आरोग्यावर कसा परिणाम होतो. **[4]**

प्र.*3)* खालील प्रश्नाचे उत्तरे द्या.

अ) जागतिक तापमान वाढीची व्याख्या लिहा. व हया तापमान वाढीचे कारणे लिहा. **[6]**

ब) ध्वनी प्रदूषणाचे परिणाम आणि नियंत्रण उपाय स्पष्ट करा. **[4]**

प्र.*4)* खालील प्रश्नाचे उत्तरे द्या.

अ) पर्यावरण संवर्धनासाठी भारतीय संस्कृतीची मदत समजावून सांगा. **[6]**

ब) भारतातील वायु प्रदुषण प्रतिबंधक कायदयावर छोटी टीप लिहा. **[4]**

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

अ) घन कचरा

ब) वायु प्रदुषण

क) ओझोन कमी होणे

ड) अम्ल पर्जन्य

इ) सायलेंट व्हेली मूवमेंट

फ) लोकसंख्या वाढ व पर्यावरण