

Total No. of Questions : 4]

SEAT No. :

P458

[Total No. of Pages : 2

[5115] - 201

S.Y. B.Sc.

MATHEMATICS

MT - 221 : Linear Algebra

(2013 Pattern) (Paper - I) (Semester - II) (81112)

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

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

Q1) Attempt any five of the following.

[10]

- a) Show that $\{f_1(x)=1, f_2(x)=e^x, f_3(x)=e^{2x}\}$ forms a linearly independent set of vectors.
- b) Find $L(s)$, where $S = \{(1,1), (-1,1)\}$ in $\mathbb{R}^2$.
- c) Find co-ordinate vector of $\bar{w} = (1,1)$ relative to the basis $S = \{(2,-4), (3,8)\}$ of $\mathbb{R}^2$.
- d) Find value of a if the vectors $(2, a)$ and $(6,4)$ are orthogonal vectors in $\mathbb{R}^2$.
- e) If $\bar{v} = (1,2,1)$ and $\bar{u} = (2,1,2)$, find $\text{proj}_{\bar{u}} \bar{v}$.
- f) Determine whether the function $T: \mathbb{R}^2 \longrightarrow \mathbb{R}^2$ defined as $T(x, y) = (x^2, y)$ is linear transformation?
- g) Let $T: \mathbb{R}^2 \longrightarrow \mathbb{R}^2$ be a linear transformation given by $T(x, y) = (2x - y, -8x + 4y)$ Is the vector $(1, -4)$ in $R(T)$?

Q2) Attempt any two of the following:

[10]

- a) If W_1 and W_2 are the subspaces of a vector space V then prove that $V = W_1 \oplus W_2$ if and only if a) $V = W_1 + W_2$ and b) $W_1 \cap W_2 = \{\bar{o}\}$.
- b) Show that for the vectors $\bar{u} = (u_1, u_2)$ and $\bar{v} = (v_1, v_2)$ in $\mathbb{R}^2$, $\langle \bar{u}, \bar{v} \rangle = 5u_1v_1 - u_1v_2 - u_2v_1 + 10u_2v_2$ defines an inner product on $\mathbb{R}^2$.
- c) Find a linear transformation $T: \mathbb{R}^2 \longrightarrow \mathbb{R}^2$, it is given that $T(1,1) =$

P.T.O.

$(0,2)$ and $T(1,-1) = (2,0)$.

Q3) Attempt any two of the following:

[10]

a) If $\bar{u}, \bar{v}$ are vectors in an inner product space V and C is any scalar then prove that.

i) $\|c\bar{u}\| = |c| \|\bar{u}\|$

ii) $\|\bar{u} + \bar{v}\| \leq \|\bar{u}\| + \|\bar{v}\|$

b) Show that a non-empty subset W of a vectors space V is a subspace of V if and only if W satisfy the following.

$C1: \bar{w}_1 + \bar{w}_2 \in W, \forall \bar{w}_1, \bar{w}_2 \in W$

$C2: k\bar{w} \in W, \forall \bar{w} \in W \text{ and } k \in F$

c) Let $T: \mathbb{R}^2 \longrightarrow \mathbb{R}^2$ be multiplication by a matrix A . Determine whether

T has an inverse; if so, find $T^{-1}\left(\begin{bmatrix} x_1 \\ x_2 \end{bmatrix}\right)$ where $A = \begin{bmatrix} 1 & 1 \\ 1 & 0 \end{bmatrix}$.

Q4) Attempt any one of the following:

[10]

a) i) Show that a linear transformation $T: V \longrightarrow W$ is injective if and only if $\ker(T) = \{\bar{0}\}$.

ii) Let $\mathbb{R}^2$ have the Euclidean inner product. Use the gram - schmidt process to transform basis vectors $\bar{u}_1 = (1,-3), \bar{u}_2 = (2,2)$ into an orthonormal basis.

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

ii) Find basis and dimension of row space of the matrix A given by

$$A = \begin{bmatrix} 2 & 3 & 1 & 1 \\ 1 & -1 & 3 & -1 \\ 1 & 0 & 2 & -1 \\ 3 & 5 & 1 & 2 \end{bmatrix}$$



Total No. of Questions : 4]

SEAT No. :

P459

[Total No. of Pages : 2

[5115] - 202

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

MATHEMATICS

MT - 222 (A) : Multivariable Calculus - II

(2013 Pattern) (Paper - II)

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

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

Q1) Attempt any five of the following.

[10]

- a) Discuss the continuity of vector function $\vec{f}(t)$ at $t = 0$ where

$$\vec{f}(t) = \frac{\sin 3t}{t} \vec{i} + e^{2t} \vec{j} + \log(1+t) \vec{k}, t \neq 0 \quad \vec{f}(0) = 3\vec{i} + \vec{j}$$

- b) If $\vec{r}(t) = (1 - \cos t) \vec{i} + (t - \sin t) \vec{j}$ then find $\frac{d\vec{r}}{dt}$ and $\frac{d^2\vec{r}}{dt^2}$.

- c) Evaluate $\int_C (x dx + y dy)$ along curve

$$C: x = 2 \cos t, y = \sin t; 0 \leq t \leq 2\pi$$

- d) Find curl of $\vec{f} = x^2 y \vec{i} + 2y^3 z \vec{j} + 3z \vec{k}$
- e) Find parametrization of the sphere $x^2 + y^2 + z^2 = a^2$
- f) State stoke's theorem.
- g) Find the gradient field of the function $f(x, y, z) = xy + yz + zx$

Q2) Attempt any two of the following:

[10]

- a) If $\vec{u}, \vec{v}$ are differentiable vector functions of t , then show that

$$\frac{d}{dt}(\vec{u} \times \vec{v}) = \vec{u} \times \frac{d\vec{v}}{dt} + \frac{d\vec{u}}{dt} \times \vec{v}.$$

- b) Find the work done by the force field $\vec{F}(x, y, z) = (x + y) \vec{i} + xy \vec{j} - z^2 \vec{k}$ on a particle that moves along the line segment from $(1, 3, 1)$ to $(2, -1, 4)$

P.T.O.

- c) Using Gauss divergence theorem, show that

$$\int_S (ax\bar{i} + by\bar{j} + cz\bar{k}) \cdot \bar{n} \, ds = \frac{4\pi}{3}(a + b + c) \text{ where } S \text{ is the surface of the sphere } x^2 + y^2 + z^2 = 1.$$

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

- a) Prove that a differentiable vector function $\bar{u}$ of a scalar t to be of constant magnitude $^{\gamma}$ if and only if $\bar{u} \cdot \frac{d\bar{u}}{dt} = 0$.

- b) Find unit tangent vector of the curve

$$\bar{r}(t) = (z + t)\bar{i} - (t + 1)\bar{j} + t\bar{k}, \quad 0 \leq t \leq 3.$$

- c) If S is any closed surface enclosing a volume V and

$$\bar{F} = x\bar{i} + 2y\bar{j} + 3z\bar{k}, \text{ then prove that } \int_S \bar{F} \cdot \bar{n} \, ds = 6V.$$

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

- a) State and prove Green's theorem in the plane.

- b) i) Show that $\bar{F} = (e^x \cos y + yz)\bar{i} + (xz - e^x \sin y)\bar{j} + (xy + z)\bar{k}$ is conservative vector field.

- ii) Use Stokes's theorem to evaluate $\int_C \bar{F} \cdot d\bar{r}$ where

$\bar{F} = xz\bar{i} + xy\bar{j} + 3xz\bar{k}$ and C is the boundary of the portion of the plane $2x + y + z = 2$ in the first octant traversed counter clockwise.



Total No. of Questions : 4]

SEAT No. :

P460

[Total No. of Pages : 3

[5115] - 203
S.Y. B.Sc. (Semester - II)
PHYSICS (Paper - I)
PH - 221: Oscillations, Waves and Sound
(2013 Pattern)

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

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

Q1) Attempt all of the following:

[10]

- a) Write the differential equation for simple Harmonic motion.
- b) Write two applications of seismic wave study.
- c) Define log decrement.
- d) Define equilibrium.
- e) State the formula for frequency of oscillation of electric charge in L – C circuit.
- f) Define resonance in forced oscillation.
- g) Define Doppler effect.
- h) What is reverberation of a hall?
- i) Find speed of sound in water which has a bulk modulus $2.1 \times 10^9 \text{ N/m}^2$ and density 10^3 kg/m^3 .
- j) A spectral line of wavelength $6000 \text{ \AA}$ is found to be displaced towards red end by $1 \text{ \AA}$ calculate the velocity of star.

Q2) Attempt any two of the following:

- a) Set up the differential equation of forced oscillations. Explain the terms involved in it. Write the general solution of the differential equation. **[5]**
- b) Obtain an expression for velocity of transverse waves over a stretched string. **[5]**

P.T.O.

- c) Calculate the reverberation time if reverberation time of empty concert hall of volume 2000 m^3 is 1.0 second, and 500 persons each of absorption 4 dB are seated in the hall. [5]

Q3) Attempt any two of the following:

- a) A particle is simultaneously subjected to two SHMS given by $x = 5 \sin (wt + \frac{\pi}{3})$ and $y = 8 \sin wt$. Find the equation and the nature of the resultant motion. [5]
- b) The equation of forced oscillations of a mechanical system is

$$2 \frac{d^2x}{dt^2} + 3 \frac{dx}{dt} + 1256x = 50 \sin qt$$

all quantities are in S.I. units. Calculate

- i) Velocity at resonance
- ii) Quality factor
- iii) Band width
- iv) Maximum velocity amplitude. [5]
- c) A capacitor of $0.4 \mu\text{f}$, and inductor of 50mH and a resistor of 400 Ohms are connected in series. Can the electrical circuit be oscillatory? [5]

Q4) A) Attempt any one.

- a) i) Show that the Doppler effect in light is symmetric in nature. [4]
- ii) Calculate the energy density and intensity of a wave of frequency 100Hz , wavelength 32 cm and amplitude 1mm , when propagated in air. Density of air is $1.29 \times 10^{-3} \frac{\text{gm}}{\text{cm}^3}$ [4]
- b) i) Obtain the formula for period of torsional pendulum $T = 2\pi \sqrt{\frac{I}{C}}$ symbols have their usual meaning. [4]
- ii) Write a short note lissajous figure with respect to production and application. [4]

B) Attempt any one of the following.

- i) What is seismology? What are different types of seismic waves. [2]
- ii) The frequency of damped oscillator of mass 3 gm is 5 Hz. If the coefficient of damping is $0.314 \frac{\text{dyne}}{\text{cm} - \text{s}^{-1}}$. Determine its quality factor. [2]



Total No. of Questions : 4]

SEAT No. :

P461

[Total No. of Pages : 2

[5115] - 204

S.Y. B.Sc.

PHYSICS

PH - 222: Optics

(2013 Pattern) (Paper - II) (Semester - II)

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

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

Q1) Attempt all of the following (one mark each)

[10]

- a) What do you mean by principal points?
- b) Find the power of a lens having focal length 10cm.
- c) State the cause of spherical aberration.
- d) What do you mean by crossed lens?
- e) Calculate the magnifying power of a magnifying glass of 5cm focal length. Distance of distinct vision is 25cm.
- f) Define magnifying power of a compound microscope.
- g) Define grating element.
- h) Give any two distinguishing points between interference and diffraction.
- i) The angle of polarization of a transparent material is 57° . Find the angle of retraction.
- j) Define uniaxial crystal.

Q2) Attempt any two of the following (Five marks each)

[10]

- a) Derive lens maker's formula for a thin lens.
- b) What do you mean by achromatism? Derive the condition for the achromatism of two co-axial thin lenses separated from each other.
- c) Explain the stokes treatment of the phase change on reflection of light.

P.T.O.

Q3) Attempt any two of the following (Five marks each) **[10]**

- a) A parallel beam of sodium light is incident on a oil film floating on water. When the film is observed at an angle of 30° with the normal, 6th dark fringe is seen. Determine thickness of the film. Refractive index of oil = 1.46.
- b) A converging lens of focal length 6.25cm is used as a magnifying glass. If the near point of the observer is 25cm from the eye and the lens is held close to the eye, calculate
 - i) The distance of the object from the lens and
 - ii) The angular magnification.
- c) The focal length of a lens in air is 15cm. What will be its focal length if air is replaced by water? Given R. I. of glass = 1.45

R. I. of water = 1.33

R. I. of air = 1

Q4) a) Attempt the following.

- i) Describe briefly Huygen's explanation of double refraction. **[4]**
- ii) What do you mean by spherical aberration? Explain how it is reduced using plano - convex lens. **[4]**

OR

- i) Distinguish between Huygen's eyepiece with Ramsden's eyepiece. **[4]**
 - ii) Derive the formula for the fringe width in case of fringes of equal thickness due to interference of wedge shaped thin film. **[4]**
- b) Attempt any one of the following.
- i) Deduce the speed of O – ray and E – ray in calcite crystal
 - a) in a plane perpendicular to its optic axis
 - b) along the optic axis(Given $\mu_e = 1.4864$ & $\mu_o = 1.6584$ for calcite crystal) **[2]**
 - ii) State Rayleigh criterion of resolution. **[2]**



Total No. of Questions : 6]

SEAT No. :

P462

[Total No. of Pages : 3

[5115] - 205
S.Y. B.Sc. (Semester - II)
CHEMISTRY
CH - 221: Physical and Analytical Chemistry
(2013 Pattern)

Time :2 Hours]

[Max. Marks :40

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Neat diagram must be drawn wherever necessary.*
- 3) *Figures to the right side indicate full marks.*
- 4) *Use of calculator is allowed.*
- 5) *Answer to both sections should be written in separate answer sheet.*

SECTION - I

[Physical Chemistry]

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

- a) State the criteria of equilibrium in - terms of ΔF .
- b) Write the Gibbs - Helmholtz equation.
- c) Draw the T-N diagram of solution with negative deviation.
- d) Define the term: Lower critical solution temperature.
- e) Define the term: Normality.

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

- i) Derive the Clapeyron equation.
- ii) State and explain Henry's law. Give its applications.
- iii) Explain with diagram the mutual solubility behaviour of phenol - water system at various temperatures.

b) Answer any two of the following. **[4]**

- i) State Raoult's law and give its equation.
- ii) Explain the physical significance of ΔF .
- iii) How will you calculate graphically the heat of vaporisation of liquid from Clausius - Clapeyron equation.

P.T.O.

Q3) Solve any two of the following. [5]

- a) Calculate free energy change, when two moles of nitrogen is compressed reversibly and isothermally at 25°C from 40 atm. to 200 atm.
(Given : $R = 8.314 \text{ J/K/mole}$)
- b) The vapour pressure of water is 2.5×10^5 Pascal at 27°C and 7.5×10^5 Pascal at 37°C. Calculate the molar heat of vaporisation of water
(Given : $R = 8.314 \text{ J/K/ mole}$)
- c) A mixture of 'X' & 'Y' contains 60% by weight of 'X'. Calculate mole fraction of 'X' & 'Y' in the above mixture (Molecular weight of X = 60 & Y = 78).

SECTION - II

[Analytical Chemistry]

Q4) Answer the following: [5]

- a) Define the term 'Equivalent weight'.
- b) What is meant by 'neutralisation point' in acid - base titration?
- c) Define the term 'Secondary standard substances'.
- d) Give any two examples of mixed indicators.
- e) What is 'Iodimetry'?

Q5) a) Answer any two of the following. [6]

- i) Explain the titration curve of strong acid weak base.
- ii) Explain redox titration with suitable example.
- iii) Write a note on 'Calibration of pipette'.

b) Answer any two of the following. [4]

- i) Give the pH transition range and colour in acid and base form for
 - 1) Methyl red
 - 2) Phenolphthalein
- ii) How will you prepare 0.1 N $\text{K}_2\text{Cr}_2\text{O}_7$ solution? How will you standardize sodium thiosulphate solution by using $\text{K}_2\text{Cr}_2\text{O}_7$ solution?

Q6) Solve any two of the following.

[5]

- a) Calculate pH of solution after adding 20ml 0.15 N NaOH to 30ml 0.15N HCl.
- b) In a redox titration 30ml 0.1M Ce^{4+} solution is added to a solution of 100ml of 0.1M Fe^{2+} solution. Calculate E_{cell} . (Given: $E^{\circ}_{\text{Fe}^{3+}/\text{Fe}^{2+}} = 0.771\text{V}$).
- c) When 25.5ml of 0.1N NaOH reacts with 10.8ml of HCl. Calculate Normality and strength of HCl. (Given : Mol. weight of HCl = 36.5).



Total No. of Questions : 6]

SEAT No. :

P463

[Total No. of Pages : 3

[5115] - 206
S.Y. B.Sc. (Semester - II)
CHEMISTRY
CH - 222: Organic & Inorganic Chemistry
(2013 Pattern)

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

- 1) Answer the two sections should be written on separate answer books.*
- 2) All questions are compulsory.*
- 3) Neat diagram must be drawn wherever necessary.*

SECTION - I

[Organic Chemistry]

Q1) Attempt the following. **[5]**

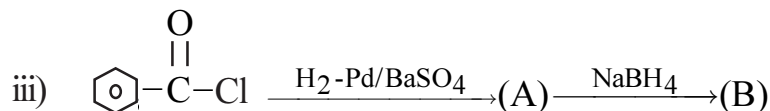
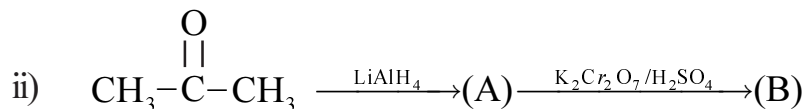
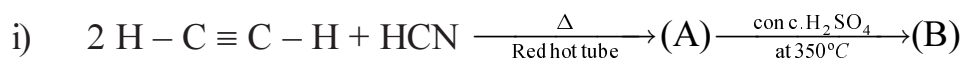
- a) Give the preparation of pyridinium chlorochromate.
- b) Give the importance of bio-chemistry in agriculture.
- c) What is action of conc. H_2SO_4 on thiophene?
- d) Draw the structure of sucrose.
- e) What is Birch reduction reaction?

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

- i) Give the synthesis of furan. What is action of following reagent on furan?
 - a) Conc. HNO_3 / $(\text{CH}_3\text{CO})_2\text{O}$,
 - b) SO_3 / Pyridine, at $100-110^\circ\text{C}$
- ii) What are carbohydrates? What is action of following on glucose?
 - a) H_2 / Ni,
 - b) $\text{Ph} - \ddot{\text{N}}\text{H} - \ddot{\text{N}}\text{H}_2$
- iii) What is hydroxylation reaction? Discuss cis-hydroxylation reaction using KMnO_4 .

P.T.O.

B) Assign (A) and (B) of the following reactions (any two) [4]



Q3) Answer any two of the following. [5]

- What are α - amino acids? Explain, the action of α - amino acid with
i) Nitrous acid, ii) Dansyl chloride.
- Give an account of killiani - fischer synthesis of carbohydrates.
- What are proteins? Discuss the four levels of structure of proteins.

SECTION - II

[Inorganic Chemistry]

Q4) Answer the following: [5]

- What are nonstoichiometric compounds?
- How many bridging carbonyl present in $\text{Mn}_2(\text{CO})_{10}$?
- Define acids and bases according to solvent system.
- Define chemical toxicology.
- Identify Lewis acid from the following H_2O , NH_3 , AlCl_3 , CN^-

Q5) a) Answer any two of the following. [6]

- What are transition element? Explain the following properties of these elements.
 - Colour
 - Magnetic properties
- Explain Wacker process with its mechanism for synthesis of acetaldehyde.
- What are properties of solvent? Discuss briefly any two properties.

- b) Attempt any two of the following. [4]
- i) Write a note on biological methylation.
 - ii) Explain the 'd' block element have ability to form complexes.
 - iii) Why NH_3 is stronger Lewis base than NF_3 ? Explain.

Q6) Answer any two of the following. [5]

- a) Write a note on Biochemical effect of Arsenic.
- b) What is spin only formula? Calculate magnetic moment of Mn^{2+} and Cu^{2+} by using spin only formula.

(Atomic number of Mn = 25 and Cu = 29)

- c) Define $18e^-$ rule. Find out valence electrons in the following metal carbonyls.



(Atomic no. of Ni = 28 and Fe = 26)



Total No. of Questions : 4]

SEAT No. :

P464

[Total No. of Pages : 2

[5115] - 207
S.Y. B.Sc.
BOTANY (Semester - II)
BO - 221 : Plant Anatomy and Embryology
(2013 Pattern) (Paper - I)

Time :2 Hours]

[Max. Marks :40

Instructions to the candidates:

- 1) All questions are compulsory.*
- 2) Figures to the right indicate full marks.*
- 3) Neat diagrams must be drawn wherever necessary.*

Q1) Answer the following.

[10]

- a) What is chalazogamy?
- b) Give an example of orthotropous ovule.
- c) What is tapetum?
- d) Define the term megasporangium.
- e) Give any one scope of embryology in taxonomy.
- f) Define normal secondary growth.
- g) Mention an example of plant having radial vascular bundle.
- h) What is inflexibility?
- i) Define complex tissue.
- j) What is uniseriate epidermis?

Q2) Answer any two of the following.

[10]

- a) Describe abnormal secondary growth in Bignonia stem.
- b) Explain structure and functions of xylem.
- c) Describe structure of tetrasporangiate anther.

P.T.O.

Q3) Write notes on (any two)

[10]

- a) Double fertilization.
- b) Epidermal out growths.
- c) Cellular endosperm.

Q4) What is megasporogenesis? Describe the development of monosporic embryo sac. **[10]**

OR

What is mechanical tissue system? Describe the distribution of mechanical tissues in dicot stem.



Total No. of Questions : 4]

SEAT No. :

P465

[Total No. of Pages : 2

[5115] - 208
S.Y. B.Sc. (Semester - II)
BOTANY (Paper - II)
BO - 222 : Plant Biotechnology
(2013 Pattern)

Time :2 Hours]

[Max. Marks :40

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicate full marks.*
- 3) *Neat diagrams must be drawn wherever necessary.*

Q1) Answer the following.

[10]

- a) What is biotechnology?
- b) Write any two properties of enzymes.
- c) What is downstream processing?
- d) Write any two uses of SCP.
- e) Enlist any two methods of phytoremediation.
- f) What is gene cloning?
- g) Define transgenic plant.
- h) Enlist any two transgenic plants in insect resistance.
- i) Write any two applications of nanotechnology in nanofertilizers.
- j) What is nanotechnology?

Q2) Answer any two of the following.

[10]

- a) Describe the production of enzyme amylase.
- b) Explain acceptability of SCP.
- c) What is phytodegradation & Add a note with suitable examples.

P.T.O.

Q3) Write notes on (any two)

[10]

- a) Restriction endonucleases.
- b) Advantages of herbicide resistance.
- c) Classification of enzymes.

Q4) What is bioreactor? Describe in detail digestive bioreactor.

[10]

OR

Define genetic transformation. Enlist methods of genetransfer in plants.
Describe the structure of Ti - Plasmid.



Total No. of Questions : 4]

SEAT No. :

P466

[Total No. of Pages : 2

[5115]-209

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

ZOOLOGY

ZY-221 : Animal Systematics and Diversity - IV

(2013 Pattern) (Paper - I) (Revised)

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

- 1) All questions are compulsory.*
- 2) Neat labelled diagrams must be drawn wherever necessary.*
- 3) Figures to the right indicate full marks.*

Q1) Answer the following :

[10]

- a) Define systole.
- b) Define hemibranch.
- c) What is heterocercal tail?
- d) Give two examples of aquatic mammals.
- e) Give any two examples of fruit eating beak.
- f) Give any two examples of Poisonous Snake.
- g) Enlist any two cranial nerves in Scoliodon.
- h) What is latitudinal migration?
- i) Give any two examples of egg laying mammal.
- j) What is mesovarium?

P.T.O.

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

- a) Membranous labyrinth.
- b) Explain cursorial and swimming feet in birds.
- c) Aquatic mammals.

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

- a) Sketch and label dorsal view of brain of Scoliodon.
- b) Write distinguishing characters of subclass prototheria.
- c) Mud probing and fish catching beak.

Q4) Describe the digestive system of Scoliodon. **[10]**

OR

Describe various types of aerial adaptations in birds.



Total No. of Questions : 4]

SEAT No. :

P467

[Total No. of Pages : 2

[5115]-210

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

ZOOLOGY (Paper - II)

ZY-222 : Applied Zoology - II (Apiculture and sericulture)

(Revised 2013 Pattern)

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

- 1) All questions are compulsory.*
- 2) Neat labelled diagrams must be drawn wherever necessary.*
- 3) Figures to the right indicate full marks.*

Q1) Attempt the following :

[10]

- a) What is moriculture?
- b) Write biological name of Rock bee.
- c) What is the use of bee brush?
- d) What is sun drying?
- e) Mention any two uses of honey.
- f) What is the biological name of mulberry silk worm?
- g) What is the use of bee veil?
- h) Mention any two fungal diseases of silk worm.
- i) Write the names of any two enemies of honey bee.
- j) What is bivoltine species?

P.T.O.

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

- a) Tail wagging dance.
- b) Comb foundation sheet.
- c) Shoot rearing method.

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

- a) Sketch and label - Honey extractor.
- b) Describe branch cutting method.
- c) Describe sorting of cocoon and deflossing.

Q4) Explain in details the uses of honey and bee wax. **[10]**

OR

What is sericulture? Give an account of different types of silk moths.



Total No. of Questions : 4]

SEAT No. :

P468

[Total No. of Pages : 2

[5115]-211

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

GEOLOGY (Paper - I)

GL-221 : Petrology

(2013 Pattern)

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

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

Q1) Answer the following questions.

[10]

- a) What is Basalt?
- b) What is cataclasite?
- c) State two Rudaceous Rocks.
- d) Name any two minerals of high silication.
- e) Define Devitrification.
- f) Define Primary Magma.
- g) What are stress minerals?
- h) Define Metamorphism.
- i) What is Laterite?
- j) Define roundness of sediments.

P.T.O.

Q2) Write notes on (any two) :

[10]

- a) Chemical Deposits
- b) Thermal Metamorphism of arenaceous Rocks
- c) Factors controlling the grain size of Igneous Rocks.

Q3) Write notes on (any two) :

[10]

- a) Classification of Igneous Rocks based on silica percentage.
- b) Crystallization of Unicomponent Magma.
- c) Orbicular and Spherulitic structure.

Q4) Define Metamorphism and explain the different kinds of metamorphism briefly.

[10]

OR

State and explain the different products of Cataclastic metamorphism.



Total No. of Questions : 4]

SEAT No. :

P469

[Total No. of Pages : 2

[5115]-212

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

GEOLOGY (Paper - II)

**GL-222 : Stratigraphy and Palaeontology
(2013 Pattern)**

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

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

Q1) Answer the following questions.

[10]

- a) Define uniformitarianism.
- b) Define angular unconformity.
- c) Define correlation.
- d) What are varves?
- e) Explain order of superposition.
- f) Define macro-evolution.
- g) Define micro palaeontology.
- h) Define lithofacies.
- i) Define Marker beds.
- j) What are radiolarian?

P.T.O.

Q2) Write a note on (any two) :

[10]

- a) Physical factors controlling stratification.
- b) Stratigraphic procedures for collection of data from out crop.
- c) Chronostratigraphy & its units.

Q3) Explain the following (any two) :

[10]

- a) Evolutionary trends in suture line of ammonoids.
- b) Types of spores based on aperture.
- c) Types of hinges in Ostracod.

Q4) What is biostratigraphy? Describe biostratigraphic units in detail.

[10]

OR

Describe the morphology of the test of foraminifera.



Total No. of Questions : 4]

SEAT No. :

P470

[Total No. of Pages : 4

[5115]-213

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

STATISTICS

ST-221 : Statistical Methods and Use of R-Software

(2013 Pattern) (Paper - I)

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

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

Q1) Attempt each of the following :

[1 each]

- a) Choose the correct alternative in each of the following :
 - i) The partial correlation coefficient lies between
 - A) 0 to 1
 - B) -1 to 1
 - C) 0 to ∞
 - D) $-\infty$ to ∞
 - ii) Type II error is
 - A) accepting H_0 when it is true
 - B) rejecting H_0 when it is true
 - C) accepting H_0 when it is false
 - D) rejecting H_0 when it is false
 - iii) Which of the following is a limitation of total fertility rate?
 - A) It does not consider the effect of infertility
 - B) Entire female population in the reproductive age period under consideration
 - C) All the women still survive upto the end of reproductive age period.
 - D) All the above

P.T.O.

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

- i) If $\sigma^2_{y \cdot x_1 x_2} = 0$ then $R^2_{y \cdot x_1 x_2} = 1$
- ii) In the M/M/1 model used in queuing theory time of arrivals of customers are assume to follow exponential distribution.
- iii) Fertility rates mainly depend on female population of child bearing age.
- c) If $r_{yx_1} = r_{yx_2} = 0$ then find $R_{y \cdot x_1 x_2}$.
- d) A shopkeeper claims that every pack of detergent powder containing 1 kg. of powder. Set-up the null hypothesis against appropriate alternative hypothesis to test the claim.
- e) Define p-value
- f) Define infant mortality rate.

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

- a) Describe the test procedure to test $H_0 : P_1 = P_2$ against the alternative hypothesis.
 - i) $H_1: P_1 \neq P_2$
 - ii) $H_1: P_1 > P_2$
 - iii) $H_1: P_1 < P_2$

State the assumptions clearly.

- b) For the following information compute gross reproduction rate (GRR) and net reproduction rate (NRR). Also interpret the result.

Age Group	Female Population (in 1000)	Female births	Survival rate
15 - 19	18	540	0.95
20 - 24	15	600	0.94
25 - 29	14	700	0.93
30 - 34	14	560	0.92
35 - 39	16	480	0.91
40 - 44	13	442	0.90
45 - 49	12	300	0.88

- c) A fertilizer company distributes its product by trucks loaded at its loading station. It was found that on an average every five minutes one truck arrived and average loading time was 3 minutes per truck.

Find :

- i) the probability that a truck has to wait.
- ii) the average waiting time of a truck in the queue
- iii) average length of queue.

Q3) Attempt any two of the following :

[5 each]

- a) Derive the formula for multiple correlation coefficient $R_{y \cdot x_1 x_2}$ (i.e. $R_{1.23}$) in terms of total correlation coefficients.
- b) Explain how to construct $100(1 - \alpha)\%$ confidence interval for difference of population means when population variances σ_1^2 and σ_2^2 are known.
- c) A sample of 900 ball bearings is found to have average weight of 12.5 grams. Can we assume that a sample is coming from a population with average weight 13 grams with standard deviation 1 gram against that it is at most 13 grams at 5% level of significance.

Q4) Attempt any one of the following :

- a) i) A soap manufacturing company claims that 36% of household use their brand of soap. In a survey it was found that out of 1600 household interviewed, 512 used the soaps produced by the company. Is the companies claim true at 5% l.o.s.? **[4]**

ii) If $r_{yx_1 \cdot x_2} = 0$ then show that $r_{yx_2 \cdot x_1} = r_{yx_1} \sqrt{\frac{1 - r_{x_1 x_2}^2}{1 - r_{yx_1}^2}}$. **[3]**

- iii) Write the commands to draw a random sample of size 4, using simple random sampling with replacement and without replacement method, from the observations given below.

23, 27, 32, 21, 34, 35, 29, 22, 20, 25 **[3]**

- b) i) Derive the equation of least square regression plane of Y on X_1 and X_2 . [7]
- ii) An automobile tyre manufacturer claims that the average life of a particular grade of tyre is more than 20000 kms. A random sample of 10 tyres tested under normal driving conditions gave the following life in kms. 22000, 18900, 23100, 20150, 19700, 20590, 21740, 19540, 21780.

Write command in R-software to test the manufacturer's claim to be valid at 5% l.o.s. [3]



Total No. of Questions : 4]

SEAT No. :

P471

[Total No. of Pages : 3

[5115]-214

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

STATISTICS

ST-222 : Sampling Distributions and Inference

(2013 Pattern) (Paper - II)

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Figures to the right indicate full marks.
- 3) Use of calculator and statistical tables 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) If a random variable (r.v.) X follows chi-square distribution with 8 degrees of freedom (d.f.) then its coefficient of skewness is

A) $\frac{1}{4}$

B) $\frac{1}{2}$

C) $\frac{3}{4}$

D) $\frac{1}{8}$

ii) If a r.v. t follows student's t-distribution with g d.f. then the mean of t is

A) 9

B) 6

C) 3

D) 0

iii) If a r.v. F follows Snedecor's F-distribution with 10 and 12 d.f.

then mean of $Y = \frac{1}{F}$ is

A) $\frac{12}{10}$

B) $\frac{10}{8}$

C) $\frac{8}{10}$

D) $\frac{10}{12}$

P.T.O.

- b) State whether each of the following statement is true or false. [1 each]
- A statistic is a r.v.
 - If $F \rightarrow F_{g,g}$ then median of $F = g$.
 - If $X \rightarrow N(4, 4)$, $Y \rightarrow N(4, 5)$ are independent variables then probability distribution of $\frac{(X - Y)^2}{g}$ is χ^2_2 .
- c) State the test statistic of McNemar's test to test the null hypothesis of equality of marginal distributions. [1]
- d) Define standard error of a test statistic. [1]
- e) If $X_1, X_2, \dots, X_{12}$ is a random sample drawn from $N(3, 9)$ distribution then obtain the value of $\text{Var}(2\bar{X})$, $\bar{X}$ is sample mean. [1]
- f) If $t \rightarrow t_g$ then find constant C such that $P(-C < t < C) = 0.70$. [1]

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

- If a r.v. X follows chi-square distribution with nd.f. then obtain moment generating function of X . Hence obtain its mean and variance.
- Describe the test procedure for testing $H_0 : \mu_1 = \mu_2$, when population variances are unknown but equal, against the following alternatives :
 - $H_1 : \mu_1 \neq \mu_2$
 - $H_1 : \mu_1 < \mu_2$
 - $H_1 : \mu_1 > \mu_2$
- If $\bar{X}$ and S^2 are the mean and variance of a random sample of size 10 drawn from $N(4, 160)$ distribution, then obtain

$$P(0 < \bar{X} < 4, 86.08 < S^2 < 170.496)$$

Q3) Attempt any two of the following :

[5 each]

- a) If a r.v. $t \rightarrow t_n$, then show that as $n \rightarrow \infty$, the probability distribution of r.v. t tends to $N(0,1)$.
- b) Describe the exact test for testing $H_0: \sigma_1^2 = \sigma_2^2$, when two independent random samples are drawn from normal populations with unknown means against the following alternatives:
- i) $H_1 : \sigma_1^2 \neq \sigma_2^2$
- ii) $H_1 : \sigma_1^2 > \sigma_2^2$
- iii) $H_1 : \sigma_1^2 < \sigma_2^2$
- c) In a set of random numbers, the digits 0, 1, 2,8, 9 were found to have the following frequencies :

Digit	0	1	2	3	4	5	6	7	8	9
Frequency	43	32	38	27	38	52	36	31	39	24

Test the hypothesis that the digits are uniformly distributed at 5% level of significance.

Q4) Attempt any one of the following :

- a) i) Define Snedecor's F-distribution. Derive its mean. **[5]**
- ii) Explain paired t-test for testing $H_0 : \mu_d = 0$ against $H_1 : \mu_d \neq 0$. Give two real life situations of it. **[5]**
- b) i) Derive the probability density function (p.d.f.) of student's t-distribution with n d.f. **[6]**
- ii) If a r.v. $X \rightarrow \chi_{15}^2$, then find **[4]**
- (I) Median of X ,
- (II) Constant K such that $P(X \leq K) = 0.30$



Total No. of Questions : 4]

SEAT No. :

P472

[Total No. of Pages : 2

[5115]-215

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

GEOGRAPHY (Paper - I)

Gg-211 : Geography of Resources - II
(2013 Pattern)

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

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

Q1) Answer the following questions in two to three sentences each (any ten) :[10]

- a) Name any two iron-ore producing countries in the world.
- b) Name any two bauxite producing states in India.
- c) Name any two coal producing states in India.
- d) Name any two nuclear energy producing countries in the world.
- e) Name any two natural gas producing countries in the world.
- f) Write any two significances of solar energy.
- g) Name any two wind producing countries in the world.
- h) What is human resource?
- i) Name any two sparsely populated countries in the world.
- j) Name any two densely populated states in India.
- k) What do you mean by optimum population?
- l) Write any two causes of over population.
- m) Write any two uses of water resource.

P.T.O.

Q2) Write short notes on the following (any two) :

[10]

- a) Iron-ore distribution in India.
- b) Types of coal.
- c) Population distribution in India.
- d) Need of resources planning.

Q3) Answer the following questions in 100 words each (any two) :

[10]

- a) Describe the bauxite distribution in world.
- b) Explain the causes of under population.
- c) Describe the role of land resource in economic development.
- d) Write the resources planning with reference to India.

Q4) Answer the following questions in 200 words (any one) :

[10]

- a) Explain in detail the production and distribution of petroleum in world.
- b) Explain the role of mineral resources in economic development.



Total No. of Questions : 4]

SEAT No. :

P473

[Total No. of Pages : 2

[5115]-216

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

Gg-212 : GEOGRAPHY (Paper - II)

Watershed Management - II

(2013 Pattern)

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

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

Q1) Answer the following questions in two or three sentences each (any ten) :[10]

- a) What is resource appraisal?
- b) Write any two methods of survey.
- c) What is meant by stream corridor?
- d) Write any two importance of watershed planning in National development.
- e) Write any two process of watershed planning.
- f) What do you mean by watershed planning?
- g) What is water conservation?
- h) Write any two traditional methods of water harvesting.
- i) Write any two importance of water harvesting.
- j) What do you mean by soil conservation?
- k) What is meant by contour bunding?
- l) Write any two benefits of soil conservation.
- m) Write any two watershed based farming system.

P.T.O.

Q2) Write short notes on the following (any two) :

[10]

- a) Benefits of watershed planning.
- b) Food security.
- c) Restoration of landscape.
- d) Advantages of water harvesting.

Q3) Answer the following questions in 100 words each (any two) :

[10]

- a) Describe the importance of watershed planning.
- b) Explain the production oriented sustainability.
- c) Explain the controlling measures for water conservation.
- d) Describe the watershed development programme in Maharashtra.

Q4) Answer the following questions in 200 words (any one) :

[10]

- a) Explain the ways of resource mapping.
- b) Describe the different components of watershed development.



Total No. of Questions : 4]

SEAT No. :

P474

[Total No. of Pages : 2

[5115]-217

S.Y. B.Sc. (Semester - II)
MICROBIOLOGY (Paper - I)
MB-221 : Bacterial Genetics
(2013 Pattern) (Theory)

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

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

Q1) Attempt the following questions :

[10]

- a) There are 12 base pairs per helix in the B-form of DNA (T/F).
- b) Closely related plasmids are not compatible to each other (T/F).
- c) Enlist three components of nucleotide.
- d) Define - plasmid.
- e) Define - Spontaneous mutation.
- f) Messelson & Stahl proved _____ nature of DNA replication.
- g) Luria and Delbruck proved spontaneous mutation theory by _____ test.
- h) What is the role of SSB proteins in DNA replication.
- i) Draw structure of Thymine.
- j) Name any two intercalating agents as mutagens.

P.T.O.

Q2) Attempt any two of the following : **[10]**

- a) Diagrammatically represent mechanism of DNA replication.
- b) Describe in detail 'Reconstitution Experiment' in Tobacco plant to prove RNA as genetic material in some viruses.
- c) Write short note on Tautomerism.

Q3) Answer any two of the following : **[10]**

- a) Describe structure and properties of plasmid.
- b) What is framshift mutation? Describe types of Framshift mutation.
- c) Write a note on properties of nucleotides that contribute to the stability of DNA.

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

- a) Enlist different types of mutations? Describe the mode of action of biological mutagens and mitomycin as mutagenic agent.
- b) Describe the initiation process of translation. Add a note on role of aminoacyl t-RNA synthatase enzyme.



Total No. of Questions : 4]

SEAT No. :

P475

[Total No. of Pages : 2

[5115]-218

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

MICROBIOLOGY

MB-222 : Air & Water Microbiology

(2013 Pattern) (Theory) (Paper - II)

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

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

Q1) Attempt the following :

[10]

- a) Define
 - i) Droplet nuclei
 - ii) Distilled water
- b) MPCB stands for _____.
- c) $K_2Cr_2O_7$ is _____ agent in COD estimation.
- d) Enlist any two applications of biogas.
- e) State true or false
 - i) Tuberculosis is a Airborne Infection.
 - ii) Trickling filter is aerobic biological method of waste water treatment.
- f) What are HEPA filters?
- g) Temperature of incubation in Eijkman test is _____.
 - i) Room temperature
 - ii) $37^\circ C$.
 - iii) $44.5^\circ C$.
 - iv) $40^\circ C$.
- h) How will you determine positive result in MPN test?

P.T.O.

Q2) Attempt any two of the following :

[10]

- a) Diagrammatically describe Hollander & Dallo valle air sampler.
- b) Diagrammatically represent membrane filter technique.
- c) Write short note on Activated Sludge Digestion.

Q3) Answer any two of the following :

[10]

- a) Justify : Air flora is transient.
- b) Comment on : Confirmed test for bacteriological analysis of water.
- c) Write short note on 'Fish bioassay' as toxicity test.

Q4) Attempt any one of the following :

[10]

- a) What are the ideal characteristics for bacteriological indices of fecal pollution of water. Describe E.coli & Bifidobacterium as indices of fecal pollution of water.
- b) Enlist various methods of anaerobic effluent treatment. Describe any one in detail.



Total No. of Questions : 4]

SEAT No. :

P476

[Total No. of Pages : 2

[5115]-219
S.Y. B.Sc. (Semester - II)
PSYCHOLOGY (Paper - I)
Health Psychology
(2013 Pattern)

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

- 1) Attempt all questions.*
- 2) Draw the figures and diagrams wherever necessary.*
- 3) Figures to the right indicate full marks.*

Q1) Answer in two or four sentences.

[16]

- a) What is health Psychology
- b) Define stress.
- c) What is conflict?
- d) What is PTSD?
- e) What is coping?
- f) What is life style?
- g) Define Burnout.
- h) Define Pressure is a stress.

Q2) Attempt any two of the following in eight or ten sentences.

[8]

- a) Define illness. Explain Bio-medical model of illness.
- b) Describe the problem-foucused constructive coping.
- c) Explain the post Traumatic Stress Disorder.

P.T.O.

Q3) Write short notes on any two of the following :

[8]

- a) Smoking and Health.
- b) Physical illness.
- c) Bio-Psycho social model.

Q4) a) Define the mind and body connection. Discuss the importance of Psychology an health. **[8]**

OR

- b) Explain in detail the Potential effect of stress.



Total No. of Questions : 4]

SEAT No. :

P477

[Total No. of Pages : 2

[5115]-220

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

PSYCHOLOGY (Paper - II)

**Psychological Testing and Assessment
(2013 Pattern)**

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

- 1) Attempt all questions.*
- 2) Draw the figures and diagrams wherever necessary.*
- 3) Figures to the right indicate full marks.*

Q1) Answer in two or four sentences.

[16]

- a) Define Psychological Test.
- b) What is Aptitude test?
- c) What is Interview?
- d) Define the counselling.
- e) What is forensic Psychology?
- f) What is Motivation?
- g) What is Neuropsychology?
- h) Define attitude?

Q2) Attempt any two of the following in eight or ten sentences.

[8]

- a) What is difference between check list and rating scale?
- b) What is clinical Interview? Explain the types of clinical Interview?
- c) Describe any one test of general Intellectual ability.

P.T.O.

Q3) Write short notes on any two of the following : **[8]**

- a) Work Preference Inventory (WPI).
- b) Observational method.
- c) Short case history data.

Q4) a) Explain any two tests of personality measurement. **[8]**

OR

- b) Define Aptitude. Explain any uses of aptitude tests in educational assesment.



Total No. of Questions : 4]

SEAT No. :

P478

[Total No. of Pages : 3

[5115]-223

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

ELECTRONIC SCIENCE (Paper - I)

Electronic Instrumentation

(2013 Pattern) (New Course)

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicate full marks.*
- 3) *Draw neat diagrams whenever necessary.*
- 4) *Use of non-programmable calculator is allowed.*

Q1) Attempt all of the following :

- a) Define linearity. [1]
- b) State any two applications of signal generator. [1]
- c) State the working principle of digital thermometer. [1]
- d) Find out voltage of a regulated power supply. If [1]

$$V_{reg} = 5V, R_1 = 2K\Omega, R_2 = 4K\Omega$$

- e) Oscilloscope is basically an electronic beam voltmeter comment. [2]
- f) Calculate value of a series resistance in DC millimeter for a range 0-50ma with internal resistance 50Ω and full scale deflection $50\mu A$. [2]
- g) What is over range in digital multimeter? [2]
- h) In a signal generator output wave is not a pure sinewave - Comment.[2]

P.T.O.

Q2) Attempt any two of the following :

- a) Explain pH measurement glass electrode with suitable diagram. [4]
- b) Draw block diagram of fixed power supply. Explain function of each block in short. [4]
- c) Draw block diagram of function generator and explain it. [4]

Q3) Attempt any two of the following :

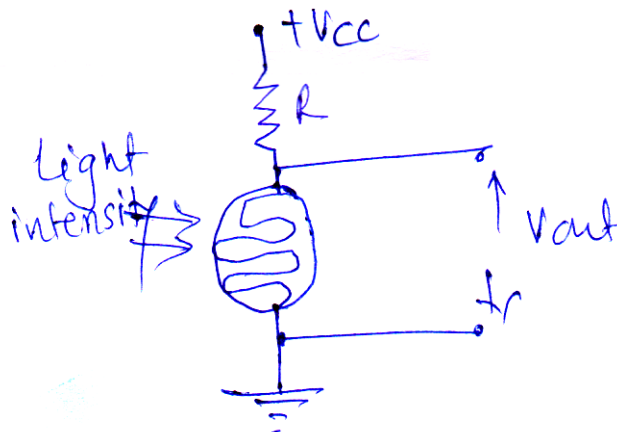
- a) What is auto-ranging in digital multimeter? State its advantages. [4]
- b) Draw block diagram of ON line UPS and explain it. [4]
- c) Explain DC voltmeter principle by D' Arsonval movement with suitable diagram. [4]

Q4) Attempt all of the following :

- a) Draw block diagram of a digital storage oscilloscope. Explain function of each block. [6]
- b) Draw block diagram of SMPs. Explain it in brief. Give any two advantages of SMPs. [6]

OR

- a) Determine output voltage in the following figure with LDR resistance values are (i) 100Ω (ii) 200Ω . [4]



- b) Determine static error if a digital voltmeter reads 4.65V and 4.38 Volts. True value of the voltage is 4.2V. **[4]**
- c) A moving coil voltmeter has a linear scale with 100 divisions. Full scale reading is 100V. And 1/10 of a scale division can be read out. Determine resolution in volts. **[4]**



Total No. of Questions : 4]

SEAT No. :

P479

[Total No. of Pages : 2

[5115]-224

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

ELECTRONIC SCIENCE (Paper - II)

EL-222 : Communication Electronics

(2013 Pattern)

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Neat and labelled diagrams must be drawn wherever.*
- 3) *Figures to the right indicate full marks.*

Q1) Attempt all of the following :

- a) What is the role of local oscillator in super heterodyne receiver? [1]
- b) State the use of MODEM device. [1]
- c) What is demodulation? [1]
- d) Define the term signal to noise ratio. [1]
- e) "AM is an inefficient method of communication". Comment. [2]
- f) "PCM is digital system of communication". Comment. [2]
- g) Calculate bandwidth required for transmission of FM signal [2]
(Given $f_d = 5\text{KHz}$ and $f_m = 2\text{KHz}$)
- h) If carrier amplitude after modulation varies between 4.4V and 0.7V. Calculate the modulation index. [2]

P.T.O.

Q2) Attempt any two of the following :

- a) Draw the block diagram of communication system. Explain the role of each block. [4]
- b) Explain the concept of need of modulation. [4]
- c) Draw the block diagram of PPM generator. Explain it with waveform. [4]

Q3) Attempt any two of the following :

- a) Explain with block diagram superheterodyne receiver. [4]
- b) Write a short note on set top box. [4]
- c) Compare serial and parallel communication system. [4]

Q4) Attempt all of the following :

- a) What is noise? State its types. Explain external noise in detail. [6]
- b) Explain in detail foster-seeley discriminator. [6]

OR

- a) A broadcast AM transmitter radiates 50kW of carrier power. What will be the radiated power at 85% modulation? [4]
- b) A 25MHz carrier is modulated by a 400Hz audio sine wave. If the carrier voltage is 4V and the frequency deviation is 10kHz. Write the equation of modulated wave for FM. [4]
- c) i) Determine the equivalent noise temperature if noise factor is 1.6. [2]
ii) If a receiver has an input signal power of $1.5\mu\text{W}$ and the noise power is $0.75\mu\text{W}$. Calculate signal to noise ratio in dB. [2]



Total No. of Questions : 4]

SEAT No. :

P480

[Total No. of Pages : 2

[5115]-225

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

DEFENCE AND STRATEGIC STUDIES

DS-201 : Conflicts Management and Resolution
(2013 Pattern)

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

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

Q1) Answer in two to four sentences.

[8 × 2 = 16]

- a) Define Conflict.
- b) State the meaning of clash of civilization.
- c) Define cultural integration.
- d) What do you mean by Municipal Law?
- e) Define International Law.
- f) Write the meaning of world order.
- g) Define nationalism.
- h) Write the meaning of conflict management.

Q2) Answer in 8 to 10 sentences (any two) :

[2 × 4 = 8]

- a) Describe historical background of conflict studies.
- b) Explain scope of peace studies.
- c) Discuss pacific methods of conflict settlement.

P.T.O.

Q3) Write shorts note on (any two) :

[2 × 4 = 8]

- a) Problems of Disarmament.
- b) Sources of International Law.
- c) Role of Peace Keeping Force (IPKF)

Q4) Answer in 18 to 20 sentences (any one) :

[1 × 8 = 8]

- a) Write a note on the U.N. system of conflict resolution.
- b) Discuss role of International law in maintaining world peace.



Total No. of Questions : 4]

SEAT No. :

P481

[Total No. of Pages : 2

[5115]-226

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

DEFENCE AND STRATEGIC STUDIES

DS-202 : Geopolitics

(2013 Pattern)

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

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

Q1) Answer in 2 or 4 sentences each.

[16]

- a) Define 'Geopolitics'.
- b) State the location of Andaman & Nicobar Islands.
- c) What do you mean by strategic minerals?
- d) Write the limits of Exclusive Economic Zone.
- e) How you would like to define state?
- f) Whose the "Diegogarcia Islands" located?
- g) Define "Buffer State".
- h) What do you understand by line of actual control?

Q2) Answer in 8 or 10 sentences (any two) :

[8]

- a) Explain the "Territory" as a field of Geopolitics.
- b) Write few lines on "Frontier".
- c) Explain the significance of "Natural Gas".

P.T.O.

Q3) Write short notes on (any two) :

[8]

- a) Siadhen Glacier.
- b) Concept of maritime boundaries.
- c) Concept of Buffer state.

Q4) Answer in 16 to 20 sentences (any one) :

[8]

- a) Explain the significance of strategic minerals with examples.
- b) Highlight on geostrategic position and importance of Andaman & Nicobar Islands.



Total No. of Questions : 4]

SEAT No. :

P482

[Total No. of Pages : 2

[5115]-227

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

DEFENCE AND STRATEGIC STUDIES

**DS-203 : Contemporary World and Security
(2013 Pattern)**

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

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

Q1) Answer in 2 to 4 sentences each.

[16]

- a) Introduce North Korean Nuclear Test-2016.
- b) Why Military Security is indispensable to a nation?
- c) Introduce Indo-Soviet 1971 Treaty.
- d) What is Denuclearization?
- e) What is meant by Energy Security?
- f) What is meant by Geopolitics?
- g) What is meant Power Projection Navy?
- h) Introduce National Objectives.

Q2) Answer in 8 to 10 sentences each (any two)

[8]

- a) Write about Coercive presence of US in Asia.
- b) Explain about Environmental Issues in contemporary World.
- c) Discuss the role of state and non state actor in world politics.

P.T.O.

Q3) Write short notes on (any two) :

[8]

- a) India and Europe
- b) Indo-US Relations
- c) Strategic situation in Indian Ocean

Q4) Answer in 16 to 20 sentences (any one) :

[8]

- a) Establish relationship amongst national values, aims, objectives and security in India's context.
- b) Explain about the Terrorism and Insurgency in Asia.



Total No. of Questions : 4]

SEAT No. :

P483

[Total No. of Pages : 2

[5115]-228

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

ENVIRONMENTAL SCIENCE

Evs-201 : Biological Diversity and its Conservation

(2013 Pattern) (Paper - I)

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

- 1) All questions carry equal marks.*
- 2) Figures to the right indicate full marks.*
- 3) Neat diagrams must be drawn wherever necessary.*

Q1) Attempt the following :

[10]

- a) Write any two reasons of loss of genetic diversity.
- b) What do you mean by indicator species?
- c) Give any two examples of GMO.
- d) Define eutrophication.
- e) Define exotic invasive species.
- f) Write any two name of world heritage sites.
- g) What is meant by habitat fragmentation.
- h) Name any two IUCN centers for plant diversity.
- i) Write full form of JMFP.
- j) Define surrogate species

P.T.O.

Q2) Answer any two of the following : **[10]**

- a) Explain the importance of wet lands.
- b) Inventorying of species are important in conservation, Explain.
- c) Explain the consumptive and non-consumptive values of biodiversity.

Q3) Write short notes on any two : **[10]**

- a) Key-stone species
- b) Harlan's domestication area
- c) Bailey's classification

Q4) What are components of biodiversity? Add a note on different types of pattern diversity. **[10]**

OR

Explain the impact and causes of human-wild life conflict.



Total No. of Questions : 4]

SEAT No. :

P484

[Total No. of Pages : 2

[5115]-229

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

ENVIRONMENTAL SCIENCE (Paper - II)

Evs-202 : Pollution Control and Environmental Technology
(2013 Pattern)

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

- 1) All questions carry equal marks.*
- 2) Figures to the right indicate full marks.*
- 3) Neat diagram must be drawn wherever necessary.*

Q1) Answer the following :

[10]

- a) Define adsorption.
- b) Write any two methods of re-utilization of domestic waste water.
- c) Give two examples of attach growth biological treatments.
- d) What is Phytoremediation.
- e) Write any two preventive measures for vibration of machines.
- f) Define pyrolysis.
- g) Give the examples of chemicals used in insitu techniques for control soil pollution.
- h) What is immobilization of metals.
- i) Define reverse osmosis.
- j) What are the demerits of sanitary landfills.

P.T.O.

Q2) Attempt any two from the following : **[10]**

- a) Differentiate between biofertilizers and biopesticides.
- b) Explain the methods of phyto remediation.
- c) What are the demerits of inceneration of solid waste.

Q3) Write short notes on any two : **[10]**

- a) Oxidation ponds.
- b) Wet scrubbing
- c) Acid Leaching

Q4) What are the advance treatments used for waste water treatments. **[10]**

OR

Non-engineering dumping of solid waste creates unhygenic conditions justify.



Total No. of Questions : 4]

SEAT No. :

P485

[Total No. of Pages : 4

[5115]-230

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

ENGLISH (Optional)

Text Book : Literary Vistas
(2013 Pattern) (Revised)

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

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

- Q1)** a) Attempt any one of the following in about 100 words : **[5]**
- i) Explain the significance of the title 'A Cup of Tea'.
 - ii) How does the narrator react to the changes made to his features in the photograph?
- b) Attempt any one of the following in about 100 words : **[5]**
- i) How does Rosemary react to Philip's admiration of Miss Smith?
 - ii) Bring out the humour in the photographer's explanation of what he had done with regard to the features of the narrator.
- Q2)** a) Attempt any one of the following in about 100 words : **[5]**
- i) How does the poem 'Ozymandias' portray the idea that human life and power is temporary?
 - ii) What, according to Rudyard Kipling are the challenges person will have to face in life?
- b) Attempt any one of the following in about 100 words : **[5]**
- i) Why, according to William Wordsworth, the sight of daffodils is the bliss of solitude?
 - ii) How does P.B.Shelly describe the emotions that still remain on the face of the sculpture?

P.T.O.

Q3) Attempt any two of the following. **[10]**

- a) Amit, Atul, Rekha & Hema are given the topic 'Students & Politics' for a group discussion. Write the transcript of the discussion in a dialogue form.
- b) Imagine that u are interviewing an agriculture minister of Maharashtra on the issue of farmer-suicide. Write a transcript of the interview consisting of five questions and the person's responses.
- c) Prepare five slides of 20 words each for a power-point presentation on the topic from one of your subject text books.
- d) Write a paragraph on 'A Meaningful Education'.

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

- a) Write a review of a film you have recently seen.
- b) Write an essay on "Can Computers Ever Replace People?"
- c) Write a brief report of two paragraphs on Landslide in Siachen claims Nine lives'.
- d) Summarize the following paragraph to one third of its length. Prepare a rough draft as well.

Education is the instrument for social, economic and cultural change. If we are to work for social and national integration, if we are to foster moral and spiritual values and increase productivity, agricultural and industrial, we have to use education in a proper way. Science and technology will help us to solve the problems of hunger and poverty, of disease and illiteracy, of superstition and deadening custom, of vast resource running to waste, of a rich country inhabited by poor people. We have to free ourselves from the inertias and inefficiencies which have bogged down our programmes of development. Our administration, at all levels, should become clean and efficient.



Total No. of Questions : 4]

P485

[5115]-230

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

ENGLISH (Optional)

Text Book : Literary Vistas

(2013 Pattern)

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

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

- Q1)*** a) Attempt any one of the following in about 100 words. **[5]**
- i) How does the poem 'Purdah' (1) bring out the loss of self and 'objectification' of girls?
 - ii) How will life become meaningful according to H.W. Longfellow in 'A Psalm of Life'?
- b) Attempt any one of the following in about 100 words. **[5]**
- i) The poem 'A Psalm of Life' talks of death and of the brevity of life. Comment on the tone of the poem.
 - ii) The poem 'Purdah' (1) is about every woman. Do you agree? Give reasons.
- Q2)*** a) Attempt any one of the following in about 100 words. **[5]**
- i) How does the poem 'Ozymandias' portray the idea that human life and power is temporary?
 - ii) What, according to Rudyard Kipling are the challenges person will have to face in life?
- b) Attempt any one of the following in about 100 words. **[5]**
- i) Why, according to William Wordsworth, the sight of daffodils is the bliss of solitude?
 - ii) How does P.B.Shelly describe the emotions that still remain on the face of the sculpture?

Q3) Attempt any two of the following. **[10]**

- a) Write a transcript of a group discussion on 'Global warming' using the following points.
Increase in earth's average temperature, accumulation of certain gases, chlorofluorocarbons eating the ozone layer, necessary ban on CFCS, tree plantation.
- b) Imagine that you are facing an interview for the post of Professor in a college. Anticipate any five questions and write down your responses to them.
- c) Write a short paragraph of about 100 words on 'Solar Energy'.
- d) Give any five guidelines for making a presentation.

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

- a) Write a review of your favorite television serial.
- b) Write a report of two short paragraphs on, 'Student Exchange Programme', for your college magazine.
- c) Write an essay on the impact of mobile phones on the lives of young people in the present day.
- d) Summarize the following paragraph.

To pollute means to make something dirty or impure by adding harmful or unpleasant substances to it. Environmental pollution has posed a serious problem to human, animal and plant life all over the world. There are different types of pollution-water pollution, air pollution, noise pollution in addition to this, there is a lot of visual pollution and also mental pollution. Rivers and seas are polluted by chemical waste from factories and sewage disposal from towns and cities; poisonous smoke emitted by vehicles pollute the air, blowing horns and unnecessarily blaring loudspeakers deafen human ears; flashes of powerful lights fluorescent advertisements and gaudy posters strain human eyes. All these types of pollution result from the mental pollution.



[5115] - 231

S.Y. B.Sc. (Semester - II)
मराठी (MARATHI) (Theory)
व्यावहारिक मराठी (Vyavharik Marathi)
(नवा अभ्यासक्रम)

(2013 पॅटर्न)

वेळ : 2 तास]

[एकूण गुण : 40

- सूचना:- 1) सर्व प्रश्न सोडविणे आवश्यक आहेत.
 2) उजवीकडील अंक प्रश्नांचे पूर्ण गुण दर्शवितात.

प्रश्न 1) अ) पुढील उक्ताऱ्याचे मराठीत भाषांतर करा.

[10]

The School was good and the teachers were generous. The aunt's husband was a man of discipline. Pandhari grew in his discipline. Though he missed his loving mother, his aunt was not troublesome. He helped his aunt in the housework. He could meet his mother in holidays. He enjoyed his friends company on sundays and returned on monday. His mother encouraged him in studies.

It was pre-independence period. The flame of patriotism burnt in every heart. The teachers inspired their pupils for devotion towards the motherland. Teachers devotedly taught and pupils learned in the same way. The teachers sang patriotic songs and made the children sing with them. They told the students about slavery and its meaning. Pandurang was deeply influenced. He wanted to free motherland from the British rule. "Kesari" a newspaper of Lokmanya Tilak Came to Dapoli's school. His pride for Bharatmata increased by reading kesari. He read many other books in the school. Good teachers of Dapoli school gave him interest in reading and meditation and thinking.

ब) पुढील उक्ताऱ्याचा एक तृतीयांश सारांश लिहून समर्पक शीर्षक द्या.

[10]

माझे तीन गुरू आहेत. प्रत्येकाला गुरू असतातच तसे मलाही आहेत. मी काही संन्याशी नाही की बैरागी नाही, पण मला गुरू आहेत. माझे पहिले आणि श्रेष्ठ गुरू बुद्ध होत. मी दहा-बारा वर्षांचा असेन. माझे वडील कबीरपंथी साधू होते. हे मला तेव्हापासून आठवते. माझ्या वडिलांचे घर धर्मासन म्हणता येईल, तसेच विद्यासन असेही म्हणता येईल. माझे वडील विद्येचे भक्त होते. तसेच ते धर्माचे चाहते होते. माझ्या लहानपणी रामायण, महाभारत इत्यादी सर्व ग्रंथांची त्यांनी माझ्याकडून पारायणे

P.T.O.

करवून घेतली होती. रामायण, महाभारत वाचून माझ्या मनावर फार मोठा परिणाम झाला. माझे वडील मला म्हणत, “आपण गरीब असलो म्हणून भिण्याचं काही कारण नाही. तू विद्वान का होऊ शकणार नाहीस?” एकदा मी कोणतीतरी परीक्षा पास झालो होतो. त्यावेळी चाळीतल्या लोकांनी माझ्या वडिलांची इच्छा नसतानाही दादा केळुसकरांच्या मदतीने माझा सत्कार करायचे ठरविले. माझे वडील म्हणायचे, “नको सत्कार. मुलांचा असा सत्कार केला म्हणजे त्यांना पुढारी झालो असे वाटते.” (हशा आणि टाळ्या) शेवटी सत्कार झालाच आणि दादा केळुसकरांनी मला बुद्धाच्या चरित्राचे एक पुस्तक बक्षीस दिले. हे पुस्तक वाचल्यानंतर माझ्यात काही निराळाच प्रकाश पडला. मारूती, सीता, राम वनवासाला, धोब्याच्या सांगण्यावरून सीतेचा त्याग, कृष्णाच्या सोळा सहस्र बायका ह्या गोष्टी काहीतरी भयंकरच वाटल्या. ह्या गोष्टी माझ्या मनाची पकडच धरेनात. परंतु बौद्ध धर्माच्या त्या अभ्यासाने मला जास्त अभ्यास करावासा वाटला. त्या धर्माची पकड माझ्या मनावर कायमची आहे व माझी अशी ठाम खात्री झाली आहे; की जगाचे कल्याण फक्त बौद्ध धर्मच करू शकेल. हिंदू लोकांना आपले राष्ट्र जगवावयाचे असेल तर बौद्ध धर्मच स्वीकारला पाहिजे असे माझे नेहमीच सांगणे आहे.

माझे दुसरे गुरू कबीर होत. वडील कबीरपंथी होते. त्यामुळे कबीराच्या जीवनाचा आणि तत्त्वाचाही माझ्यावर फार मोठा परिणाम झाला. माझ्या मताप्रमाणे कबीराला बुद्धाच्या तत्त्वज्ञानाचे खरे रहस्य कळले. मी मोठा कोणालाच म्हटले नाही. गांधीला मी महात्मा म्हटले नाही; कारण कबीराने म्हटले आहे, मानूस होना कठीन है। तो साधू क्या बने। जो माणूस झाला नाही तो महात्मा कसा होईल?

माझे तिसरे गुरू म्हणजे जोतिबा फुले होत. ब्राम्हणेतरांचे खरे गुरू तेच होत. शिंपी, कुंभार, न्हावी, कोळी, महार मांग, चांभारांना माणुसकीचे धडे फुल्यांनीच दिले आणि शिकविले. पूर्वीच्या राजकारणात आम्ही जोतिबांच्या मार्गानेच जात होतो. कोणी कोठेही जावोत, पण आम्ही मात्र जोतिबांच्याच मार्गाने जाऊ. हे असे माझे तीन गुरू आहेत. यांच्या शिकवणीने माझे आयुष्य बनले आहे.

(शब्द संख्या : 346)

प्रश्न 2) पुढीलपैकी कोणत्याही दोन प्रश्नांची उत्तरे लिहा.

[15]

- अ) ‘वाचनसंस्कृती’ या विषयावर वृत्तपत्रासाठी 200 शब्दांपर्यंत लेख तयार करा
- ब) ‘स्वच्छता अभियान’ या विषयावर आकाशवाणीसाठी 200 शब्दांपर्यंत भाषण संहिता तयार करा.
- क) ‘महाविद्यालयीन निवडणुका या विषयावर विद्यार्थ्याने प्राचार्याची दूरदर्शनसाठी घेतलेली मुलाखत तयार करा. (वेळ 5 मिनिटे)

प्रश्न 3) खालीलपैकी कोणत्याही पाच इंग्रजी संज्ञांना मराठी पारिभाषिक पर्याय लिहा.

[5]

- i) Supervisor
- ii) Radiology
- iii) Surgeon
- iv) Poster
- v) Automatic
- vi) Assistant
- vii) Population
- viii) Category
- ix) Centre
- x) Expert



[5115]-232
S.Y. B.Sc. (Semester - II)
हिंदी (HINDI)
(नया पाठ्यक्रम) (सामान्य) (General)
(2013 Pattern)

पाठ्यपुस्तकें : 1) भारतीय गद्य – संग्रह सं. डॉ. मधु धवन
2) कवितायन सं. डॉ. भोलानाथ तिवारी

समय : 2 घंटे]

[पूर्णांक : 40

सूचनाएँ : 1) सभी प्रश्न अनिवार्य हैं।

2) दाहिनी ओर लिखे अंक प्रश्न के पूर्णांक हैं।

प्रश्न 1) अ) निम्नलिखित पारिभाषिक शब्दों में से किन्हीं आठ के हिंदी पर्याय लिखिए। [8]

- | | |
|----------------|---------------|
| i) Anemia | ii) Catalyst |
| iii) Density | iv) Energy |
| v) Flue pipe | vi) Hardware |
| vii) Microwave | viii) Optics |
| ix) Pathology | x) Technology |

आ) निम्नलिखित परिच्छेद का एक-तिहाई शब्दों में सार-लेखन कर उसे उचित शीर्षक दीजिए: [4]

विज्ञान और साहित्य, दोनों मानव-जीवन के यथार्थ उसकी स्थिती और गति के नियमों की खोज करते हैं। मूलतः यथार्थ एक ही होता है और उसे टुकड़ों में विभक्त नहीं किया जा सकता है। विज्ञान और साहित्य की प्रकृति भिन्न होने के बावजूद, उनका शोध विषय एक होने के कारण उनके द्वारा उपलब्ध ज्ञान का मूल एक ही होता है। इसीलिए सामाजिक शास्त्र गहन अध्येता साहित्यकारों के लिए निश्चित उपकारक एवं उपयुक्त होगा।

प्रश्न 2) अ) निम्नलिखित गद्य अवतरण की ससंदर्भ व्याख्या कीजिए। [4]

“आनुवंशिक भिन्नता सभी जीवों में स्वतः होती है, जो प्रायः जीन के परिवर्तन (म्यूटेशन) से होती है। बीजों तथा पौधों को विकिरण देकर म्यूटेशन की गति तेज की जा सकती है।”

अथवा

“रासायनिक उपचार के उपरांत अनाज में रसायन की कुछ न कुछ मात्रा बची रहती है जो हानिकारक हो सकती है।”

आ) निम्नलिखित पद्य अवतरण की ससंदर्भ व्याख्या कीजिए। [4]

“शिवजी की तीसरी आँख से
निकली हुई महाज्वाला में
घृतमिश्रित सूखी समिधा – सम
कामदेव जब भस्म हो गया।”

अथवा

“मैं जो हूँ नृपति विराट का विश्वस्त दास
नृत्य, गीत, कविता, कलाओं का ज्ञाता,
किन्तु हरदम भयाक्रान्त—
मेरा अज्ञातवास खुल न जाए।”

प्रश्न 3) अ) निम्नलिखित में से किन्हीं दो प्रश्नों के उत्तर लिखिए। [10]

च) बच्चनजी सेंट कैथरीन को क्यों धन्यवाद देना चाहते हैं?

छ) रेशम तैयार होने की प्रक्रिया को स्पष्ट कीजिए।

ज) श्रीनिवास रामानुजन के गणित विषयक कार्य को संक्षेप में लिखिए।

आ) निम्नलिखित में से किन्हीं दो प्रश्नों के उत्तर लिखिए। [10]

ट) ‘मुझे आज हँसना चाहिए’ कविता का भावार्थ स्पष्ट कीजिए।

ठ) वर्तमान परिस्थिति का चित्रण ‘दैनिक’ कविता में किस प्रकार व्यक्त हुआ है?

ड) ‘मैं फिर जन्म लूँगा’ ऐसा गांधीजी क्यों कहते हैं?



Total No. of Questions : 4]

SEAT No. :

P488

[Total No. of Pages : 2

[5115] - 233

S.Y. B.Sc.

SANSKRIT

गीर्वाणभारती (Girwanbhārati)

(2013 Pattern) (Semester - II)

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates :

1) *All questions are compulsory.*

सूचना:-

सर्व प्रश्न अनिवार्य आहेत.

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

उजवीकडील अंक पूर्ण गुण दर्शवितात.

Q1) Write short answers of the following questions (2-4 lines)

[16]

पुढील प्रश्नांची उत्तरे लिहा. (2-4 ओळीत)

- i) Who edited सद्धर्मपुण्डरीकसूत्र?
सद्धर्मपुण्डरीकसूत्राचे संपादन कोणी केले?
- ii) What is meant by नास्तिकदर्शन? State the names.
नास्तिक दर्शने म्हणजे काय? ती कोणती?
- iii) State the meaning of 'शास्त्र.'
'शास्त्र' शब्दाचा अर्थ लिहा.
- iv) State the types of खनित्र
खनित्राचे प्रकार लिहा.
- v) Which are the अष्टदण्डपरिणाममार्गाः?
अष्टदण्डपरिणाममार्ग कोणते?
- vi) Which topics are discussed in लीलावती?
लीलावतीत कोणत्या विषयांची चर्चा केली आहे?
- vii) Whose life is described in वैयाकम्?
वैयाकम् मध्ये कोणाचे जीवन वर्णिले आहे?

P.T.O.

viii) Explain the meaning -

अर्थ स्पष्ट करा-

‘गृहिणी सचिवः सखी मिथः प्रियशिष्या ललिते कलाविधौ’

Q2) Write short notes on any two of the following in 8-10 lines [8]

पुढीलपैकी कोणत्याही दोहोंवर 8-10 ओळीत संक्षिप्त टीपा लिहा.

- i) आयुर्वेदः।
- ii) वनस्पतिशास्त्रम्।
- iii) गणितम्।

Q3) Write short notes on any two of the following in 8-10 lines [8]

पुढीलपैकी कोणत्याही दोहोंवर 8-10 ओळीत संक्षिप्त टीपा लिहा.

- i) सुभाषितम्।
- ii) लीलावती।
- iii) शीलं परं भूषणम्।

Q4) Answer any one of the following in 16-20 lines [8]

पुढीलपैकी कोणत्याही एका प्रश्नाचे 16-20 ओळीत उत्तर लिहा.

- i) Explain वास्तुशास्त्र and ज्योतिषशास्त्र
वास्तुशास्त्र व ज्योतिषशास्त्र स्पष्ट करा
- ii) Explain the meaning: of Following verse.
पुढील श्लोकाचा अर्थ स्पष्ट करा.
अष्टौ व्याकरणानि षट् च भिषजां व्याचष्ट ताः संहिताः
षट् तर्कान् गणितानि पञ्च चतुरो वेदानधीते स्म यः।
रत्नानां त्रितयं द्वयं च बुबुधे मीमांसयोरन्तरे
सद्ब्रह्मैकगमगाधबोधमहिमा सोडस्याः कविर्भास्करः॥



[5115] - 234

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

FUNCTIONAL ARABIC

(2013 Pattern)

Time : 2 Hours]

[Max. Marks : 40

1. Translate into Eng / Urdu / Marathi any two of the following Passages: 10

(الف) هذا الرسم جميل جداً - ما في الرسم يا عزيزي؟ في الرسم قفص - ما في القفص؟ في القفص طائر - أذلك الطائر -

ببيغاد؟ نعم - أذلك الطائر ببيغاد - كيف أذلك الطائر؟ هو جميل جداً -

(ب) هن أقامر - هذا الفار صغير - أذلك قط -

أذلك القط كبير وهو أبيض - أذلك طائر - أذلك الطائر غراب - وهو أسود -

هنا أدريس - هذا الدرس جديد وهو سهل لا صعب -

(ج) أنا وكذا أنت وكذا - أنا قصير - أنت طويل -

أنا سمير - أنت هنري - أنا جالس على الكرسي -

وَهُوَ وَاقِفٌ عَلَى الْأَرْضِ - أَنَا مُشْغُولٌ بِالْقِرَاءَةِ
 وَهُوَ مُشْغُولٌ بِاللَّعِبِ - أَنَا مُسْلِمٌ - وَهُوَ الْيَهُدِيُّ
 مُسْلِمٌ - أَنَا فِي الْقِرَاءَةِ وَهُوَ فِي اللَّعِبِ -

2. Translate and explain any five
 Verses of the following Poem: 10

عِيْدُ الْفِطْرِ — لِيَوْمِ الْبِرِّ
 نَخْتَمُ فِيهِ — صَوْمَ الشَّهْرِ
 نَلْبَسُ فَرَحًا — حَلَّكَ الْبَشِيرِ
 نَرْتَعُّ نَلَهُو — نَلْعَبُ نَجْرِي
 نُسَعِدُ فِيهِ — أَهْلَ الْخُسْرِ
 وَنُجَنِّبُهُم — مَسَسَ الْفَقْرِ
 قَدْ عَوَدْنَا — دِينَ الْبِرِّ

3. Answer in Arabic any five of the
 following: 10

- (١) مَنْ شَيْءُ لَكَ ؟
- (٢) أَكْتُ لِبَانِ قُرْءَانِ لِلْمُسْلِمِ ؟

- (٣) أَنَيْنَهُو ؟
 (٤) قَلِّ الْقَارُ كَبِيرُ ؟
 (٥) مَالُونَ الْبَغَاءُ ؟
 (٦) آيُ حَيَوَانُ طَوِيلُ ؟
 (٧) مَتَى امْتِحَانُكَ ؟

4. Write the letter in Arabic to the
 Bank Manager Or Company
 Manager,

١٥
 أَلْتَبُ الرِّسَالَةَ فِي الْعَرَبِيَّةِ
 إِلَى مُدِيرِ الْبَنْكِ أَوْ مُدِيرِ الشَّرْكَةِ



Total No. of Questions : 4]

SEAT No. :

P490

[Total No. of Pages : 2

[5115] - 235

S.Y. B.Sc. (Vocational) (Semester - II)

BIOTECHNOLOGY (Paper - I)

Voc. - 221 : Plant and Animal Tissue Culture

(2013 Pattern)

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

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

Q1) Answer each of the following in 1-2 lines

[10]

- a) Why it is important to follow aseptic technique in PTC : Justify
- b) What are micronutrients?
- c) Define : Protoplast
- d) Give any two applications callus culture
- e) Explain the use of cytokinin in PTC
- f) Give the role of antibiotics in ATC medium
- g) Define : Pluripotent stem cells.
- h) What is finite life span cell line?
- i) Give the role of trypsin in ATC
- j) State two applications of animal Tissue culture.

Q2) Write short notes on any two of the following.

[10]

- a) Subculturing
- b) Mechanical tissue disaggregation
- c) Auxins and cytokinins

P.T.O

Q3) Answer any two of the following in brief

[10]

- a) What is protoplast? Explain the process of protoplast culture.
- b) State the importance of surface sterilisation in PTC
- c) Enlist different criteria used in subculturing of cell lines

Q4) a) Give the principle working and application of laminar air flow in PTC[5]

b) Write the characteristics of transformed cell lines [5]

OR

a) Write the protocol for callus culture and add a note on it's significance [5]

b) Write the components of serum free media. [5]



Total No. of Questions : 4]

SEAT No. :

P491

[Total No. of Pages : 2

[5115] - 236

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

INDUSTRIAL CHEMISTRY (Vocational)

221 : Unit Processes in Organic Chemical Industries

(2013 Pattern) (Paper - I)

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

- 1) *Neat diagrams must be drawn wherever neccessary.*
- 2) *Figures to the right indicate full marks.*
- 3) *All questions are compulsory.*

Q1) Write balanced chemical equations with necessary conditions for the following synthesis. **[16]**

- a) Benzene to acetophenone.
- b) Acetaldehyde to acetic acid.
- c) Acetylene to vinylacetate.
- d) Benzene to nitrobenzene.
- e) Ethanol to chloral.
- f) Phenol to 2,4,6 - tribromophenol.
- g) Ethene to formaldehyde.
- h) Acetaldehyde to l-phenyl ethanol.

Q2) Attempt any two of the followoing. **[8]**

- a) What is oxidation? Describe the role of KMnOu as oxidising agent.
- b) Write a note on hydrogenation of oil.
- c) Discuss the mechanism of bromination of phenol.

P.T.O.

Q3) Answer any two of the following. **[8]**

- a) Describe the mechanism involved in esterification of benzoic acid with Ethanol under acid catalysed conditions.
- b) What is the role of catalyst involved in hydrogenation reactions? Illustrate with suitable examples
- c) "Phenol on nitration gives 4-nitrophenol as the major product while nitrobenzene gives m-dinitrobenzene. Explain.

Q4) Describe the manufacture of aniline from nitrobenzene with the help of flow sheet diagram. **[8]**

OR

Describe the synthesis of methanol with the help of flow sheet diagram.



Total No. of Questions : 4]

SEAT No. :

P492

[Total No. of Pages : 2

[5115] - 237

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

PHOTOGRAPHY AND AUDIO-VISUAL PRODUCTION

Colour Photography

(Vocational)

(2013 Pattern)

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

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

Q1) Answer in short.

[16]

- a) Daylight and sky light are not same. Comment.
- b) Explain the Purkinje shift.
- c) White balance is very important in digital photography. Explain.
- d) The colour temperature of a light source is 200 Mired. Convert it to Kelvin.
- e) Define colour temperature of a light source.
- f) What are the difference between saturation and brightness of a colour?
- g) State the law of transmission and absorption of light.
- h) What is the use of 'histogram' in digital photography?

Q2) Attempt any two of the following:

[8]

- a) What do you mean by the Mired shift? What is positive and negative Mired shift? How are these corrected?
- b) Draw the black body radiation curve at three different temperatures and discuss how it can be related to the colour temperature of a light source. Give suitable examples.

P.T.O.

- c) Draw a suitable diagram and explain what primary, secondary and complementary colours are. Give appropriate examples.

Q3) Write short notes on any two of the following: **[8]**

- a) Sociology of colours.
- b) Street photography.
- c) Importance of colour in photography.

Q4) Attempt any one of the following: **[8]**

- a) Discuss the social impact of digital photography. What norms you should follow while processing a digital image?
- b) Draw a suitable diagram and explain the construction of a typical sensor used in a digital camera. Explain the purpose of each 'layer' of the sensor. Discuss the sequence of events taking place when the sensor is exposed to a 'scene'.



Total No. of Questions : 4]

SEAT No. :

P493

[Total No. of Pages : 2

[5115] - 238

S.Y. B.Sc.

**ELECTRONICS EQUIPMENT AND MAINTENANCE
(Vocational) (Paper - I)**

**221 : Trouble Shooting of Electronic Equipment - B
(2013 Pattern)**

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

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

Q1) Answer all of the following.

- a) List the types of regulators [1]
- b) State the advantages of sulfare mount technology [1]
- c) What do you mean by BGA? [1]
- d) Give the names of packaging types of SM Devices [1]
- e) List most popular logic families [2]
- f) What precaution should be taken while handling ICS [2]
- g) State the typical faults in digital circuits. [2]
- h) Write the function of logic comparator. [2]

Q2) Attempt any two of following.

- a) Explain the procedure for removing the IC from circuit board. [4]
- b) Discuss the steps involved in removing surface mount devices using hot gas machine. [4]
- c) List common faults in SMPS. [4]

P.T.O.

Q3) Attempt any two of following.

- a) Explain the procedure of testing IC using pulse generator. [4]
- b) Draw the block diagram of Linear P/S and explain the working of each block. [4]
- c) Write a note on cylindrical diode packages. [4]

Q4) a) What the help of subsystem blocks explain the working of SMPS. [6]

- b) Draw the neat labeled diagram of oscilloscope [6]

OR

- a) Mention the special points to be considered for fault diagnosis of digital circuit [4]
- b) Discuss the steps involved in replacement of surface mount devices (components). [4]
- c) Write a note on troubleshooting of $\mu A 723$ regulator and three pin regulator [4]



Total No. of Questions : 4]

SEAT No. :

P494

[Total No. of Pages : 2

[5115] - 239

S.Y. B.Sc. (Vocational)

COMPUTER HARDWARE & NETWORK ADMINISTRATION

Microprocessor & Interfacing Techniques

(2013 Pattern) (Semester - II) (Paper - I)

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

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

Q1) a) Attempt the following: [4 × 1 = 4]

- i) What is plotter?
- ii) Which add-on card is needed to enhance the video performance of a PC?
- iii) What is the advantage of parallel communication over serial?
- iv) What is LAN?

b) Attempt the following: [4 × 2 = 8]

- i) What is Green PC?
- ii) List various embedded IO systems.
- iii) What is Wi-Fi? State applications of Wi-Fi.
- iv) What is the function of sound card?

Q2) Attempt any two of the following: [2 × 4 = 8]

- a) Write a short note on display adaptors.
- b) List various types of storage devices available and explain anyone of them in brief.
- c) Write a short note on remote desktop sharing tools.

P.T.O.

Q3) Attempt any two of the following:

[2 × 4 = 8]

- a) What is BIOS? Explain the important functions of BIOS.
- b) What are the different types of Printers? Explain in brief the advantages and disadvantage of any one.
- c) Explain concept of speech recognition.

Q4) Attempt any two of the following:

[2 × 6 = 12]

- a) List various device controllers used in PC. Describe in brief the working of any one type of device controller.
- b) State advantages and disadvantages of serial communication. Explain in brief asynchronous communication protocol with its applications.
- c) What is Bluetooth? Explain features and application of Bluetooth.



Total No. of Questions : 4]

SEAT No. :

P495

[Total No. of Pages : 2

[5115] - 240

S.Y. B.Sc. (Vocational) (Semester - II)

SEED TECHNOLOGY

**Voc. - Sete - 221 : Vegetable Seed Production
(2013 Pattern)**

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

- 1) All questions are compulsory.*
- 2) Figures to the right indicate full marks.*
- 3) Neat diagrams must be drawn wherever necessary.*

Q1) Answer the following :

[10]

- a) What is microsporogenesis?
- b) Define Genetic Male sterility
- c) Define pollination
- d) What is pureline selection?
- e) Give the isolation distance for okra.
- f) Which type of bed is required for growing onion seedlings?
- g) Define Roughing
- h) Give any two achievements of population improvement
- i) Enlist different types of hybridization techniques.
- j) Enlist breeding methods in vegetable crops.

Q2) Answer any two of the following.

[10]

- a) Give the concept and objectives of vegetable seed production
- b) Comment on Apomixis.
- c) Explain fertilization process

P.T.O

Q3) Write notes on (any two) :

[10]

- a) Cytoplasmic Male sterility
- b) Pedigree selection
- c) Objectives of hybridization technique in vegetable crops

Q4) Explain seed production procedure in Brinjal w.r.t land requirement isolation, nursery management, cultural practices, roughing plant protection, harvesting, seed extraction, seed drying and storage. **[10]**

OR

Explain seed production procedure in Tomato w.r.t land requirement isolation, nursery management, cultural practices, roughing, plant protection, harvesting, seed extraction, seed drying and storage. **[10]**



Total No. of Questions : 4]

SEAT No. :

P496

[Total No. of Pages : 2

[5115] - 241

S.Y. B.Sc. (Vocational) (Semester - II)

INDUSTRIAL MICROBIOLOGY (Paper - I)

**Mic - 221 : Microbial Fermentations & Downstream Processing
(2013 Pattern)**

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

- 1) All questions are compulsory.*
- 2) Figures to the right indicate full marks.*
- 3) All questions carry equal marks.*
- 4) Draw neat labelled diagram wherever neccessary.*

Q1) Answer each sub-question in one or two lines fill in the blanks, state whether the statement is true or false: **[10]**

- a) Define- International unit of Penicillin.
- b) Give one example each of cation and anion exchanger
- c) Name two phosphate solubalisers used as bioinoculants.
- d) State whether statement is true or false:
Antibiotics are produced during logarithmi phase of growth of a cell.
- e) Write another name for vitamin B₁₂
- f) Write any two applications of acetic acid
- g) Name any two organisms used for commercial production of Glutamic acid.
- h) Name the method used for solvent recovery.
- i) Fill in the blank
Ammonium sulphate precipitation method is used for purification of
- j) Name the enzyme used in cheese production & state its function.

P.T.O.

Q2) Answer any two of the following. **[10]**

- a) Enlist the types of continuous filters used in removal of microbial cells from finished fermentation broth & describe any one in detail.
- b) With the help of suitable example explain the principle of adsorption chromatography.
- c) Draw a flow chart for microbial production of penicillin

Q3) Write short note on any two : **[10]**

- a) Flocculation
- b) Whole broth processing
- c) Biochemistry of Lysine production

Q4) Answer any one of the following **[10]**

- a) What are bioinoculants? Describe different bioinoculants & methods of production of any one in detail.
- b) Explain the principle of liquid - liquid extraction in downstream processing. Draw the diagram for cocurrent & counter current extraction system.



Total No. of Questions : 4]

SEAT No. :

P497

[Total No. of Pages : 2

[5115] - 242

S.Y. B.Sc. (Vocational) (Semester - II)
INDUSTRIAL CHEMISTRY (Paper - II)
222 : Industrial Pollution
(2013 Pattern)

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

- 1) All questions are compulsory.*
- 2) Neat diagrams must be drawn wherever necessary.*
- 3) Figures to the right indicate full marks.*

Q1) Answer the following

[16]

- a) Define batch discharge
- b) What are the advantages of dewatering the sludge?
- c) Explain "effective dose equivalents."
- d) What are pesticides? write any two classes of pesticides
- e) Describe two effects due to thermal pollution
- f) Explain "Sound pressure level" (SPL).
- g) Define and explain COD.
- h) Explain "Electrodialysis."

Q2) Attempt any two of the following.

[8]

- a) Explain the hazards of carbon monoxide pollution.
- b) Write a note on "Percolating filters" used in sewage treatment.
- c) Describe radiation pollution in detail

P.T.O.

Q3) Write short notes on any two of the following : **[8]**

- a) Cyclone separator
- b) Reverse osmosis.
- c) Medical applications of radioactivity.

Q4) Describe the source and ill effects of Nox pollution. **[8]**

OR

Explain the construction and working of Imhoff septic tank. **[8]**



Total No. of Questions : 4]

SEAT No. :

P498

[Total No. of Pages : 2

[5115] - 243

S.Y.B.Sc. (Vocational) (Semester - II)

BIOTECHNOLOGY (Paper - II)

**Voc. - Biotech - 222 : Immunology and Medical Microbiology
(2013 Pattern)**

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

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

Q1) Answer each of the following in 1-2 lines.

[10]

- a) Define vaccines
- b) What is ADCC?
- c) What is the difference between innate and acquired immunity?
- d) Define Antibodies.
- e) What is weil - Felix text
- f) Name the etiological agent of AIDS
- g) Name 2 bacteria causing skin infections
- h) Name the antibody predominant in secondary immune response
- i) Give examples of APLs.
- j) Name 2 bacteria causing respiratory diseases

Q2) Answer any two of the following.

[10]

- a) Describe Autoimmune diseases with examples
- b) Describe the morphology of staphylococcus aureus and control measures of staph infections in hospitals.
- c) Describe the various types of hypersensitivity reactions.

P.T.O.

Q3) Write short notes on any two of the following :

[10]

- a) Types of vaccines
- b) Primary lymphoid organs
- c) IgM.

Q4) Define immune response. Describe in detail humoral and cell mediated immune response.

[10]

OR

Describe the technique of ELISA and VDRL test in detail



Total No. of Questions : 4]

SEAT No. :

P499

[Total No. of Pages : 2

[5115] - 244

S.Y. B.Sc. (Vocational) (Semester - II)

PHOTOGRAPHY AND AUDIO-VISUAL PRODUCTION

Principles & Applications of Analog and Digital Communication

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

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

Q1) Attempt the following questions.

- a) State whether the following statements are TRUE or FALSE with reason.[2]
 - i) AGC is used to keep receiver output constant.
 - ii) Serial transmission is faster transmission
- b) Comment on the following statements [4]
 - i) SSB generation is preferred over DSB.
 - ii) AM is preferred over FM.
- c) Attempt the following. [6]
 - i) For a binary PCM system, the number of bits per transmitted word is 8 and the sampling frequency $f_s=8\text{KHz}$. Calculate the i) bit rate and ii) baud rate.
 - ii) An ASK transmitter transmits 5 kbps. Calculate the minimum bandwidth. Assume transmission to be half duplex.
 - iii) A carrier is frequency modulated with a sinusoidal signal of 1 kHz resulting in a maximum frequency deviation of 5 kHz. Find modulation index.

P.T.O.

Q2) Attempt ANY TWO of the following. [8]

- a) What is the need of Modulation? Explain its advantages.
- b) Explain basic communication system.
- c) Calculate the maximum bit rate for a channel having Band Width 300 Hz and S/N ratio is 40db.

Q3) Attempt ANY TWO of the following. [8]

- a) Compare the FM and AM Systems.
- b) What is PSK? Explain 16PSK with constellation diagram.
- c) Explain the Sampling theorem on the Channel Capacity. What is the importance of Channel Bandwidth?

Q4) Attempt ANY TWO from the following. [12]

- a) The Output voltage of transmitter is given by $500 (1 + 0.4 \sin 6280t) \sin 3.14 \times 10^7 t$ this voltage is fed to a load of 600Ω . Determine Carrier frequency, Modulating frequency, Carrier power and Mean power output.
- b) Explain data representation.
- c) Explain DPCM.

OR

Q4) Attempt ANY TWO of the following. [12]

- a) Explain natural PAM sampling and flat topped sampling.
- b) Explain Bell 103 and Bell 212 modems.
- c) Explain the working of super heterodyne AM receiver with a neat block diagram.



Total No. of Questions : 5]

SEAT No. :

P500

[Total No. of Pages : 2

[5115] - 245

S.Y. B.Sc. (Vocational) (Semester - II)

ELECTRONIC EQUIPMENT MAINTENANCE (Paper - II) (EEM)

Audio, Video & Office Equipment - B

(2013 Pattern)

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

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

Q1) Answer the following :

- a) State the use of Barcode Reader. [1]
- b) State various Input Devices. [1]
- c) What type of lamp is used in OHP projector? [1]
- d) State the difference between Pen Drive and Hard Disk Drive. [1]
- e) State the advantages of Laptop over Desktop PC. [2]
- f) Give advantages of Optical Mouser over Scroll Mouse. [2]
- g) State the specifications of PC Monitor. [2]
- h) State the difference between ROM and RAM. [2]

Q2) Answer any two of the following.

- a) Explain the working of slide projector [4]
- b) Explain the working principle of touch screen. [4]
- c) Write a short note on multimedia. [4]

P.T.O.

Q3) Answer any two of the following

- a) Explain the working of Ink-Jet printer [4]
- b) Discuss the common faults in dot matrix printer. [4]
- c) Distinguish between impact and non-impact printer. [4]

Q4) Answer the following.

- a) Explain the various steps involved in the operation of photo-copier machine. [6]
- b) Explain with neat diagram the operation of EPABX system. [6]

OR

Q5) Answer the following

- a) Explain with neat block diagram the working of any one type of VDU monitor. [6]
- b) Write a short note on 'Large screen and rolling display'. [6]



Total No. of Questions : 4]

SEAT No. :

P501

[Total No. of Pages : 2

[5115] - 246

S.Y. B.Sc. (Vocational) (Semester - II)

**COMPUTER HARDWARE & NETWORK ADMINISTRATION
(Paper - II)**

**Computer System Management II
(2013 Pattern) (New)**

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

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

Q1) a) Attempt the following: **[4 × 1 = 4]**

- i) What is Antivirus?
- ii) List various Wi-fi interfaces.
- iii) What is PDA?
- iv) What is function of Modem?

b) Attempt the following: **[4 × 2 = 8]**

- i) State functions of Hardware?
- ii) State any two advantages of upgrading PC.
- iii) What is a Tablet PC?
- iv) What is USB? List various USB devices that can be interfaced to a computer system.

Q2) Attempt any two of the following: **[2 × 4 = 8]**

- a) List any four types of users? Explain their roles and responsibilities.
- b) What is Android? State various applications of Android.
- c) Write a short note on network resource sharing.

P.T.O.

Q3) Attempt any two of the following: **[2 × 4 = 8]**

- a) List various application softwares and explain in brief installation procedure of any one.
- b) Write a short note on network operations.
- c) What is BlackBerry? Explain features available in BlackBerry.

Q4) Attempt any two of the following: **[2 × 6 = 12]**

- a) List various printer interfaces. Explain steps involved in installing a typical printer in windows XP.
- b) What is Operating System? Explain in brief installation procedure of Windows XP.
- c) What is client-server? List various network devices. Explain any two devices in brief



Total No. of Questions : 4]

SEAT No. :

P502

[Total No. of Pages : 2

[5115] - 247

S.Y.B.Sc. (Vocational) (Semester - II)

SEED TECHNOLOGY (Paper - IV)

Voc-Sete - 222 : Seed Quality Control

(2013 Pattern)

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

- 1) All questions are compulsory.*
- 2) Figures to the right indicate full marks.*
- 3) Neat diagrams must be drawn wherever necessary.*

Q1) Answer the following :

[10]

- a) Define certified seed.
- b) What is Isolation distance?
- c) Write any one duty of seed Inspector.
- d) What is minimum qualification required for being a field inspector?
- e) Give any one concept of seed quality.
- f) Who is responsible for establishment of central seed committee?
- g) What are pheromones?
- h) Give any one general principle of field inspection.
- i) Draw any one walking pattern of field inspection.
- j) Define Roughing.

Q2) Answer any two of the following.

[10]

- a) Comment on seed certification agencies and its organization.
- b) Explain procedure of seed law enforcement.
- c) Give an account on Biofertilizers.

P.T.O.

Q3) Write notes on (any two) :

[10]

- a) Specific crop standards
- b) Types of seed legislation
- c) Procedure for seed certification

Q4) Explain in brief technique of field inspection employed for hybrid seed production with suitable example **[10]**

OR

Describe any two statutory bodies and agencies established in India. **[10]**



Total No. of Questions : 4]

SEAT No. :

P503

[Total No. of Pages : 2

[5115] - 248

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

INDUSTRIAL MICROBIOLOGY (Paper - II)

**Voc-IND-MIC - 222 : Quality Assurance for Industrial
Fermentation Products (Theory)**

(2013 Pattern)

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

- 1) All questions are compulsory.*
- 2) All questions carry equal marks.*
- 3) Draw neat-labeled diagram wherever necessary.*
- 4) Figures to the right indicate full marks.*

Q1) Answer each sub question in one or two lines: Fill in the blanks; state whether the statement is true or false. **[10]**

- a) Define 'Pyrogen'
- b) List the test required for quality assurance of packaged drinking water.
- c) Violet red bile glucose agar is used for inhibition of ___ bacteria.
- d) Indian pharmacopia 2010 was published by _____.
- e) Name any two chemical carcinogen.
- f) Water for injection has to be pyrogen free but need not be sterileT/F
- g) _____ studies attempt to predict the shelf life of a product without running a full length storage trial.
- h) Name the advanced chromatographic methods used for purity analysis of products.
- i) Define 'Quality Assurance'.
- j) 'Vitamin B₁₂ assay test the growth inhibition of test strain'. T/F

P.T.O.

Q2) Answer any two of the following: [10]

- a) Write steps to determine shelf life of fermentation product.
- b) Schematically represent the experimental design of 'Ames test'.
- c) What is undue toxicity test?

Q3) Answer any two of the following: [10]

- a) Enlist various methods used for purity analysis of product and describe any one of it.
- b) How is Most Probable Number test used in enumeration of specified microorganism?
- c) How is sterility testing of injectables done?

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

- a) Describe the 'pyrogen test' in detail.
- b) Explain the bioassay for any antibiotic.



Total No. of Questions : 4]

SEAT No. :

P504

[Total No. of Pages : 2

[5115] - 249

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

MATHEMATICS (Paper - II)

MT - 222(B) : Numerical Methods and It's Applications
(2013 Pattern)

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

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

Q1) Attempt any five of the following:

[10]

- a) Find relative error of the number 11.426.
- b) Round-off the following numbers to four significant figures
40.0468, 0.467268, 2.26357, 6.39458
- c) State Newton's formula for backward interpolation.
- d) Prove that $(1 + \Delta)(1 - \nabla) = 1$ where Δ and ∇ are forward and backward difference operators respectively.
- e) State formula for Aitken's Δ^2 process.
- f) State normal equations to fit a second degree polynomial $a+bx+cx^2$.
- g) Given that $\frac{dy}{dx} = 1 - y$ with $y(0)=0$. find $y(0.5)$ by Euler's method.
(Take $h = 0.5$. Perform one iteration)

Q2) Attempt any two of the following.

[10]

- a) derive Newton-Raphson formula to find a square root of a given number C and hence find $\sqrt{10}$.
- b) Find the root of the equation $x^3 - 3x - 5 = 0$ between $x = 2$ and $x = 3$ using bisection method.

P.T.O.

- c) Using lagrange's interpolation formula find $y(2)$ for the following data:

x	0	1	3	4
y	-12	0	12	24

Q3) Attempt any two of the following

[10]

- a) State and prove Newton's formula for forward interpolation
- b) Using Newton's general interpolation formula find the value of $f(15)$ for the following data:

x	4	5	7	10	11	13
y=f(x)	48	100	294	900	1210	2028

- c) Fit the exponential curve $y = ce^{dx}$ to the following data:

x	0	2	4
y	5.012	10	31.62

Q4) Attempt any one of the following :

[10]

- a) i) State general Quadrature formula and hence derive Simpson's $\frac{3^{th}}{8}$ rule for numerical integration.
- ii) By using Runge - kutta method of fourth order find $y(1.2)$ if $\frac{dy}{dx} = 1 + xy$ with $y(1) = 3$. Take $h = 0.2$
- b) i) Evaluate $\int_2^{10} \frac{1}{1+x} dx$ by using Trapezoidal rule. Take $h = 1$.
- ii) Given that the differential equation $\frac{dy}{dx} - \sqrt{xy} = 2$, $y(1) = 1$. Find the value of $y(1.5)$, (Take $h=0.5$) using Euler's modified method.



Total No. of Questions : 4]

SEAT No. :

P505

[Total No. of Pages : 1

[5115] - 250

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

URDU GENERAL (Paper - II) (UR G2)

(2013 Pattern)

Time : 2 Hours]

[Max. Marks : 40

تمام سوالات کے جوابات لازمی ہیں۔

خوشخطی کا لحاظ رکھیں۔

(10) سوال نمبر ۱۔ پریم چند کی افسانہ نگاری کی اہم خصوصیات بتائیے۔

یا

پریم چند کے حالات زندگی بیان کیجئے۔

(10) سوال نمبر ۲: افسانے کے اجزائے ترکیبی بتائیے۔

یا

مختصر افسانے کا ارتقاء بیان کیجئے۔

(10) سوال نمبر ۳: کوئی دو کرداروں کا تجزیہ کیجئے۔

۱۔ الوپی دین ۲۔ نصیر ۳۔ عباسی ۴۔ شری کنٹھ

(10) سوال نمبر ۴: نیچے دئے گئے سائنٹفک اصطلاحات میں سے کوئی دس کا اردو میں ترجمہ کیجئے۔

1. Biomass 2. Freezing Point 3. vaccine 4. Nuclear force

5. components 6. voltage 7. pesticide 8. Micro organism

9. Density 10. Radiation 11. Seasonal Wind 12. Mixture

13. Translation Motion

