

Total No. of Questions : 4]

SEAT No. :

**P1014**

**[5017]-2001**

[Total No. of Pages : 2

**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) Is the set  $\{(1, 1), (1, 2), (2, 3)\}$  linearly dependent? Justify.
- b) Show that the set  $\{(1, 1, 1), (0, 2, 3), (0, 0, 4)\}$  is basis of vector space  $\mathbb{R}^3$ .
- c) Prove that in an inner product space  $V$ , for any  $\bar{u}, \bar{v} \in V$

$$\|\bar{u} + \bar{v}\|^2 + \|\bar{u} - \bar{v}\|^2 = 2\|\bar{u}\|^2 + 2\|\bar{v}\|^2.$$

- d) Suppose  $\bar{u}, \bar{v}$  &  $\bar{w}$  are vectors in an inner product space such that  $\langle \bar{u}, \bar{v} \rangle = 2$ ,  $\langle \bar{u}, \bar{w} \rangle = -3$ ,  $\langle \bar{v}, \bar{w} \rangle = 5$ ,  $\|\bar{u}\| = 1$ ,  $\|\bar{v}\| = 2$ ,  $\|\bar{w}\| = 7$  Evaluate

i)  $\langle \bar{u} + \bar{v}, \bar{v} + \bar{w} \rangle$

ii)  $\langle 2\bar{u} - \bar{w}, 3\bar{u} + 2\bar{w} \rangle$

- e) State dimension theorem for matrices & hence find nullity of matrix  $A$  of order  $5 \times 8$  &  $\text{rank}(A) = 3$ .

- f) Let  $T : \mathbb{R}^3 \rightarrow \mathbb{R}^2$  be linear Transformation such that

$$T(1, 0, 0) = (1, 1) \quad T(0, 1, 0) = (3, 0)$$

$$T(0, 0, 1) = (4, -7).$$

Find  $T(1, -2, 3)$ .

- g) Let  $T : \mathbb{R}^2 \rightarrow \mathbb{R}^2$  be a linear Transformation defined by

$$T(x, y) = (x + y, x + y) \text{ find Matrix of } T \text{ with respect to standard basis of } \mathbb{R}^2.$$

**P.T.O.**

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

a) Let  $V$  be a vector space over field  $F$ . Then for any  $\bar{u} \in V$  &  $\alpha \in F$ . Prove that

i)  $0 \cdot \bar{u} = \bar{0}; 0 \in F$

ii)  $\alpha \cdot \bar{0} = \bar{0}$

iii)  $(-1) \cdot \bar{u} = -\bar{u}$

b) Find co-ordinate vectors of  $(1, 0, 0)$ ,  $(0, 1, 0)$ ,  $(0, 0, 1)$  &  $(1, 1, -1)$  with respect to basis  $B = \{(1, 2, 1), (2, 1, 0), (1, -1, 2)\}$  of euclidean space  $\mathbb{R}^3$ .

c) Find the basis for column space of matrix  $A = \begin{bmatrix} 1 & 2 & 3 & 1 & 5 \\ 2 & 1 & 3 & 1 & 4 \\ 1 & 1 & 2 & 1 & 3 \end{bmatrix}$ .

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

a) State & prove Cauchy - Schwarz's Inequality.

b) Let  $T : \mathbb{R}^2 \rightarrow \mathbb{R}^2$  be a Linear Transformation such that

$T(1, 1) = (0, 2)$  &  $T(1, -1) = (2, 0)$

Compute  $T(1, 4)$  &  $T(-2, 1)$

c) In  $V = \mathbb{R}^3$ , Let  $W = \{(x, y, z) / x+y+z = 0\}$  Prove that  $W$  is a subspace of Vector space  $V$ .

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

a) i) Define Kernel of Linear Transformation  $T : V \rightarrow W$  prove that Kernel of  $T$  is a subspace of  $V$ .

ii) Let  $T : \mathbb{R}^3 \rightarrow \mathbb{R}^2$  be a linear Transformation defined by  $T(x, y, z) = (x + y + z, y + z)$ . Find matrix  $A$  of  $T$  with respect to standard bases of  $\mathbb{R}^3$  &  $\mathbb{R}^2$ .

b) Let  $\mathbb{R}^3$  have Euclidean Inner product. Use Gram-Schmidt process to convert basis  $B = \{\bar{u}_1, \bar{u}_2, \bar{u}_3\}$  where  $\bar{u}_1 = (1, 1, 1)$ ,  $\bar{u}_2 = (0, 1, 1)$ ,  $\bar{u}_3 = (0, 0, 1)$  into an Orthonormal basis.



Total No. of Questions : 4]

SEAT No. :

**P1015**

[5017]-2002

[Total No. of Pages : 2

S.Y.B.Sc.

**MATHEMATICS**

**MT - 222 (A) : Multivariable Calculus - II**

**(2013 Pattern) (Semester - II) (Paper - II(A)) (811A2)**

*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) If  $\vec{f}(t) = (t^2 + 1)\vec{i} + (4t - 3)\vec{j} + \left(2t^2 - \frac{1}{2}t\right)\vec{k}$ , find  $\lim_{t \rightarrow 2} \vec{f}(t)$ .

b) If  $\vec{r}(t) = 3\cos t \vec{i} + 3\sin t \vec{j} + t^2 \vec{k}$  is the position vector of a particle in the space at time  $t$ , find the particles velocity and acceleration vectors.

c) Find the unit tangent vector of the curve

$$\vec{r}(t) = t^2 \vec{i} + 2\cos t \vec{j} + 2\sin t \vec{k}, 1 \leq t \leq 2.$$

d) If  $\phi(x, y, z) = x^2 + y^2 + z^2 - 25$ , find  $|\nabla \phi|$  at  $(-3, 0, 4)$ .

e) State Stoke's theorem.

f) If  $\vec{f} = (2y + 3)\vec{i} + xz \vec{j} + (yz - x)\vec{k}$ , then evaluate  $\int_C \vec{f}(r) \cdot d\vec{r}$  along the

path  $C : \vec{r}(t) = 2t^2 \vec{i} + t \vec{j} + t^3 \vec{k}$  from  $t = 0$  to  $1$ .

g) Evaluate  $\int_0^1 \int_0^2 \int_0^3 1 \cdot dx dy dz$ .

**Q2)** Attempt any two of the following:

**[10]**

a) Show that a differentiable vector function  $\vec{u}$  of a scalar variable  $t$  to be of

constant magnitude if and only if  $\vec{u} \cdot \frac{d\vec{u}}{dt} = 0$ .

**P.T.O.**

- b) Find  $\bar{T}$  and  $\bar{N}$  for the circular motion  $\bar{r}(t) = t\bar{i} + t^2\bar{j}$ .
- c) Find the surface area of the cone  $z = \sqrt{x^2 + y^2}$ ,  $0 \leq z \leq 1$  by using a parametrization.

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

- a) If  $\bar{f}(x, y, z)$  is a differentiable real valued function and C is a path joining the points A( $x_0, y_0, z_0$ ) to B ( $x_1, y_1, z_1$ ) then show that  $\int \nabla \bar{f} \cdot d\bar{s} = \bar{f}(B) - \bar{f}(A)$ .
- b) Show that  $\bar{F} = 2xy^3\bar{i} + (1 + 3x^2y^2)\bar{j}$  is conservative and find a potential function  $f$  such that  $\bar{F} = \nabla f$ .
- c) Evaluate  $\iiint_S (x\bar{i} + y\bar{j} + z^2\bar{k}) \cdot \bar{n} \, ds$  where S is the closed surface bounded by the cone  $x^2 + y^2 = z^2$  and the plane  $z = 1$ .

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

- a) State and prove Green's theorem in a plane.
- b) i) Use Stoke's theorem to evaluate  $\int_C \bar{F} \cdot d\bar{r}$ , if  $\bar{F} = xz\bar{i} + xy\bar{j} + 3xz\bar{k}$  and C is the boundary of the portion of the plane  $2x + y + z = 2$  in the first octant, traversed counter clockwise.
- ii) If  $\bar{F} = 4xz\bar{i} - y^2\bar{j} + yz\bar{k}$ , evaluate  $\iiint_S \bar{F} \cdot \bar{n} \, ds$  where S is the surface of the cube bounded by  $x = 0, x = 1, y = 0, y = 1, z = 0, z = 1$ .



Total No. of Questions : 4]

SEAT No. :

**P1016**

**[5017]-2003**

[Total No. of Pages : 2

**S.Y.B.Sc.**

**PHYSICS**

**PH-221 : Oscillations, Waves and Sound  
(Paper-I) ( 2013 Pattern)(New)(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 table and calculators is allowed.*

**Q1)** Answer the following:

- a) What is stable equilibrium? [1]
- b) What are damped oscillations? [1]
- c) What are coupled oscillations? [1]
- d) The velocity of transverse waves over a stretched string is 200cm/s. If its mass per unit length is 5 gm/cm, find the tension in the string. [1]
- e) What is Doppler effect? [1]
- f) Calculate the change in intensity level when the intensity of sound increases by 1000 times the original intensity. [1]
- g) State the factors on which pitch of sound depends. [1]
- h) What are forced oscillations? [1]
- i) State the factors on which the velocity of longitudinal wave depends. [1]
- j) Define linear simple harmonic motion. [1]

**Q2)** Answer any TWO of the following:

- a) What are Lissajous figures? Explain any one method to demonstrate the Lissajous figures. [5]
- b) Show that Doppler effect in light is symmetric. [5]
- c) Define reverberation time. Explain what causes reverberation in a hall and how it can be reduced? [5]

**P.T.O.**

**Q3)** Attempt any TWO of the following.

- a) A person blowing a whistle is moving with a speed of 10m/s towards a rocky hill. Determine the apparent rise in frequency of echo heard by the person due to reflection from the hill. Assume air at rest, speed of sound 330 m/s and frequency of whistle sound is 200Hz. [5]
- b) An alternating e.m.f. of peak value 200volt is applied across the series combination of an inductor of inductance 20mH, a capacitor of capacitance 2 $\mu$ F and resistance of 50 $\Omega$ . Determine resonant frequency, quality factor and band-width. [5]
- c) The equation of damped motion is given as,

$$2\left(\frac{d^2x}{dt^2}\right)+12\left(\frac{dx}{dt}\right)+50x=0$$

Find the frequency of damped oscillations. [5]

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

- a) i) Define the term log decrement. Derive expression for it. [4]  
ii) What are seismic waves? Explain the types of seismic waves.[4]
- b) i) A longitudinal disturbance generated by an earthquake travels 1000km in 2 minutes. If the average density of the rock is assumed to be 2800kg/m<sup>3</sup>, calculate the bulk modulus of the rock. [4]  
ii) The two SHMs acting on the particle simultaneously are given as  $x = a \sin 3\omega t$  and  $y = a \sin \omega t$ , find the equation of resultant path. [4]

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

- a) Obtain the differential equation for undamped free oscillations. [2]  
b) The frequency of damped oscillator of mass 3gm is 5Hz. If the coefficient of damping is 0.314 dyne/cm-s<sup>-1</sup>, determine its Q value.[2]

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Total No. of Questions : 4]

SEAT No. :

[Total No. of Pages : 2

**P1017**

**[5017]-2004**

**S.Y.B.Sc.**

**PHYSICS**

**PH - 222 : Optics**

**(2013 Pattern) (New) (Semester - II) (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 diagrams wherever necessary.*
- 4) *Use of log tables and calculators is allowed.*

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

**[10]**

- a) What do you mean by Cardinal Points?
- b) Define the term “aberration”.
- c) Define magnifying power (M.P.) of simple microscope.
- d) What is plane diffraction grating?
- e) State Brewster’s law.
- f) Explain the term division of amplitude.
- g) What is aplanatic lens?
- h) What is an eye-piece?
- i) Two thin convex lenses each of focal length 10cm are placed co-axially at a distance of 10cm apart. Calculate the equivalent focal length of given combinations.
- j) If the refractive index of material is 1.73, calculate polarizing angle for air and transparent material.

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

**[10]**

- a) Show that the distance of the second principal plane from the second lens of an optical system is  $\beta = \frac{-Xf}{f_1}$ , where the symbols have their usual meanings.

**P.T.O.**

- b) Describe the construction and working of Newton's Rings. Show that

$$\lambda = \frac{D_m^2 - D_n^2}{4(m-n)R}.$$

- c) Explain the working of Ramsden's eyepiece. What are the drawbacks in it?

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

- a) A parallel beam of light of wavelength  $5890 \text{ \AA}$  is incident on a thin film of refractive index 1.5, such that the angle of refraction into the film is  $60^\circ$ . Calculate the smallest thickness of the film which will make it appear dark by reflection.
- b) A concave lens made up of crown glass has radii of curvature 50cm and 15cm. Find the longitudinal chromatic aberration for an object situated at infinity. (Given :  $\mu_v = 1.523$  and  $\mu_r = 1.514$ ).
- c) The lenses in Huygen's eye-piece have focal length of 2cm and 6cm. Find the distance between them and sketch the cardinal points.

**Q4)** a) Attempt the following:

- i) Distinguish between negative and positive crystals with examples. **[4]**
- ii) What do you mean by achromatism? Derive the condition for the achromatism of two lenses in contact. **[4]**

OR

- i) Explain the phenomenon of interference in thin film due to transmitted light. Obtain the expression for minima and maxima for transmitted rays. **[4]**
- ii) Derive Lens maker's formula for a thin lens. **[4]**

b) Attempt any one of the following:

- i) State any two applications of Nicol's Prism. **[2]**
- ii) Calculate the focal length of a plano-convex lens for which the radius of curved surface is 25cm and refractive index of the material of the lens is 1.5. **[2]**





Total No. of Questions : 6]

SEAT No. :

**P1018**

**[5017]-2005**

[Total No. of Pages : 3

**S.Y. B.Sc.**

**CHEMISTRY**

**CH - 221 : Physical and Analytical Chemistry  
(2013 Pattern) (Paper-III) (Semester-II)**

*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 side indicates full marks.*
- 4) *Use of calculator is allowed.*
- 5) *Answer to both sections should be written in separate answer books.*

**SECTION-I**

**(Physical Chemistry)**

**Q1)** Answer the following:

**[5]**

- a) Define Helmholtz free energy.
- b) Write equilibrium constant expression for the reaction
$$\text{CO}_{(g)} + \text{H}_2\text{O}_{(g)} \rightleftharpoons \text{CO}_{2(g)} + \text{H}_2(g)$$
- c) What are Azeotropes?
- d) Define the term mole fraction.
- e) What do you mean by the term ideal solution?

**Q2) a)** Answer Any Two of the following:

**[6]**

- i) Derive Gibbs Helmholtz equation.
- ii) Discuss with the help of neat diagram the effect of temperature on solubilities of triethylamine with water.
- iii) Discuss with the help of neat diagram the distillation of non-ideal binary miscible liquid system with minimum boiling point.

**P.T.O.**

b) Attempt Any Two of the following: [4]

i) Derive  $\left[ \frac{\partial(A/T)}{\partial T} \right]_v = -\frac{E}{T^2}$ .

ii) State different forms of Clapeyron equation.

iii) State Henry's law and give its equation.

**Q3)** Solve Any Two of the following: [5]

a) Two moles of an ideal gas are compressed isothermally and reversibly at 90°C from a pressure of  $1.0 \times 10^{-5}$  pascal to  $3.0 \times 10^{-5}$  pascal. Find free energy change.

( $R = 8.314 \text{ JK}^{-1} \text{ mole}^{-1}$ ).

b) Ether boils at 34.5°C at pressure of one atm. At which temperature will it boil at a pressure of 750 mm. Molar heat of vapourization of ether is 6542 J.

( $R = 8.314 \text{ JK}^{-1} \text{ mole}^{-1}$ ).

c) A mixture of 'A' and 'B' is prepared in 1:1 ratio by weight. Calculate mole fraction of 'A' and 'B' in the above mixture.

(Molecular weight of A = 95, B = 18).

## SECTION-II

### (Analytical Chemistry)

**Q4)** Answer the following: [5]

a) Define the term end point of titration.

b) Give the names of primary standard substances used in acid-base titration.

c) Define the term polyacidic base.

d) Define the term reducing agent.

e) What is meant by precipitation titration.

**Q5) a) Answer Any Two of the following: [6]**

- i) Explain the titration curve between strong acid-weak base.
- ii) Discuss titration curve between  $\text{Fe}^{2+}$  &  $\text{Ce}^{4+}$ .
- iii) Describe the estimation of Cu in crystalline  $\text{CuSO}_4$  using iodometric titration.

**b) Attempt Any Two of the following: [4]**

- i) How will you calibrate pipette.
- ii) Explain the term available chlorine in bleaching powder.
- iii) How will you prepare 0.1 N sodium thiosulphate solution? What precaution to be taken for its preservation?

**Q6) Solve Any Two of the following: [5]**

- a) Calculate the strength of HCl if 15 ml of it required to neutralize 25 ml of 0.1 N NaOH.

(equivalent weight of HCl = 36.5).

- b) Calculate pOH of the solution after adding 35 ml 0.1 M NaOH to 25 ml 0.1 M HCl.

- c) Calculate  $E_{\text{cell}}$  for a redox titration in which concentration of  $\text{Ce}^{4+}$  and  $\text{Ce}^{3+}$  is 0.011 M and 0.04 M respectively.

$(E_{(\text{Ce}^{4+}/\text{Ce}^{3+})}^{\circ} = 1.62\text{V})$ .



Total No. of Questions :6]

SEAT No. :

[Total No. of Pages :3

**P1019**

**[5017] - 2006**

**S.Y.B.Sc.**

**CHEMISTRY**

**CH - 222 : Organic and Inorganic Chemistry**

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

*Time : 2 Hours]*

*[Max. Marks :40*

*Instructions to the candidates:*

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

**SECTION - I**

**(Organic Chemistry)**

**Q1)** Attempt the following:

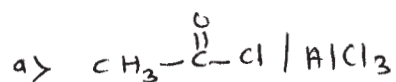
**[5]**

- a) Give the two important uses of  $\text{LiAlH}_4$ .
- b) Explain the role of biochemistry in population control.
- c) Define Huckel rule with example.
- d) Draw the structure of cellobiose.
- e) Give any two applications of  $\text{Sn/HCl}$ .

**Q2) a)** Attempt any two of the following:

**[6]**

- i) Give synthesis of furan. What is the action of following on furan?

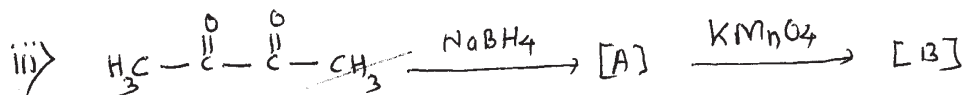
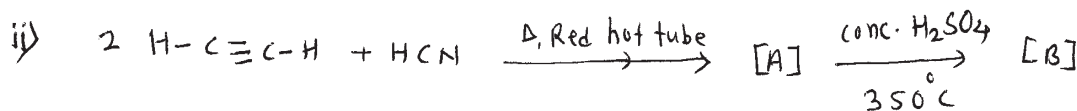
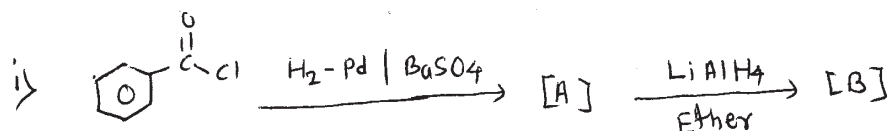


- b)  $\text{SO}_3$  / pyridine

- ii) Explain Killiani - Fischer synthesis of carbohydrates with example.
- iii) Give any three applications of  $\text{NaBH}_4$ .

**P.T.O.**

b) Assign (A) and (B) of the following reaction (Any Two): [4]



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

- Define peptide linkage. Draw the structure of
  - Alanine
  - Serine
- What is oxidation? Discuss cis - hydroxylation by osmium tetroxide.
- What are amino acids? Discuss amphoteric nature of amino acids.

## SECTION - II

### (Inorganic Chemistry)

Q4) Answer the following: [5]

- Write the outer electronic configuration of chromium (Atomic number; Cr = 24).
- Define the term organometallic compounds.
- Define acids and bases according to Lux - Flood concepts.
- Name the metal ion in Ouch - Ouch disease.
- What are hydracids?

**Q5) a)** Answer any Two of the following: [6]

i) What are d - block elements? Explain the following properties of d-block elements.

- 1) Oxidation state
- 2) Complex formation ability

ii) Define 18 - electron rule. Find out the valence electrons in the following metal carbonyls.

- 1)  $V(CO)_6$
- 2)  $Fe(CO)_5$

Atomic number of V = 23 and Fe = 26.

iii) Explain the Lewis concepts of acids and bases with suitable example. Give its merits.

**b)** Attempt Any Two of the following: [4]

- i) Write the names and effect of toxic trace elements in waste water.
- ii) The compounds of d - block elements are coloured. Explain.
- iii) Why  $BF_3$  is stronger Lewis acid than  $BH_3$ ?

**Q6)** Answer Any Two of the following: [5]

a) Write a note on Biochemical effect of Mercury.

b) What is spin only formula? Calculate magnetic moment of  $Fe^{2+}$  and  $Cu^{2+}$  by using spin - only formula.

(Atomic number of Fe = 26 and Cu = 29).

c) Draw the solid state structure of

- i)  $Mo(CO)_6$
- ii)  $Ni(CO)_4$



Total No. of Questions : 4]

SEAT No. :

[Total No. of Pages : 2

**P1020**

**[5017]-2007**

**S.Y.B.Sc.**

**BOTANY**

**BO - 221 : Plant Anatomy and Embryology  
(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.*
- 3) *Neat diagrams must be drawn wherever necessary.*

**Q1)** Answer the following

**[10]**

- a) What is porogamy?
- b) Give an example of circinotropous ovule.
- c) Give function of tapetum.
- d) Define embryology.
- e) Give any one scope of plant anatomy.
- f) Define secondary growth.
- g) Give an example of plant having conjoint, collateral and closed vascular bundle.
- h) What is incompressibility.
- i) What is lenticel?
- j) Enlist any two simple tissues.

**Q2)** Answer any two of the following

**[10]**

- a) Describe abnormal secondary growth in Dracena stem.
- b) Explain structure and functions of xylem.
- c) What is tapetum? Enlist types and give details of tapetum.

**P.T.O.**

**Q3)** Write notes on (any two):

**[10]**

- a) Dicot embryo.
- b) Entry of pollen tube in ovule.
- c) Distribution of mechanical tissues in dicot stem.

**Q4)** What is megasporogenesis? Describe the development of tetrasporic embryo sac.

**[10]**

OR

What is epidermal tissue system? Explain different types of epidermal outgrowths.

**[10]**





Total No. of Questions : 4]

SEAT No. :

[Total No. of Pages : 2

**P1021**

**[5017]- 2008**

**S.Y.B.Sc.**

**BOTANY**

**BO - 222 : Plant Biotechnology  
(2013 Pattern) (Semester - II) (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) *Neat diagrams must be drawn wherever necessary.*

**Q1)** Answer the following

**[10]**

- a) Define biotechnology.
- b) What are enzymes?
- c) Define fermentation.
- d) What is SCP?
- e) Define phytoremediation.
- f) What are plasmids?
- g) Enlist any two methods of gene transfer.
- h) Name any two transgenic plants for storage protein quality.
- i) Define nanotechnology.
- j) Write any two advantages of nanofertilizers.

**Q2)** Answer any two of the following

**[10]**

- a) Give industrial applications of enzymes.
- b) Explain economic implications of SCP.
- c) What is rhizofiltration? Give its advantages.

**P.T.O.**

**Q3)** Answer notes on (any two)

**[10]**

- a) Southern Hybridisation.
- b) Advantages of insect resistant transgenic crops.
- c) Immobilization of enzymes.

**Q4)** What are bioreactors? Describe in detail stirred tank bioreactor.

**[10]**

OR

Describe any two methods of direct gene transfer in plants.



Total No. of Questions : 4]

SEAT No. :

**P1022**

**[5017]-2009**

[Total No. of Pages : 2

**S.Y.B.Sc.**

**ZOOLOGY**

**ZY-221:Animal Systematics and Diversity-IV  
(Revised 2013 Pattern) (Semester - II) (Paper - I)**

*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) Enlist any two examples of Non-Poisonous snakes.
- b) What is holobranch?
- c) Write any two advantages of bird migration.
- d) Write the function of clasper in Scoliodon.
- e) Enlist any two examples of Neornithes.
- f) Mention the function of placoid scales.
- g) Define latitudinal migration in birds.
- h) What is heterocercal tail?
- i) Write any two examples of seed eating beak.
- j) What is venous heart?

**Q2)** write short notes on (any two):

**[10]**

- a) Aerial adaptations in birds.
- b) Desert adaptations in Reptiles.
- c) Ampulla of Lorenzini.

**P.T.O.**

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

- a) Sketch and label- ventral view of brain of scoliodon.
- b) Write distinguishing characters of Parapsida.
- c) Explain raptorial and cursorial feet in birds

**Q4)** Give detail account of digestive system of scoliodon. **[10]**

OR

Give an account of general characters of class mammalia and distinguishing characters of subclass Prototheria.



Total No. of Questions : 4]

SEAT No. :

[Total No. of Pages : 2

**P1023**

**[5017]-2010**

**S.Y.B.Sc.**

**ZOOLOGY**

**ZY-222:Applied Zoology - II**

**(Apiculture and Sericulture)**

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

*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 absconding?
- b) Write biological name of muga silkworm.
- c) Give the use of smoker.
- d) What is deflossing?
- e) Write biological name of western bee.
- f) Write the use of leaf chamber.
- g) Mention two uses of royal jelly.
- h) Name any two brood diseases of honey bee.
- i) Name any two pests of silkworms.
- j) What is stifling?

**Q2)** Write short notes on (Any Two)

**[10]**

- a) Composition and uses of bee venom.
- b) Honey extractor.
- c) Advantages of shoot harvest method.

**P.T.O.**

**Q3)** Attempt the following (any two)

**[10]**

- a) Describe Queen bee.
- b) Sketch and label-bee hive.
- c) Write the composition and uses of silk.

**Q4)** What is bee communication? Explain round dance and tail wagging dance. **[10]**

OR

What is moori culture? Describe the life cycle of mulberry silkworm.



Total No. of Questions :4]

SEAT No. :

[Total No. of Pages :2

**P1024**

**[5017] - 2011**

**S.Y.B.Sc.**

**GEOLOGY**

**GL - 221: Petrology**

**(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.*
- 3) Neat diagrams must be drawn wherever necessary.*

**Q1)** Answer the following in 2/3 lines each:

**[10]**

- a) Pneumatolitic metamorphism.
- b) Devitrification.
- c) Porphyritic texture.
- d) Diagenesis.
- e) Symmetrical ripple marks.
- f) Schistose structure.
- g) Eutectic crystallization.
- h) Roundness of sediments.
- i) Perlitic structures.
- j) Mud cracks.

**Q2)** Write notes on (any two):

**[10]**

- a) Solid solution series with reference to crystallization of plagioclase.
- b) Thermal metamorphism of Limestone.
- c) Phosphatic and Ferruginous biochemical deposits.

***P.T.O.***

**Q3)** Answer the following (any two):

**[10]**

- a) Explain the factors determining the texture of igneous rocks.
- b) Regional metamorphism of argillaceous rocks.
- c) Describe Lamination and graded bedding.

**Q4)** Explain the physico-chemical constitution of magma with reference to Viscosity and Volatiles of magma.

**[10]**

OR

Enumerate kinds of metamorphism. Comment on Cataclastic metamorphism. Add a note on slate, crush breccia and Mylonite.





Total No. of Questions : 4]

SEAT No. :

[Total No. of Pages : 2

**P1025**

**[5017]-2012**

**S.Y.B.Sc.**

**GEOLOGY**

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

*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 order of Superposition.
- b) What are index fossils?
- c) Define Cyclothem.
- d) What is marine transgression?
- e) Define Assemblage zone.
- f) Define micro-evolution.
- g) Explain Faunal succession.
- h) Define micropalaeontology.
- i) Define biofacies.
- j) What are diatoms?

**Q2)** Write notes on (Any two):

**[10]**

- a) Chemical factors controlling stratification.
- b) Stratigraphic procedure for collection of data from subsurface.
- c) Chronostratigraphy and its units.

**P.T.O.**

**Q3)** Explain the following (Any two): **[10]**

- a) Evolutionary trends in glabella of trilobites.
- b) Pollens and spores.
- c) Types of streptospiral coiling.

**Q4)** What is lithostratigraphy? Describe lithostratigraphic units in detail. **[10]**

OR

Describe the morphology of hardparts of ostracods.



Total No. of Questions : 4]

SEAT No. :

[Total No. of Pages : 3

**P1026**

**[5017]-2013**

**S.Y. B.Sc.**

**STATISTICS**

**ST - 221 : Statistical Methods and Use of R-Software  
(2013 Pattern) (Paper-I) (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) *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]**

a) Type I error means.

- i) rejecting  $H_0$  when it is true
- ii) rejecting  $H_0$  when it is false
- iii) rejecting  $H_1$  when it is true
- iv) rejecting  $H_1$  when it is false

b) If  $3Y - 7X_1 + 5X_2 = 200$  is the equation of regression plane of Y on  $X_1$  and  $X_2$  then  $b_{YX_2, X_1}$  is equal to

i)  $\frac{7}{3}$

ii)  $-\frac{7}{3}$

iii)  $-\frac{5}{3}$

iv)  $\frac{5}{3}$

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

- i) CDR
- ii) infant death rate
- iii) male death rate
- iv) standardized death rate

**P.T.O.**

- B) State whether each of the following statements is True or False: **[1 each]**
- a) A 'statistic' is a function of random variables and unknown parameters of the probability distribution.
  - b) NRR is smaller than GRR.
  - c) Larger is the value of  $R^2_{Y \cdot X_1 X_2}$  (ie  $R^2_{1,23}$ ), stronger is the linear relation between the three variables.
- C) Define: critical region. **[1]**
- D) Define: Null Hypothesis. **[1]**
- E) If  $r_{YX_1} = r_{YX_2} = r_{X_1 X_2} = \rho, \rho \neq \pm 1$  (ie  $r_{ij} = \rho \forall i, j, i \neq j$ ) then obtain  $r_{YX_1 \cdot X_2}$  (ie  $r_{12,3}$ ). **[1]**
- F) Write a command in R-software to draw a random sample of size 8 from a population of 60 units by SRSWOR. **[1]**

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

- a) Derive the equation of regression plane of Y on  $X_1$  and  $X_2$  using the method of least squares.
- b) Explain the Direct method of standardization to compute standardized death rate (STDR) for a population A.
- c) A company, manufacturing electric heater, claims that its average life is 1600 hrs. A random sample of 80 heaters shows that the mean life is 1520 hrs, with a standard deviation of 140 hrs. Test the company's claim at 5% level of significance and give your conclusion.

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

- a) Derive the expression for partial correlation coefficient  $r_{YX_1 \cdot X_2}$  (ie  $r_{12,3}$ ) in terms of total correlation coefficients.
- b) Explain a large sample test to test  $H_0: \mu_1 = \mu_2$  against  $H_1: \mu_1 < \mu_2$ , where  $\mu_1$  and  $\mu_2$  are population means of two populations. Two independent random samples of large sizes  $n_1$  and  $n_2$  are taken from these populations. The population variances are known.

- c) Tests in communication skills were taken for 6 persons before and after they were given a training. The scores before and after the training are as:

Scores (before): 48 60 45 70 65 55

Scores (after): 54 72 50 78 68 62

Write commands in R software to carry out a paired t-test to check whether there is any effect on the average score of the training or not.

**Q4)** Attempt Any One of the following:

- a) i) Define multiple correlation coefficient  $R_{Y \cdot X_1 X_2}$  (ie  $R_{1.23}$ ). Prove that

$$R_{Y \cdot X_1 X_2}^2 = b_{YX_1 \cdot X_2} r_{YX_1} \frac{\sigma_{X_1}}{\sigma_Y} + b_{YX_2 \cdot X_1} r_{YX_2} \frac{\sigma_{X_2}}{\sigma_Y}$$

$$\left( \text{ie } R_{1.23}^2 = b_{12.3} r_{12} \frac{\sigma_2}{\sigma_1} + b_{13.2} r_{13} \frac{\sigma_3}{\sigma_1} \right). \quad [5]$$

- ii) Explain M/M/1: FIFO model. Derive the expression for the average number of customers in queue under this model. [5]
- b) i) Explain the test for testing  $H_0 : P_1 = P_2$  against  $H_1 : P_1 \neq P_2$  where  $P_1$  and  $P_2$  are population proportions of two populations. The sizes  $n_1$  and  $n_2$  of random samples, taken from these two populations, are large. [5]
- ii) Explain how to construct a  $100(1 - \alpha)\%$  confidence interval for population mean  $\mu$  of normal distribution when the standard deviation  $\sigma$  is known, while testing  $H_0 : \mu = \mu_0$  against  $H_1 : \mu \neq \mu_0$ . [5]



Total No. of Questions : 4]

SEAT No. :

**P1027**

**[5017]-2014**

[Total No. of Pages : 3

**S.Y. B.Sc.**

**STATISTICS**

**ST - 222 : Sampling Distributions and Inference  
(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) *Use of scientific 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]**

a) If a r.v.  $X$  follows chi-square distribution with variance 12 then mean of the distribution is

- |        |        |
|--------|--------|
| i) 10  | ii) 24 |
| iii) 6 | iv) 9  |

b) The standard error of a statistic (T) is

- |                 |                            |
|-----------------|----------------------------|
| i) Mean (T)     | ii) Variance (T)           |
| iii) Median (T) | iv) Standard Deviation (T) |

c) If a r.v.  $t$  follows t-distribution with 12 d.f. then variance of  $t$  is

- |                    |                     |
|--------------------|---------------------|
| i) $\frac{12}{10}$ | ii) $\frac{10}{12}$ |
| iii) 6             | iv) 10              |

B) State whether each of the following statements is True or False:

**[1 each]**

- a) A statistic is a function of the parameter values.
- b) In paired t-test the observations in the two samples are independent of each other.
- c) Mean of  $F_{n_1, n_2}$  distribution is greater than mode.

**P.T.O.**

- C) State the additive property of chi-square distribution. [1]
- D) State the test statistic of McNemar's test to test the null hypothesis of equality of marginal distributions. [1]
- E) Let a r.v.T follows t-distribution with 12 df. Find C such that  $P(-C < t < C) = 0.6$ . [1]
- F) State the p.d.f. of  $F_{n_1, n_2}$  distribution. [1]

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

- a) Let a r.v.X follows chi-square distribution with n d.f. Derive the expression of mode of the distribution.
- b) If  $X_1, X_2, \dots, X_n$  is a random sample drawn from a normal population with mean  $\mu$  and variance  $\sigma^2$  (unknown) then explain the test procedure to carry out appropriate test for testing  $H_0 : \mu = \mu_0$  against  $H_1 : \mu \neq \mu_0$ .
- c) If  $\bar{x}$  and  $S^2$  are the mean and variance of a random sample of size 16 from  $N(20, 25)$  population, then find  $P[19 < \bar{x} < 21.5, 13.354 < s^2 < 34.854]$ .

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

- a) A r.v.T follows t-distribution with n d.f.. Obtain the  $(2r)^{\text{th}}$  ordered central moment of T and obtain the variance of T.
- b) Describe the exact test for testing  $H_0 : \sigma_1^2 = \sigma_2^2$  against  $H_1 : \sigma_1^2 \neq \sigma_2^2$  when two independent random samples are drawn from normal populations with unknown means.
- c) A die tossed 300 times gave the following results:

Score:	1	2	3	4	5	6
Frequency:	43	49	56	45	66	41

Are the data consistent at 5% level of significance with the hypothesis that the die is true?

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

- a) i) A r.v.  $X$  follows  $F_{n_1, n_2}$  distribution. Prove that as  $n_2 \rightarrow \infty$ , the distribution of  $y = n_1 X$  tends to Chi-square with  $n_1$  d.f. [5]
- ii) If  $X_1, X_2$  are iid  $N(10, 1)$  random variables then obtain  $P[(x_1 - x_2)^2 < 2.2]$ . [3]
- iii) If  $X_1, X_2, \dots, X_{15}$  be a random sample drawn from normal population with mean 20 and variance  $\sigma^2$ . The value of  $\sum_{i=1}^{15} (x_i - 20)^2$  is 150. To test  $H_0: \sigma^2 = 25$ , obtain the value of test statistic. [2]
- b) i) If  $X$  and  $Y$  are two independent chi-square random variables with  $m$  and  $n$  d.f. respectively. Let  $U = X + Y$  and  $V = \frac{X}{X + Y}$  prove that  $U$  and  $V$  are independently distributed. Identify the distribution of  $U$ . [6]
- ii) A r.v.  $X$  follows chi-square distribution with 12 d.f.. Obtain
- 1)  $K$  such that  $P(X \leq K) = 0.05$ .
  - 2) Median of  $X$ . [4]





Total No. of Questions : 4]

SEAT No. :

**P1028**

**[5017]-2015**

[Total No. of Pages : 2

**S.Y.B.Sc.**

**GEOGRAPHY**

**Gg-211:Geography of Resources - II  
(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.*
- 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 bauxite producing countries.
- b) Name any two iron ore producing states in India.
- c) Write the types of coal.
- d) Name any two coal producing states in India.
- e) Name any two gas producing countries in the world.
- f) Write any two significances of solar energy.
- g) Name any two nuclear energy using countries in the world.
- h) Name any two petroleum producing countries in the world.
- i) What is human resource?
- j) What do you mean by optimun population?
- k) Write any two effects of over population.
- l) Write any two importance of water resource.
- m) What do you mean by resources planning?

**P.T.O.**

**Q2)** Write short notes on the following: (Any Two) **[10]**

- a) Iron-ore distribution in the world.
- b) Significance of wind energy.
- c) Causes of under population.
- d) Need of resources planning.

**Q3)** Answer the following questions in 100 words each. (Any Two) **[10]**

- a) Write the bauxite distribution in India.
- b) Describe the coal distribution in world.
- c) Describe the role of mineral resources in economic development.
- d) Explain the resources planning with reference to India.

**Q4)** Answer the following question in 200 words: (Any One) **[10]**

- a) What is over population? Explain the causes of over population.
- b) Describe the role of energy resources in economic development.



Total No. of Questions : 4]

SEAT No. :

[Total No. of Pages :2

**P 1029**

**[5017] - 2016**

**S.Y.B.Sc.**

**GEOGRAPHY**

**Gg-212 : Watershed Management - II  
(2013 Pattern) (Semester - II) (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 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 do you mean by soil map?
- b) What is meant by cadastral map?
- c) What do you mean by watershed map?
- d) Define watershed.
- e) What is watershed planning?
- f) Write any two objectives for the watershed planning in production oriented sustainability.?
- g) What is food security?
- h) Define water conservation.
- i) What do you mean by contour bunding?
- j) What is meant by watershed development programme?
- k) Write any two purposes of watershed development programme.
- l) What is dryland farming?
- m) Give the fullform of EGS.

***P.T.O.***

**Q2) Write short notes on the following : (Any Two) [10]**

- a) Survey methods of resource appraisal.
- b) Importance of watershed planning.
- c) Restoration of landscape.
- d) Components of watershed development.

**Q3) Answer the following questions in 100 words each: (Any Two) [10]**

- a) Explain the process of database generation.
- b) Describe the plan for watershed planning.
- c) Explain the traditional methods of water harvesting.
- d) Describe the rural and integrated watershed development plan.

**Q4) Answer the following question in 200 words: (Any One) [10]**

- a) What is watershed planning? Explain the process of watershed planning.
- b) Define soil conservation. Describe the methods of soil conservation.



Total No. of Questions :4]

SEAT No. :

**P1030**

**[5017]-2017**

[Total No. of Pages :2

**S.Y.B.Sc.**

**MICROBIOLOGY**

**MB-221: Bacterial Genetics**

**(2013 Pattern) (Paper - I) (Theory) (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 labelled diagram wherever necessary.*

**Q1)** Attempt the following:

**[10]**

- a) State True or False:
  - i) Gene is a basic unit of heredity.
  - ii) Plasmid confer resistance towards antibiotics.
- b) Draw the structure of Adenine.
- c) What is the role of DNA polymerase III in DNA replication.
- d) Give the examples of nonsense codon.
- e) Define: Transition mutations.
- f) \_\_\_\_\_ form of DNA is present in the cell.
- g) \_\_\_\_\_ amino acid is required to form initiation complex in protein synthesis in prokaryotes.
- h) Enlist cross linking agents used to induce matations.
- i) Define plasmid incompatibility.

**P.T.O.**

**Q2)** Diagrammatically represent & comment on any two of the following: [10]

- a) Griffith's experiment.
- b) termination of translation.
- c) Fluctuation test.

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

- a) Describe Aveny & Macleod experiment.
- b) Enlist different types of mutations. Describe any two types with suitable example.
- c) Enlist different properties of plasmid.

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

- a) Describe Messelson & Stahl's experiment to prove semi conservative mode of DNA replication.
- b) What are induced mutations? Explain the mode of action of base analogues & nitrous acid as base pair substitution mutations.

*EEE*

Total No. of Questions : 4]

SEAT No. :

**P1031**

**[5017]-2018**

[Total No. of Pages : 2

**S.Y. B.Sc.**

**MICROBIOLOGY**

**MB - 222 : Air and Water Microbiology  
(2013 Pattern) (Paper-II) (Semester-II) (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 diagram wherever necessary.*

**Q1)** Answer the following:

**[10]**

- a) Define droplet nuclei.
- b) In elevated temperature test, incubation temperature used is
  - i) 37°C
  - ii) 44 ± 2°C
  - iii) Room temperature
  - iv) 60°C
- c) Poliomyelitis is an air borne infection. (T/F)
- d) Pore size of membrane filter is 0.42 µm to 0.45 µm. (T/F)
- e) Define mineral water.
- f) What is eutrophication?
- g) Name raw material used for biogas production.
- h) Enlist any two methods of water purification.
- i) \_\_\_\_\_ mg/liter is the minimum BOD limit to release domestic treated sewage in natural flow of water.
- j) \_\_\_\_\_ and \_\_\_\_\_ are the organisms involved in solid waste management.

***P.T.O.***

**Q2) Attempt Any Two of the following: [10]**

- a) Explain how membrane filter technique is more useful than MPN.
- b) Enlist various physicochemical parameters of wastewater and discuss total solids and suspended solids in detail.
- c) Describe any two methods of air sampling by impaction on solid surface.

**Q3) Answer Any Two of the following: [10]**

- a) Enlist sources of chemical pollutants in air and discuss effects of carbon monoxide and sulfur dioxide on human health.
- b) What is BOD? Explain Winklers method of BOD estimation.
- c) Comment on water borne infections.

**Q4) Attempt Any One of the following: [10]**

- a) Explain any two aerobic methods of sewage treatment.
- b) Describe various types of anaerobic digestors.





Total No. of Questions :4]

SEAT No. :

[Total No. of Pages :2

**P1032**

**[5017] - 2019**

**S.Y.B.Sc.**

**PSYCHOLOGY**

**EP - 221: Health Psychology**

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

*Time : 2 Hours]*

*[Max. Marks :40*

*Instructions to the candidates:*

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

**Q1)** Answer in two or four sentences.

**[16]**

- a) Who introduced the biopsyo - social illness model?
- b) Define burnout.
- c) Define defensive coping.
- d) Define habit.
- e) State any two effects of overeating.
- f) Define coping.
- g) What is illness?
- h) Define health psychology.

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

**[8]**

- a) Explain the posttraumatic stress disorder.
- b) Describe the effect of - lack of exercise on health.
- c) Explain the mind body connection.

***P.T.O.***

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

- a) Giving up.
- b) Biomedical model of illness.
- c) Stress is self imposed.

**Q4)** What is stress? Explain the major types of stress. **[8]**

OR

Explain the concept of coping. Explain various coping patterns.



Total No. of Questions : 4]

SEAT No. :

**P1033**

**[5017]-2020**

[Total No. of Pages : 1

**S.Y.B.Sc.**

**PSYCHOLOGY**

**EP-222: Psychological Testing and Assessment  
(Semester-II) (Paper-II)(New Pattern) (2013 Pattern)**

*Time : 2Hours]*

*[Max. Marks : 40*

*Instructions to candidates:*

- 1) *All questions are compulsory.*
- 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 Neuropsychological test?
- b) State the full form of - SVIB and its use.
- c) Define psychological test.
- d) What is achievement?
- e) State the full form of GRE & purpose of it.
- f) Define aptitude.
- g) What is substance abuse.
- h) Define mental disorder.

**Q2) Attempt any two of the following questions in eight or ten sentences. [8]**

- a) What is the difference between checklist - and rating scale.
- b) Describe any one test of general intellectual ability.
- c) What is clinical interview? Explain various types of clinical interview.

**Q3) Write short notes (Any two) [8]**

- a) Work Reference Inventory.
- b) Forensic psychological assessment.
- c) Observation method.

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

OR

Explain any two types of Aptitude tests used for educational counselling.



Total No. of Questions : 4]

SEAT No. :

[Total No. of Pages : 2

**P1034**

**[5017]-2023**

**S.Y.B.Sc.**

**ELECTRONIC SCIENCE**

**Electronic Instrumentation**

**(New Course) (2013 Pattern) (Semester - II) (Paper - I) (82212)**

*Time : 2 Hours]*

*[Max. Marks : 40*

*Instructions to the candidates:*

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

**Q1)** Attempt all the following:

- a) Define rms value of A.C. signal. [1]
- b) Explain working of intensity control knob in CRO. [1]
- c) What is Techometer? [1]
- d) Explain over ranging in DMM. [1]
- e) Write any two differences between working modes of dual trace CRO. [2]
- f) Explain application of universal impedance bridge. [2]
- g) What is transient response of power supply. [2]
- h) “ Initial zero setting for pH measurement is at pH=7”, Comment. [2]

**Q2)** Attempt any two of the following:

- a) Draw block diagram and explain working of PMMC-ohmmeter. [4]
- b) Draw block diagram of dual trace CRO and explain purpose of delay line. [4]
- c) With the help of block diagram explain working of DMM. [4]

**P.T.O.**

**Q3)** Attempt any two of the following.

- a) List different applications of CRO and explain any one in brief. [4]
- b) Draw block diagram of DFM and explain working of it. [4]
- c) With the help of suitable diagram explain working of CVCC. [4]

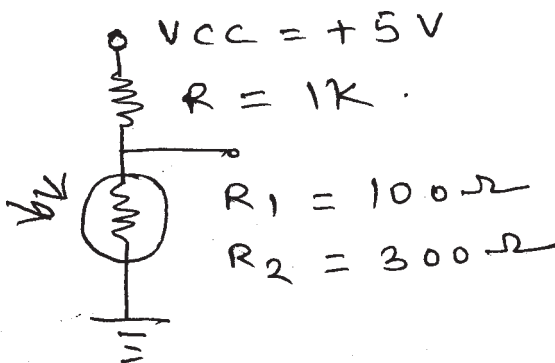
**Q4)** Attempt all of the following.

- a) Discuss online and off line UPS with the help of block diagrams. [6]
- b) Explain A.C. volt meter and discuss true rms voltmeter in brief. [6]

OR

**Q4)** Attempt all of the following.

- a) A moving coil voltmeter has a linear scale with 100 divisions. The full scale reading is 100volts and  $\frac{1}{10}$  of a scale division can be read out. Determine the resolution of it in volts. [4]
- b) Determine static error if a digital voltmeter reads 4.6 5V and 4.38V. True value of the voltage is 4.2V. [4]
- c) Find the output voltage in the following diagram with LDR resistance  
1)  $100\Omega$  2)  $300\Omega$  [4]



Total No. of Questions : 4]

SEAT No. :

**P1035**

**[5017]-2024**

[Total No. of Pages : 2

**S.Y.B.Sc.**

**ELECTRONIC SCIENCE**

**EL - 222 : Communication Electronics**

**(82222) (Paper - II) (2013 Pattern) (Semester - II) (New)**

*Time : 2 Hours]*

*[Max. Marks : 40*

*Instructions to the candidates:*

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

**Q1)** Attempt all of the following:

- a) State the types of electronic communication systems. [1]
- b) What is meant by modulation? [1]
- c) State the function of set top box. [1]
- d) Define frequency modulation. [1]
- e) "Serial communication is used for long distance communication". Comment. [2]
- f) "In FM the bandwidth requirement is longer than AM". Comment. [2]
- g) What is the wavelength of a radio station which operates on an assigned frequency of 570 kHz. [2]
- h) Calculate frequency deviation (fd), if  $m_f = 5$  and  $f_m = 300$  Hz. [2]

**Q2)** Attempt any two of the following:

- a) In AM, show that  $P_c = \frac{2}{3}P_r$  for 100% modulation. [4]
- b) Draw the block diagram of PWM generator and its waveform. State its advantages. [4]
- c) What is meant by external noise? Describe its different types. [4]

**Q3)** Attempt any two of the following:

- a) Distinguish between serial and parallel communication system. [4]
- b) Explain with block diagram tuned radio frequency (TRF) receiver. [4]
- c) Draw and explain block diagram of digital communication system. [4]

**P.T.O.**

**Q4)** Attempt all of the following:

- a) Explain pulse dialing technique used in telephone system. Compare pulse and DTMF dialing. [6]
- b) Describe slope detector circuit in detail. State its drawbacks. [6]

OR

- a) If a FM wave represented by the equation  
$$e = 10 \sin (8 \times 10^8 t + 4 \sin 1500 t)$$
, calculate the carrier frequency, modulating frequency, modulation index and frequency deviation. [4]
- b) A  $10 \text{ k}\Omega$  resistor is at room temperature  $27^\circ\text{C}$ . Calculate the thermal noise voltage for a bandwidth of  $200 \text{ kHz}$ .  
(Given  $K = 1.38 \times 10^{-23} \text{ Joule/Kelvin}$ ). [4]
- c) A carrier wave with amplitude  $10\text{V}$  and frequency  $10\text{MHz}$  is amplitude modulated to  $70\%$  level with a modulating frequency of  $1.2 \text{ kHz}$ . Write down the equation of AM wave. [4]



Total No. of Questions : 4]

SEAT No. :

**P1036**

**[5017]-2025**

[Total No. of Pages : 2

**S.Y.B.Sc.**

**DEFENCE AND STRATEGIN STUDIES**  
**DS- 201; Conflicts Management and Resolution**  
**(2013 Pattern) (Semester -II) (Paper-I)**

*Time : 2Hours]*

*[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.

**8×2=16**

- a) Define world order.
- b) State the meaning of ADR.
- c) Define cultural integration.
- d) Define arms control.
- e) Define international law.
- f) Write any two relationships between conflict and communication.
- g) Write any two sources of international law.
- h) Write the meaning of conflict resolution.

**Q2)** Answer in 8 to 10 Sentences (any two).

**2×4=8**

- a) Describe historical background of war studies.
- b) Write the causes of clash of civilization.
- c) Discuss pacific methods of conflict settlement.

**Q3)** Write short notes on (any two)

**2×4=8**

- a) Arms control and world order.
- b) Problems of peace research.
- c) World order and peace keeping force (IPKF)

**P.T.O.**



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

**1×8=8**

- a) Write a note on the role of U.N in maintaining world peace.
- b) Discuss nature and scope of peace studies.



Total No. of Questions :4]

SEAT No. :

**P1037**

**[5017]-2026**

[Total No. of Pages :2

**S.Y.B.Sc.**

**DEFENCE AND STRATEGIC STUDIES**

**DSSY-202: Geopolitics**

**(2013 Pattern) (Semester - II) (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.*

**Q1)** Answer in 2 or 4 sentences each:

**[16]**

- a) Define "Territorial Sea".
- b) State the meaning of E.E.Z.
- c) What do you mean by strategic minerals.
- d) Define 'State'.
- e) Where the maximum deposits of oil is located?
- f) Write any two factors of Geopolitics.
- g) What do you understand by Geopolitics.
- h) What do you mean by "Border".

**Q2)** Answer in 8 or 10 sentences(Any Two):

**[8]**

- a) Write a few lines on "Diego Garcia Islands".
- b) Explain in brief geostrategic importance of Andaman & Nicobar Islands.
- c) Write in short strategic importance of Jammu & Kashmir.

**P.T.O.**

**Q3)** Write short notes on (Any Two):

**[8]**

- a) Concept of “Buffer state”.
- b) Concept of line of actual control.
- c) Lakshadweep Islands.

**Q4)** Answer in 16 to 20 sentences (Any One):

**[8]**

- a) Explain in detail geostrategic position and importance of Siachen Glacier.
- b) Discuss in detail problems & solutions of Land-locked state.

*EEE*

Total No. of Questions : 4]

SEAT No. :

**P1038**

**[5017]-2027**

[Total No. of Pages : 2

**S.Y. B.Sc.**

**DEFENCE AND STRATEGIC STUDIES**

**DSSY - 203 : Contemporary world and Security  
(2013 Pattern) (Paper-III) (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.*

**Q1)** Answer in 2 to 4 sentences each:

**[16]**

- a) Differentiate between Nation and State.
- b) Define Terrorism.
- c) Define Nuclear Proliferation.
- d) Introduce ISIS.
- e) What is meant by Revolutionary War?
- f) What is meant by National Defence and Security?
- g) What is meant by Defence in Depth?
- h) Differentiate between Military and Comprehensive Security.

**Q2)** Answer in 8 to 10 sentences each (Any Two):

**[8]**

- a) Discuss the relevance of Energy Security.
- b) Discuss why Human Rights are essential.
- c) Discuss the Objectives of National Security.

**P.T.O.**

**Q3)** Write short notes on (Any Two):

**[8]**

- a) India and South East Asia.
- b) China's Emerging Presence in Indian Ocean.
- c) India and Russia.

**Q4)** Answer in 16 to 20 sentences (Any One):

**[8]**

- a) Discuss the Concept of Comprehensive Security.
- b) Dynamics of Geo-Politics.



Total No. of Questions : 4]

SEAT No. :

**P1039**

**[5017]-2028**

[Total No. of Pages : 2

**S.Y.B.Sc.**

**ENVIRONMENTAL SCIENCE**

**Biological Diversity and its Conservation  
( 2013 Pattern) (Semester - II) (Paper - I)**

*Time : 2 Hours]*

*[Max. Marks : 40*

*Instructions to candidates :*

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

**Q1)** Answer the following:

**[10]**

- a) Define key stone species.
- b) What is genetic drift.
- c) Give full form of CITES.
- d) Define community forest.
- e) How many biogeographic zones and biotic province in India.
- f) Define global warming.
- g) What are the demerits of GMO.
- h) What is importance of social forest?
- i) Define Eco tourism.
- j) Write any two medicinal importance examples of forest.

**Q2)** Attempt any two from the following:

**[10]**

- a) What is importance of joint forest managment programme.
- b) What are the threats of over exploitation of bioresources.
- c) Write the significance of molecular marker techniques.

**P.T.O.**

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

- a) Udvardy's classification.
- b) Endemism in India.
- c) Environmental protection act, 1986.

**Q4) How do sustainable development helping in preservation of bio diversity? [10]**

OR

What are the differences between monitoring and inventorying.



Total No. of Questions : 4]

SEAT No :

**P1040**

**[5017]-2029**

[Total No. of Pages : 2

**S.Y.B.Sc.**

**ENVIRONMENTAL SCIENCE**

**EVS : 202 - Environmental Pollution and Environmental Technology  
(2013 Pattern) (Semester - II) (Paper - II)**

*Time : 2 Hours]*

*[Max. Marks : 40*

*Instructions to the candidates:*

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

**Q1)** Attempt the following:

**[10]**

- a) Define ultra filtration.
- b) What is role of catalytic converters.
- c) State the difference between Gray and black water.
- d) Define bioremediation.
- e) Name any two personal noise control devices.
- f) What do you mean by sound insulation.
- g) Write any two mechanical methods of sludge drying.
- h) Define biogasification.
- i) Which are the disinfection methods used for water treatments.
- j) Define reverse osmosis.

**Q2)** Answer any Two from the following:

**[10]**

- a) What are the methods used for control of noise at source.
- b) What is activated sludge process. Add a note on recirculation of sludge.
- c) Draw a neat labelled diagram of electrostatic precipitator.

**P.T.O.**



**Q3)** Write a short notes on any Two:

**[10]**

- a) Composting.
- b) Immobilization of heavy metals.
- c) Spray ponds.

**Q4)** What are the biological methods used for control the soil pollution.

**[10]**

OR

Explain the mechanical methods used for volume and size reduction of solid waste.



Total No. of Questions : 4]

SEAT No. :

**P1041**

**[5017]-2030**

[Total No. of Pages : 4

**S.Y.B.Sc.**

**ENGLISH (Optional)**

**Text Book : Literary Vistas**

**(2013Pattern - Revised) (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.*

**Q1) a)** Attempt any one of the following in about 100 words. **[5]**

- i) What is the significance of the little box that Rosemary wanted to buy?
- ii) Explain the central idea 'With the photographer'.

**b)** Attempt any one of the following in about 100 words. **[5]**

- i) Why did Rosemary Fell ask Miss Smith to leave her home?
- ii) Why does the narrator say about his own photograph as a 'worthless trifle'?

**Q2) a)** Attempt any one of the following in about 100 words. **[5]**

- i) Analyse Wordsworth's attitude to nature, memory and imagination.
- ii) Explain the significance of the final lines from the poem 'If'.  
'Yours is earth and everything that's in it'  
'And which is more - you'll be a Man, my son'.

**b)** Attempt any one of the following in about 100 words. **[5]**

- i) What kind of advice does the poem 'If' convey for any good life?
- ii) Bring-out the central theme of the poem 'Ozymandias'.

**P.T.O.**

**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 A 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.



Total No. of Questions : 4]

**P1041**

**[5017]-2030**

**S.Y.B.Sc.**

**ENGLISH (Optional)**

**Text Book : Literary Vistas**

**(2013 Pattern - Old) (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.*

**Q1) a)** Attempt any one of the following in about 100 words. **[5]**

- i) Throughout the poem 'A Psalm of Life', H.W.Longfellow compares life to a number of things. Identify these comparisons and point out the implications of each.
- ii) What is the central idea of the poem 'Purdah' (1)?

**b)** Attempt any one of the following in about 100 words. **[5]**

- i) What message has been conveyed in the poem 'A Psalm of Life'?
- ii) 'Purdah' is literally and figurative 14 oppressive. How does the poem argue this point?

**Q2) a)** Attempt any one of the following in about 100 words. **[5]**

- i) Analyse Wordsworth's attitude to nature, memory and imagination.
- ii) Explain the significance of the final lines from the poem 'If'.  
'Yours is earth and everything that's in it'  
'And which is more-you'll be a Man, my son'.

**b)** Attempt any one of the following in about 100 words. **[5]**

- i) What kind of advice does the poem 'If' convey for any good life?
- ii) Bring out the central theme of the poem 'Ozymandias'.

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

- a) A group of four friends has a discussion on recently released film. Write the transcription of the discussion in a dialogue form.
- b) Imagine that you are facing an interview for the post of a Purchase Manager in a Multi National company. Anticipate any five questions & write down your responses to them.
- c) Write a short paragraph in about 100 words on ‘A Meaningful Education’.
- d) Prepare a presentation using charts, transparencies or slides on ‘Environmental Pollution’. Write down the matter for display on charts or screens and also the script of your talk.

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

- a) Write an essay on “Empowerment alone cannot help our women”.
- b) Write a review of a restaurant you have recently visited.
- c) Write a brief newspaper report of two paragraphs on ‘New Shopping Mall’.
- d) Summarize the following passage.

The computer has been hailed as the greatest invention in human history. It has transformed our lives and vastly expanded the horizons of human endeavour. But there is another side to the computer that we cannot ignore: by its speed anonymity and vast reach, the computer has spawned a new range of crimes, necessitating the introduction of a new branch of law known as Cyberlaw. These crimes are difficult to trace or prevent since they take place not in the physical world around us but in cyberspace, the space where all Internet activities take place.



Total No. of Questions : 3]

SEAT No. :

P1042

[Total No. of Pages : 3

[5017] - 2031

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

मराठी (MARATHI) (Theory)

व्यावहारिक मराठी (Vyavharik Marathi)

(नवा अभ्यासक्रम)

(2013 Pattern)

वेळ : 2 तास]

[एकूण गुण : 40

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

प्रश्न 1) अ) पुढील उताऱ्याचे मराठीत भाषांतर करा.

[10]

Technology is the only tool that can free us from our shackles, both physical and psychological. The advent of information technology is now tangible across the nation and our lives. A similar spread of technological transformation is needed in the areas of healthcare and value added production. This is the only way we can become a developed nation. Fortunately, we have all the components of technological success people, material, skills and infrastructure the time has come to emerge from the mindset of a suffering civilization and strive for our destiny as a developed nation. There is no need for the peacock to turn into an ostrich. The rhythm and harmony that signify a song and the grace of a peacock that goes with that song are innate to India. They must be preserved and inculcated into our social fabric. The benefits of technology must percolate down to the lowest strata of society, enabling them to change, to move on.

It must not be thought that the scientists are only intent on warlike weapons. Men are working steadily in the atomic laboratories, trying to find the best way of applying this new power to industry and to domestic life. The words supplying this new

[P.T.O.]

power to industry and to domestic life. The world's supplies of coal will be exhausted some day, and similarly, we may find that our resources of petrol will come to an end. What is to be done then? There is little doubt that coal and petrol will be replaced at some future time by atomic energy. Scientists are working in the laboratories in an effort to find out how trains and ships may be driven by atomic energy, how factories may use it for power and how it may be used to light our houses.

ब) पुढील उताऱ्याचा एक तृतीयांश सारांश लिहून समर्पक शीर्षक द्या. [10]

हा भारत 'महान' बजविण्याची प्रक्रिया खऱ्या अर्थाने 26 जानेवारी 1950 पासून सुरू झाली. 'भारत महान बनवायचा' म्हणजे नेमकं काय करायचं, याचं चित्र राज्यघटनेच्या प्रास्ताविकात मांडलंय. त्यात भारत हे राष्ट्र: 'सार्वभौम, समाजवादी, धर्मनिरपेक्ष, लोकशाही, गणराज्य घडविण्याचा निर्धार आहे. न्याय, स्वातंत्र्य, समानता व बंधुता, प्रवर्धित करण्याचा संकल्प आहे'. हे चित्र आदर्श आहे. स्वप्नवत् आहे. म्हणजे फारच लांबचा पल्ला गाठायचाय. भारत महान बनविण्यासाठी काही शतकं लागणार, हेही त्यातून स्पष्ट होतंय! पण आपले राष्ट्रपती डॉ. कलाम म्हणतात, "इ. स. 2020 मध्ये भारत हे राष्ट्र महासत्ता बनणार!" प्रश्न असा आहे की, 'महासत्ता' झाल्यावर 'भारत महान झाला', असं म्हणता येईल का? याचं उत्तर अनेक तरूणां प्रमाणेच मलाही मिळालेलं नाही!

दि. 26 जानेवारी 1950 रोजी 'भारत महान बनवायचा' हे ध्येय घेऊन आपल्या देशाने वाटचाल सुरू केली. त्यासाठी कोणता मार्ग स्वीकारला? लोकशाही! अर्थातच 'लोकशाही' ही केवळ राज्यपद्धती नाही, ती जीवनपद्धतीही आहे. त्यामुळे 26 जानेवारी 1950 रोजी या देशात लोकशाही राज्यपद्धतीचा सांगाडा आला. पण जोपर्यंत समाजात 'लोकशाही' जीवनपद्धती म्हणून रूजत नाही, तोपर्यंत ती 'राज्यपद्धती' म्हणून यशस्वी होणार नाही, हे उघड आहे.

'लोकशाही' हा काही आदर्श मार्ग नाही. कमीतकमी तोष असणारा, कमीतकमी त्रास देणारा आणि जास्तीत जास्त लोकांचं हित साधणारा हा 'लांबचा' मार्ग आहे. याबद्दल घटनाकारांच्या व तत्कालीन नेत्यांच्याही मनात संभ्रम नव्हता. 'केवळ बहुमत म्हणजे लोकशाही नव्हे!' याबाबत नेहरू व आंबेडकर या भारतीय लोकशाहीच्या दोन्ही शिल्पकारांच्या मनात गोंधळ नव्हता. नेहरूंनी तर 18 फेब्रुवारी 1953 रोजी जाहीरपणे आणि तेही थेट संसदेत सांगितलं होतं. "लोकशाहीविषयी पूर्ण आदर व प्रेम बाळगूनही मी इतकंच म्हणून की, बहुमताने घेतलेले निर्णय योग्य असतातच, असे नाही!"

[शब्दसंख्या : 237]

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

- अ) 'अणुसंशोधन व भारत' या विषयावर वृत्तपत्रासाठी 200 शब्दांत लेख तयार करा.
- ब) 'भ्रष्टाचारमुक्ती' या विषयावर आकाशवाणीसाठी 200 शब्दांत भाषण संहिता तयार करा.
- क) 'वाढती पाणी टंचाई व त्यावरील उपाययोजना' या विषयावर जलतज्ज्ञांची महाविद्यालयीन विद्यार्थ्यांने दूरदर्शनसाठी घेतलेली मुलाखत तयार करा (वेळ पाच मिनिटे).

प्रश्न 3) खालीलपैकी कोणत्याही पाच इंग्रजी संज्ञांना मराठी पारिभाषित पर्याय लिहा. [5]

- अ) Microbiology.
- ब) Commissioner.
- क) Visa.
- ड) Trade Mark.
- इ) Demonstration.
- फ) Quotation.
- य) Registration.
- र) Circular
- ल) Virtual.
- व) Service Tax.





Total No. of Questions : 3]

SEAT No. :

P1043

[Total No. of Pages : 2

[5017] - 2032

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

हिन्दी (HINDI) (General)

(2013 पॅटर्न)

- पाठ्यपुस्तकें : 1) भारती 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) Acoustics      | ii) Biophysical |
| iii) Chemistry    | iv) Cosmology   |
| v) Drug Addiction | vi) Fossil      |
| vii) Generator    | viii) Neurosis  |
| ix) Parasite      | x) Vibration    |

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

26 जनवरी, 1950 को देश एक पूर्ण प्रभुतासंपन्न लोकतांत्रिक गणराज्य घोषित किया गया। इसी दिन की यादगार में हर वर्ष 26 जनवरी को हम बड़ी धूमधाम से गणतंत्र की खुशियाँ मनाते हैं, उत्सव करते हैं। यही वह दिन है, जब हमारे देश में हमारा अपना संविधान हमने स्वयं अपने ऊपर लागू किया; पर यह मंगल महूर्त यों ही नहीं आ गया। इसकी कीमत स्वाधीनता – संग्राम के सैनिकों ने बार – बार अपने लहू और त्याग से चूकाई।

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

“फसलों का उत्पादन, उनमें रोगों व कीटों तथा प्रतिकूल परिस्थितियों के विरुद्ध प्रतिरोधक शक्ति जैसे गुणों का लगातार विकास समाज की बदलती व बढ़ती आवश्यकताओं के संदर्भ में अति महत्वपूर्ण है।”

P.T.O.

अथवा

“समीकरण के जो हल निकाले हैं, उनको स्वप्न में भी हल करना आश्चर्य जनक ही माना जाएगा। अलावा इसके उन प्रश्नों को हल करने में यूरोप के विख्यात गणितज्ञ को सौ वर्ष से अधिक समय लगा था।”

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

“और कहीं लिक्खा था

अन्न का अभाव है;

और कहीं कारण था अन्न के अभाव का!

आज तीन साल से ऐसी ही भयानक खबरे।”

अथवा

“मैं फिर जन्म लूँगा

फिर मैं

इसी जगह आऊँगा

उचरती निगाहों की भीड़ में।”

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

i) फसलों को उन्नत करने की कौन-सी नई तकनीक है?

ii) रेशम कीट के प्रकारों को स्पष्ट कीजिए।

iii) खाद्य - पदार्थों का संरक्षण किस प्रकार किया जाता है?

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

i) ‘कालिदास से’ कविता का भावार्थ अपने शब्दों में लिखिए।

ii) ‘मुझे आज हँसना चाहिए’ ऐसा कवि अज्ञेय क्यों कहते हैं?

iii) धर्मवीर भारती ने ‘बृहन्नला’ की व्यथा का चित्रण किस प्रकार किया है?



Total No. of Questions : 4]

SEAT No. :

**P1044**

[5017] - 2033

[Total No. of Pages : 2

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

संस्कृत (Sanskrit)

गीर्वाणभारती (Gīrvānabhārati)

(2013 Pattern)

Time : 2 Hours]

[Max. Marks :40

Instructions :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 in 2 - 4 lines on the following questions : **[16]**

पुढील प्रश्नांनी 2 - 4 ओळीत उत्तरे लिहा.

- i) How many types of भौतिकशास्त्र and which are they?  
भौतिकशास्त्राचे प्रकार किती व कोणते?
- ii) What is the 'यन्त्र' ?  
'यन्त्र' म्हणजे काय ?
- iii) Which Śāstragranthas are studied by Bhāskarācārya?  
भास्कारचार्यांनी कोणत्या शास्त्रग्रंथांचा अभ्यास केला होता ?
- iv) Which is the epic of Dr. G.B. Plasule?  
डॉ. ग. बा. पळसुले यांचे महाकाव्य कोणते ?
- v) Explain the meaning of 'कूपे पश्य पयोनिधावपि घटो गृहणाति तुल्यं जलम्'.  
'कूपे पश्य पयोनिधावपि घटो गृहणाति तुल्यं जलम्' या विधानाचा अर्थ स्पष्ट करा.
- vi) Explain the meaning of 'काकोडपि जीवति चिराय बलिं च भुङ्क्ते'.  
'काकोडपि जीवति चिराय बलिं च भुङ्क्ते' या विधानाचा अर्थ स्पष्ट करा.
- vii) How many types of 'खनित्र' and which are they?  
खनित्राचे प्रकार किती व कोणते ?
- viii) Who is the author of शिशुपालवध महाकाव्य?  
शिशुपालवध महाकाव्याचा कर्ता कोण ?

P.T.O.

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

संक्षिप्त टीपा लिहा. (कोणत्याही दोहोंवर)

- i) आयुर्वेदः
- ii) भूमिपरीक्षणम्
- iii) वृक्षप्रकाराः

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

संक्षिप्त टीपा लिहा. (कोणत्याही दोहोंवर)

- i) Explain स्पष्ट करा: पद सौहार्दानि सुजने शिथिलीभवन्ति।
- ii) विनायकः
- iii) सुभाषितानि

**Q4) Write any one of the following in 16-20 lines.** [8]

पुढीलपैकी कोणत्याही एका प्रश्नाचे उत्तर लिहा.

- i) Write the summary of 'सद्धर्मपुण्डरीककथा'  
सद्धर्मपुण्डरीककथेचा सारांश लिहा.
- ii) Explain the thoughts of भास from the lesson 'सुभाषितानि'  
'सुभाषितानि' या पाठात व्यक्त झालेले भासाचे विचार स्पष्ट करा.



FUNCTIONAL ARABIC  
(2013 Pattern) (Semester - II)

Time : 2 Hours]

[Max. Marks : 40

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

(الف) الآدبُ واجبٌ - هل ذلك قرآنٌ ؟  
ذلك الطائرُ غرابٌ - وهو أسودٌ -  
هذا رجلٌ مسلمٌ - في يده كتابٌ عربيٌّ -  
هل أنت كبيرٌ ؟ لا أنا صغيرٌ - نعم  
هذا كتابٌ - ذلك ولدٌ مجتهدٌ -

(ب) هذا الرسمُ جميلٌ جداً - في الرسمِ  
جميلٌ جداً - في الرسمِ قفصٌ - كيف ذلك  
الطائرُ ؟ ماذا قارٌ - ذلك القطُّ كبيرٌ -  
الوقتُ عندُ هُ منى بضميْن - الولدُ الكسلانُ  
مذمومٌ - وفي ذلك الكتابُ منهاجٌ جيدٌ -

(ج) ذلك الرجلُ مشغولٌ بالقدرةِ هذا دكانُ  
الفاكهاني - فيه كلُّ قسمٍ من الفاكهةِ -  
وهو واقفٌ على الأرض - أنا مسلمٌ وهو  
الضامسُ - الشمكُ في الماءِ - أنت طويلٌ  
هو قصيرٌ - اللعِبُ ضارٌّ ورتيٌّ والعلمُ مفيدٌ -

Q2) Translate and explain any five Verses of the following Poem:

[10]

قَتَعُوا دَنَا — دِينَ الْبِرِّ  
أَنْ نَمَسَحَهُمْ — بِيَدِ الْيُسْرِ  
مَرَّامَرًا — مُسَدَى الْخَيْرِ  
كُنْ مَعْرَانًا — لِلْمُضْطَرِّ  
وَأَرْحَمَ لَعْنَمِ — خَيْرِ الْأَجْرِ  
عَيْدِ الْفَطْرِ — عَيْدِ الْبِرِّ

Q3) Answer in Arabic any five of the following:

[10]

- (١) هل أنت صغيّر؟
- (٢) كيف الزهر؟
- (٣) أي حيوان طويل؟
- (٤) ما ذالك؟
- (٥) هل الفأر كبير؟
- (٦) أنت؟
- (٧) أين هو؟

Q4) Write the letter in Arabic to the Bank Manager or Company Manager.

[10]

الكتب الرسالة في العربية الى  
مدير البنك أو مدير الشركة



Total No. of Questions : 4]

SEAT No. :

**P1046**

**[5017]-2035**

[Total No. of Pages : 2

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

**BIOTECHNOLOGY**

**Voc Biotech-221:Plant and Animal Tissue Culture**

**(2008 & 2013 Pattern) (Semester - II) (Paper - I)**

*Time : 2 Hours]*

*[Max. Marks : 40*

*Instructions to the candidates:*

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

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

**[10]**

- a) Define Anchorage dependent cell lines.
- b) What is the difference between MEM and DMEM medium?
- c) Why surface sterilisation is not carried out in ATC?
- d) How cell separation is key in cell culture establishment?
- e) Give two examples of cell line.
- f) Define Organogenesis.
- g) How rooting and shooting growth is controlled by auxin conc?
- h) Why meristematic tissue is used as explants in PTC?
- i) Give the role of light intensity in incubation room of PTC.
- j) Enlist important applications of plant tissue culture.

**Q2)** Attempt any two of the following:

**[10]**

- a) Comment on secondary metabolite production by using plant tissue culture.
- b) How cells undergo transformation? Explain with suitable graph.
- c) Describe different steps of surface sterilisation in plant tissue culture.

**P.T.O.**

**Q3)** Write short notes on any two of the following.

**[10]**

- a) M.S medium in PTC.
- b) Warm trypsinisation.
- c) Cell line characterisation.

**Q4)** How will you multiply banana plantlets with the help of plant tissue culture?  
Explain in detail.

**[10]**

OR

What is organ culture? Explain various methods of organ culture.





Total No. of Questions : 4]

SEAT No. :

**P1047**

**[5017]-2036**

[Total No. of Pages : 2

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

**INDUSTRIAL CHEMISTRY**

**VOC- 221:Unit Processes in Organic Industries**

**(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.*
- 3) *Draw neat diagrams wherever necessary.*

**Q1)** Give balanced equations with conditions for the following reactions/  
conversions. **[16]**

- a) Benzene  $\rightarrow$  Nitrobenzene.
- b) Acetanilide  $\rightarrow$  p-Nitroacetanilide.
- c) Cellulose  $\rightarrow$  Cellulose acetate.
- d) Acetic acid  $\rightarrow$  Monochloroacetic acid.
- e) Nitrobenzene  $\rightarrow$  Aniline.
- f) Toluene  $\rightarrow$  Benzoic acid.
- g) Chlorobenzene  $\rightarrow$  Aniline.
- h) Ethyl benzene  $\rightarrow$  Styrene.

**Q2)** Attempt any two of the following:

**[8]**

- a) Nitration of nitrobenzene gives m- Dinitrobenzene. Explain.
- b) Write a note on Friedel Craft alkylation.
- c) Discuss the mechanism of sulphonation of benzene.

**P.T.O.**

**Q3)** Answer any two the following: **[8]**

- a) What is oxidation? What are the different oxidising agents used?
- b) Write a short note on esterification process.
- c) Describe in brief the manufacture of Chloral.

**Q4)** Describe the synthesis of vinyl acetate from acetylene with the help of flow sheet diagram. **[8]**

OR

Describe the synthesis of ethyl benzene with the help of flow sheet diagram.



Total No. of Questions : 4]

SEAT No. :

**P2205**

**[5017]-2037**

[Total No. of Pages : 2

**S.Y. B.Sc.**

**PHOTOGRAPHY AND AUDIO-VISUAL PRODUCTION (Vocational)**

**Colour Photography  
(Semester-II) (Paper-III)**

*Time : 2 Hours]*

*[Max. Marks : 40*

*Instructions to the candidates:*

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

**Q1)** Answer in short:

**[16]**

- a) Draw a black body radiation curve. Mention what information it provides.
- b) If you do not set appropriate white balance, what will be the effect on the image you shoot?
- c) Colour temperature of overcast sky is 8000 Kelvin. Convert it to mired.
- d) What is the effect of sky light on a photographic image?
- e) What is chromaticity of a colour?
- f) Two light sources A and B have colour temperatures of 3200 K & 3400 K respectively. Which of them will be bluer? Why?
- g) Why do you need filters in photography?
- h) Draw a diagram and explain the difference between reflection from a glossy and a matte surface.

**Q2)** Attempt Any Two of the following:

**[8]**

- a) Explain how polarizing filter is useful in photography.
- b) Draw a labelled diagram and explain the cross section of a digital sensor.
- c) Discuss the importance of 'histogram' in digital photography.

**P.T.O.**

**Q3)** Write short notes on Any Two of the following: [8]

- a) Colour wheel.
- b) Use of polarizing filter in photography.
- c) Hard and soft light sources.

**Q4)** Attempt Any One of the following: [8]

- a) You are asked to shoot a cosmetic product. The image will be used in hoardings to be displayed in a metropolitan city. Draw a sketch and show the lighting plan you will use. Clearly mention the type and the purpose of various lights you will be using.
- b) Draw a suitable sketch and explain the concept of photographic composition. Which elements of composition do you think are important in your sketch? Why are they important?



Total No. of Questions : 4]

SEAT No. :

**P1048**

**[5017]-2038**

[Total No. of Pages : 2

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

**ELECTRONIC EQUIPMENT AND MAINTENANCE - I**  
**VOC- EEM- 221: Troubleshooting Electronic Equipments -B**  
**(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.*
- 3) *Draw neat diagrams wherever necessary.*

**Q1)** Answer all of the following:

- a) State the function of logic clip. [1]
- b) What do you mean by COB? [1]
- c) Write the use of chip size code. [1]
- d) What is the difference between conductive and connective method of removing surface mount components? [1]
- e) List the packaging types of ICS. [2]
- f) Test signal should not be applied while power is off ! State true or false. [2]
- g) Give the name of tool used to check tristate buffer. [2]
- h) State the advantages of SMPS over linear regulators. [2]

**Q2)** Attempt any two:

- a) How would you identify an IC. [4]
- b) What is surface mount technology? Why it is popular? State the advantages of the same. [4]
- c) With the help of suitable diagram discuss three pm regulator and it's troubleshooting. [4]

**P.T.O.**

**Q3)** Attempt any two:

- a) Write a note on logic pulsar. [4]
- b) Explain in detail flat pack & quad pack. [4]
- c) Explain the working of SMPS with block diagram. [4]

**Q4)** a) Explain in detail the troubleshooting process of power supply. [6]

- b) Discuss the preliminary steps involved in fault diagrams of oscilloscope. [6]

OR

- a) Discuss the working of logic comparator. [4]
- b) Write a note on packaging of passive surface mount components. [4]
- c) Explain what is high voltage DC supply? How it is constructed? [4]



Total No. of Questions : 4]

SEAT No. :

**P1049**

**[5017]-2039**

[Total No. of Pages : 2

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

**COMPUTER HARDWARE & NETWORK ADMINISTRATION**

**Microprocessor & Interfacing Techniques - II**

**( Paper-I ) (New Course 2013) (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.*

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

- i) What is Android?
- ii) What is the function of Sound Card?
- iii) What is MPEG?
- iv) State advantages of Laser printer.

**b) Attempt the following: (4×2=8)**

- i) What is scanner? State types of scanner.
- ii) What is the function of Ethernet card?
- iii) State advantages and disadvantages of serial communication.
- iv) State the minimum requirements for a Multimedia PC.

**Q2) Attempt any Two of the following: (2×4=8)**

- a) Write a short note on display adaptors.
- b) Explain the features and applications of Bluetooth..
- c) Write a short note on remote desktop sharing tools.

**P.T.O.**

**Q3)** Attempt any Two of the following:

**(2×4=8)**

- a) Explain the concept of speech recognition in brief.
- b) What is BIOS? Explain the important functions of BIOS.
- c) Explain in brief the optical disk data storage devices.

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

**(2×6=12)**

- a) Describe the working of a device controller with the help of block diagram.
- b) What is Network? State advantages of Network. Explain features of LAN.
- c) What is Green PC? State advantages of Green PC.





Total No. of Questions : 4]

SEAT No. :

**P1050**

**[5017]-2040**

[Total No. of Pages : 2

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

**SEED TECHNOLOGY**

**VOC- SETE - 221:Vegetable Seed Production**

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

*Time : 2 Hours]*

*[Max. Marks : 40*

*Instructions to the candidates:*

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

**Q1)** Answer the following:

**[10]**

- a) Define fertilization.
- b) What is cytoplasmic genetic male sterility.
- c) What is stigma receptivity.
- d) Define pedigree selection.
- e) Give the isolation distance for Bitter gourd.
- f) Which type of bed is required for raising Tomato seedlings.
- g) What is seed storage?
- h) Give any two objectives of population improvement.
- i) Define hybridization.
- j) Enlist different methods employed in population improvement.

**Q2)** Answer any Two of the following:

**[10]**

- a) Give the classification of vegetable crops based on part used for consumption.
- b) Comment on vegetative reproduction.
- c) Explain the process of megasporogenesis.

**P.T.O.**

**Q3)** Write notes on (any two):

**[10]**

- a) Genetic Male sterility.
- b) Mass selection.
- c) Bulk method.

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

OR

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.



Total No. of Questions : 4]

SEAT No. :

**P1051**

**[5017]-2041**

[Total No. of Pages : 2

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

**INDUSTRIAL MICROBIOLOGY**

**VOC.IND.MIC-221: Microbial Fermentations & Downstream Processing  
(Paper-I) ( 2013 Pattern) (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) *All questions carry equal marks.*
- 4) *Draw neat labelled diagram wherever necessary.*

**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 semisynthetic penicillin.
- b) Write the role of antifoam agent.
- c) Give one example of fermentation product produced by two step process.
- d) State whether the statement is true or false. 'Amylase is an endo as well as exo enzyme'.
- e) Write another name for 4% acetic acid solution.
- f) State any two uses of glutamic acid.
- g) Name any two organisms used for commercial production of penicillin G.
- h) What is the purpose of using filter aids?
- i) Fill in the blank.

Gel permeation chromatography is used for the separation & purification of the product on the basis of \_\_\_\_\_

- j) What is meant by 'formulation' with reference to a pharmaceutical product.

**P.T.O.**

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

- a) Enlist the types of batch 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 ion exchange chromatography.
- c) Draw a flow chart for production of semisynthetic penicillin.

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

- a) Biochemistry of vinegar production.
- b) Crystallisation as recovery step.
- c) Dual fermentation.

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

- a) With the help of flow chart describe the production of cheese.
- b) Describe different types of drying process as final step of manufacturing of fermentation product.



Total No. of Questions : 4]

SEAT No. :

**P1052**

[5017] - 2042

[Total No. of Pages :1

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

**INDUSTRIAL CHEMISTRY**

**Voc: 222 : Industrial Pollution**

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

*Time : 2 Hours]*

*[Max. Marks : 40*

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

**Q1)** Answer the following : **[16]**

- a) Define and explain BOD.
- b) What is the unit used for measurement of noise level?
- c) Write two hazards of pesticide pollution.
- d) What is acid rain?
- e) Explain 'Lagooning'.
- f) Write the chemical constituents of 'London smog'.
- g) Explain the term 'electrodialysis'.
- h) What is the importance of ozone in atmosphere?

**Q2)** Answer Any two of the following: **[8]**

- a) Write a note on nitrogen cycle.
- b) Distinguish between coagulation and peptization.
- c) Explain the hazards of CO (carbon monoxide) pollution.

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

- a) Write a short note on "Biodegradation of Pesticides".
- b) What is meant by thermal pollution? How it affects aquatic life?
- c) Explain in detail "Tannery waste".

**Q4)** Explain the process of dewatering of sludge in sludge treatment **[8]**

OR

Write notes on ultrafiltration and electrodialysis.



Total No. of Questions : 4]

SEAT No. :

**P1053**

**[5017]-2043**

[Total No. of Pages : 2

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

**BIOTECHNOLOGY**

**Voc.Biotech-222:Immunology and Medical Microbiology**

**(2013 Pattern) (Semester-II) (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) *All questions carry equal marks.*
- 4) *Draw diagrams wherever necessary.*

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

**[10]**

- a) What are toxoids?
- b) Name the secondary lymphoid organs.
- c) What are the types of acquired immunity.
- d) Define hapten.
- e) What is widel test?
- f) Give difference between primary and secondary immune response.
- g) What is complement fixation test?
- h) What are the types of T - cells?
- i) Name the etiological agent of polio.
- j) Name two pathogenic viruses.

**Q2)** Answer any TWO of the following.

**[10]**

- a) What are Autoimmune diseases? Explain it with the help of examples.
- b) Define vaccines. Describe the types of vaccines.
- c) Define hypersensitivity. Describe the types of hypersensitivity.

**P.T.O.**

**Q3)** Write short notes on any TWO of the following.

**[10]**

- a) ELISA
- b) IgE
- c) Thymus.

**Q4)** Describe in detail the role of B and T lymphocytes in immune response. **[10]**

OR

Name the etiological agent of syphilis. Describe the morphology and characteristics of etiological agent of syphilis. Add a note on VDRL test.

✓ ✓ ✓

Total No. of Questions : 4]

SEAT No. :

**P2206**

**[5017]-2044**

[Total No. of Pages : 2

**S.Y. B.Sc.**

**PHOTOGRAPHY AND AUDIO-VISUAL PRODUCTION (Vocational)**  
**Principles & Applications of Analog and Digital Communications**  
**(Semester-II) (Paper-IV)**

*Time : 2 Hours]*

*[Max. Marks : 40*

*Instructions to the candidates:*

- 1) *All questions are compulsory.*
- 2) *Draw neat and labelled 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) Timing error is reduced due to synchronization.
  - ii) Serial transmission is faster transmission.
- b) Comment on the following statements. [4]
  - i) SSB generation is preferred over DSB.
  - ii) FSK is normally used in MODEM.
- c) Attempt the following: [6]
  - i) For a binary PCM system, the number of bits per transmitted word is 8 and the sampling frequency  $f_s = 8$  kHz. Calculate the
    - 1) bit rate and
    - 2) baud rate
  - ii) Six message signals each of BW 5 kHz are Time Division Multiplexed and transmitted. Calculate:
    - 1) Signaling rate
    - 2) Minimum channel BW of the PAM/TDM Channel.

**P.T.O.**



**Q2) Attempt Any Two of the following: [8]**

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

**Q3) Attempt Any Two of the following: [8]**

- a) Explain the Shanon's theorem on the Channel Capacity. What is the importance of Channel Bandwidth?
- b) Compare the FM and AM Systems.
- c) What is PAM? Explain the Generation of PAM with diagram.

**Q4) Attempt Any Two of the following numericals: [12]**

- a) A calculate the Carrier Swing, frequency deviation and modulation Index of FM signal which reaches a maximum frequency of 99.05 MHz and minimum frequency of 99.03 MHz. The frequency of modulating signal is 6 KHz.
- b) The rms antenna current from an AM transmitter measures by 15% over its unmodulated value when sinusoidal modulation is applied, Determines the m.
- c) A FM wave is represented by the following equation,
  - i)  $V = 10 \sin [5 \times 10^8 t + 41250t]$ .
  - ii) Find:
    - 1) Carrier and modulating frequencies.
    - 2) Modulation index and maximum deviation.
    - 3) The power dissipated by this FM wave in 5 ohm resistor.

OR

**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 : 4]

SEAT No. :

**P 1054**

**[5017] - 2045**

[Total No. of Pages :2

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

**ELECTRONIC EQUIPMENT MAINTENANCE - I**

**Audio, Video & Office Equipment - B**

**(2013 Pattern) (Semester - II) (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 diagrams wherever necessary.*

**Q1)** Answer the following :

- a) State various output devices. **[1]**
- b) What is barcode? **[1]**
- c) What type of lamp is used in LCD projector? **[1]**
- d) What is motherboard of PC? **[1]**
- e) State types of memories used in computer. **[2]**
- f) Give typical specifications of PC. **[2]**
- g) State common faults in PC. **[2]**
- h) State the advantages of EPABX System. **[2]**

**Q2)** Answer any two of the following:

- a) Explain the working of Flat bed Scanner. **[4]**
- b) Discuss the construction of PC keyboard in brief. **[4]**
- c) Explain the operating principle of dot matrix printer. **[4]**

**P.T.O.**

**Q3)** Answer any two of the following:

- a) State any four advantages of LCD monitor over CRT monitor. [4]
- b) Write a short note on Rolling display. [4]
- c) Give the construction of LASER printer. [4]

**Q4)** Answer the following:

- a) Describe the architectural features of microprocessor used in PC. [6]
- b) Explain the working of photo copier machine with the help of neat diagram. [6]

OR

**Q4)** Answer the following:

- a) Explain the concept of multimedia. Discuss the role of Software in development of multimedia. [6]
- b) List different types of projectors. Explain the working of any one of them. [6]



Total No. of Questions : 4]

SEAT No. :

**P 1055**

**[5017] - 2046**

[Total No. of Pages :2

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

**COMPUTER HARDWARE & NETWORK ADMINISTRATION**

**Computer System Management - II**

**(2013 Pattern -) (New Course) (Semester -II) (Paper-II)**

*Time : 2 Hours]*

*[Max. Marks : 40*

*Instructions to the candidate :*

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

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

- i) List various utility softwares used in PC.
- ii) What is a flash memory?
- iii) List various Bluetooth devices that can be interfaced to a computers system.
- iv) What is android?

**b) Attempt the following: [4×2=8]**

- i) What is the function of Mainframe?
- ii) List any four types of user.
- iii) What is client-server?
- iv) List any four application softwares you know.

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

- a) Explain in brief installation procedure of printer.
- b) What is segregation of duties?
- c) Write a note on maintenance and disposal of storage media.

**P.T.O.**

**Q3)** Attempt any two of the following:

**[2×4=8]**

- a) Explain in brief the need of upgrading a PC.
- b) List various network devices and explain any one in brief.
- c) Write a note on network operations.

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

**[2 × 6 = 12]**

- a) List various components of a desktop system. Explain in detail assembly Procedure of a desktop PC.
- b) What do you mean by portable devices? State features of BlackBerry and iPhone devices.
- c) List various resources that can be shared in a network. Explain LAN controls in brief.



Total No. of Questions : 4]

SEAT No. :

**P 1056**

**[5017] - 2047**

[Total No. of Pages :2

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

**SEED TECHNOLOGY**

**Voc - SETE- 222: Seed Quality Control**

**(2013 Pattern) (New) (Semester - II) (Paper - IV)**

*Time : 2 Hours]*

*[Max. Marks : 40*

- Instructions :*
- 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 Breeder seed.
- b) What are off type plants?
- c) Write any one objective of field Inspection.
- d) Draw any one walking pattern in field inspection.
- e) How many members comprise central seed certification board.
- f) Enlist types of seed legislations.
- g) What are Biofertilizers?
- h) Give any one name of state seed certification agency.
- i) Write any one duty of seed inspector.
- j) What are trap crops?

**Q2)** Answer any two of the following:

[10]

- a) Explain the powers of seed inspector.
- b) Comment on any one type of seed legislation.
- c) Give an account on green manuring.

**P.T.O.**

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

- a) State seed testing laboratory.
- b) General seed certification standards.
- c) Phases of seed certification.

**Q4)** Describe in detail the classes of seed. **[10]**

OR

Give an account of techniques employed in field inspection with suitable example.



Total No. of Questions : 4]

SEAT No. :

**P1057**

**[5017]-2048**

[Total No. of Pages : 2

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

**INDUSTRIAL MICROBIOLOGY**

**VOC-IND-MIC-222: Quality Assurance for Industrial Fermentation Product**

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

*Time : 2 Hours]*

*[Max. Marks : 40*

*Instructions to the candidates:*

- 1) *All questions carry equal marks.*
- 2) *All questions are compulsory.*
- 3) *Draw neat labelled diagrams 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 'Potency' of pharmaceutical product.
- b) State two test to asses quality of packeaged drinking water.
- c) "Back mutants are able to grow on medium containing histidine in ames test' (T/F)
- d) State difference between 'Quality Assurance' and 'Quality control'.
- e) What is chromatogram?
- f) Acceleration factor such as \_\_\_\_\_ are applied to the product to attempt to increase the rate at deterioration.
- g) \_\_\_\_\_ is naturally occuring mutagenic product produced by Aspergillin flarus.
- h) State the role of pharmacopeia.
- i) Define 'Pyrogen'
- j) Cetrimide agar is used for testing \_\_\_\_\_ bacteria.

**Q2)** Answer any Two of the following.

**[10]**

- a) How is LAL test done?
- b) How are the results of 'Ames test' analysed'.
- c) Compare real time vs accelerated self life studies.

**P.T.O.**



**Q3)** Answer any Two of the following. **[10]**

- a) Describe any two methods performed for purity analysis of product.
- b) How is pyrogen testing done?
- c) Describe the growth promoting properties of media for testing specified microorganism with the help of example.

**Q4)** Answer any One of the following. **[10]**

- a) Explain any one growth promotion assay for testing potency of product.
- b) Describe various microbial enumeration test for testing product.

✓   ✓   ✓

Total No. of Questions : 4]

SEAT No. :

**P1058**

**[5017]-2049**

[Total No. of Pages : 2

**S.Y.B.Sc.**

**MATHEMATICS**

**MT - 222(B) : Numerical Methods and It's Applications  
(2013 Pattern) (Semester - II) (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 calculator is allowed.*

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

**[10]**

- a) An approximate value of  $e$  is 2.7195518 and it's true value is given by  $x = 2.71821828$ . Find relative error.
- b) Round - off the following numbers to four decimal places 3.3465827, 5.375829, 54.2549757, 0.00457328.
- c) Construct a forward difference table from the following tabulated function

$x$	0	1	2	3	4	5
$y = f(x)$	12	15	20	27	39	52

- d) Prove that  $E = 1 + \Delta$ , where  $\Delta$  is forward difference operator and  $E$  is shift operator.
- e) State Newton's formula for backward interpolation.
- f) State Simpson's  $\frac{1}{3}$ <sup>rd</sup> rule for numerical integration.
- g) Given that  $\frac{dy}{dx} - \sqrt{xy} = 2$  with  $y(1) = 1$  find  $y(1.5)$  by Euler's method (Take  $h = 0.5$ . Perform one iteration).

**P.T.O.**

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

- a) Prove that  $n^{\text{th}}$  difference of a polynomial of degree  $n$  in  $x$  are constant when the values of independent variables are at equal intervals.
- b) Find the root of the equation  $x^2 - 5x + 3 = 0$  using bisection method.
- c) Using Newton - Raphson method find approximate root of the equation  $x^3 - x - 4 = 0$ .

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

- a) State and Prove Newton's general interpolation formula.
- b) Obtain  $y(8)$  for the data given below using Newton's forward interpolation formula.  $y(1) = 24, y(3) = 120, y(5) = 336, y(7) = 720$ .
- c) Using the principle of least squares, obtain a suitable linear fit to the following data:

$x$	1	2	3	4	5
$y$	14	27	40	55	68

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

- a)
  - i) State general quadrature formula and hence derive Trapezoidal rule for numerical integration.
  - ii) By using Runge - Kutta fourth order formula find  $y(1)$  if  $\frac{dy}{dx} = \frac{x^2 + y^2}{10}, y(0) = 1$ . Take  $h = 1$ .

- b)
  - i) Find the value of  $\int_0^6 \frac{1}{\sqrt{x+1}} dx$  by Simpson's  $\frac{3^{\text{th}}}{8}$  rule with 6 strips.

- ii) Given that the differential equation

$\frac{dy}{dx} = x^2 + y, y(0) = 1$ . Determine  $y(0.01)$  by modified Euler's method. (Take  $h = 0.01$ ).

