

Total No. of Questions :4]

SEAT No. :

P178

[Total No. of Pages :2

[5422] - 201

S.Y.B.Sc. (Regular)

MATHEMATICS

MT-221 : Linear Algebra

(2013 Pattern) (Semester - II) (Paper - I) (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) Let $W = \{(x, y, 1) \mid x, y \in R\}$. Is W a subspace of R^3 ? Justify.
- b) Show that the set $W = \{(1, 2), (2, 1)\}$ is linearly independent.
- c) Find the coordinate vector of $\bar{v} = (1, 1)$ relative to the basis $S = \{(2, -4), (3, 8)\}$ of R^2 .
- d) Let $\bar{v} = (1, 2, 1)$ and $\bar{u} = (2, 1, 2)$, find the orthogonal projection of \bar{v} along \bar{u} .
- e) If $(a, 2)$ and $(2, 3)$ are orthogonal vectors in R^2 then find the value of a .
- f) If $T : R^3 \longrightarrow R^2$ is given by $T(x, y, z) = (x - y, x - z)$ then find nullity of T .
- g) Let $T : R^2 \longrightarrow R^2$ be a linear transformation defined by $T(x, y) = (x + y, x - y)$. Find the matrix of T with respect to the standard basis of R^2 .

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

- a) Let V be a vector space over field F . Then for any $\bar{u} \in V$ and $\alpha \in F$, prove that
 - i) $0 \cdot \bar{u} = \bar{0}$, $0 \in F$
 - ii) $\alpha \cdot \bar{0} = \bar{0}$
 - iii) $(-1) \cdot \bar{u} = -\bar{u}$

P.T.O.

- b) Show that the set $S = \{(1, 2, 1), (2, 1, 0), (1, -1, 2)\}$ forms a basis for \mathbb{R}^3 .
- c) Find domain, codomain of $T_2 \circ T_1$ and compute $(T_2 \circ T_1)(x, y, z)$ if $T_1(x, y, z) = (x - y, y + z, x - z)$ and $T_2(x, y, z) = (0, x + y + z)$.

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

- a) State and prove Cauchy-Schwarz inequality.
- b) Consider the basis $S = \{\bar{v}_1, \bar{v}_2, \bar{v}_3\}$, where $\bar{v}_1 = (1, 1, 1)$, $\bar{v}_2 = (1, 1, 0)$, $\bar{v}_3 = (1, 0, 0)$ and let $T : \mathbb{R}^3 \longrightarrow \mathbb{R}^3$ be linear operator such that $T(\bar{v}_1) = (2, -1, 4)$, $T(\bar{v}_2) = (3, 0, 1)$, $T(\bar{v}_3) = (-1, 5, 1)$. Find formula $T(x, y, z)$ and use it to compute $T(2, 4, -1)$.
- c) Let $T : \mathbb{R}^2 \longrightarrow \mathbb{R}^2$ be multiplication by A . Determine whether T has an inverse, if so find $T^{-1}\left\langle \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} \right\rangle$, if $A = \begin{bmatrix} 1 & 1 \\ 1 & 0 \end{bmatrix}$.

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

- a) Let \mathbb{R}^3 have Euclidean inner product. Use Gram - Schmidt process to transform the basis $B = \{(1, 1, 1), (-1, 1, 0), (1, 2, 1)\}$ into an orthonormal basis.
- b) i) Let $S = \{\bar{v}_1, \bar{v}_2, \bar{v}_3, \bar{v}_4, \dots, \bar{v}_r\}$ be the set of vectors in \mathbb{R}^n . It $r > n$, then show that S is linearly dependent.
- ii) Let $\mathbb{R}^4 \longrightarrow \mathbb{R}^3$ be the linear transformation given by the formula $T(x_1, x_2, x_3, x_4) = (4x_1 + x_2 - 2x_3 - 3x_4, 2x_1 + x_2 + x_3 - 4x_4, 6x_1 - 9x_3 + 9x_4)$
Which of the following vectors are in $\ker(T)$?
- i) $(3, -8, 2, 0)$
- ii) $(0, 0, 0, 1)$
- iii) $(0, -4, 1, 0)$



Total No. of Questions : 4]

SEAT No. :

P179

[5422]-202

[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 $\vec{f}(t) = e^{-t} \cos t \vec{i} + e^{-t} \sin t \vec{j} + e^{-t} \vec{k}$, if $t \neq 0$ then find $\vec{f}(0)$ so that $\vec{f}(t)$ is continuous at $t = 0$.
- b) If $\vec{r}(t) = 3 \cos t \vec{i} + 3 \sin t \vec{j} + t^2 \vec{k}$ is the position of a particle in space at time t , find the particle's velocity and acceleration vectors.
- c) Find the unit tangent vector of the curve
 $\vec{r}(t) = e^{-t} \vec{i} + 2 \cos 3t \vec{j} + 2 \sin 3t \vec{k}$, at $t = 0$.
- d) State Gauss divergence theorem.
- e) Find parametrization of the sphere, $x^2 + y^2 + z^2 = a^2$.
- f) Evaluate $\int_C \vec{F} \cdot d\vec{r}$ for the vector field, $\vec{F} = y\vec{i} - x\vec{j}$, counter clockwise along the circle $x^2 + y^2 = 1$ from $(1, 0)$ to $(0, 1)$.
- g) Find curl of $\vec{f} = x^2 y \vec{i} + 2y^3 z \vec{j} + 3z \vec{k}$.

Q2) Attempt any two of the following:

[10]

- a) Show that a differentiable vector function $\vec{u}(t)$ of a scalar variable 't' is of constant magnitude if and only if $\vec{u} \cdot \frac{d\vec{u}}{dt} = 0$.
- b) Find the work done by $\vec{F} = xy\vec{i} + y\vec{j} - yz\vec{k}$ over the curve
 $\vec{r}(t) = t\vec{i} + t^2\vec{j} + t\vec{k}$, $0 \leq t \leq 1$.

P.T.O.

- c) By using parametrization, find the surface area of the cone
 $z = \sqrt{x^2 + y^2}, 0 \leq z \leq 1.$

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

- a) Let \bar{u}, \bar{v} and \bar{w} be differentiable vector functions of 't'. Then prove that

$$\frac{d}{dt} [\bar{u} \bar{v} \bar{w}] = \left[\frac{d\bar{u}}{dt} \bar{v} \bar{w} \right] + \left[\bar{u} \frac{d\bar{v}}{dt} \bar{w} \right] + \left[\bar{u} \bar{v} \frac{d\bar{w}}{dt} \right]$$

Hence find $\frac{d}{dt} [\bar{r} \dot{\bar{r}} \ddot{\bar{r}}]$, where $\dot{\bar{r}} = \frac{d\bar{r}}{dt}$ and $\ddot{\bar{r}} = \frac{d^2\bar{r}}{dt^2}$.

- b) By Gauss divergence theorem, evaluate

$$\iiint_S (x^3 - yz) dy dz - 2x^2 y dz dx + z dx dy, \text{ where } S \text{ is a cube bounded}$$

by co-ordinate planes and planes $x = y = z = a.$

- c) Find the curvature of a circle of radius 'a'.

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

- a) State and prove Green's theorem in plane.
- b) i) Using stoke's theorem, calculate circulation of $\bar{F} = x^2 \bar{i} + 2x \bar{j} + z^2 \bar{k}$ around the ellipse $4x^2 + y^2 = 4$ in XY - plane, counter clockwise.
- ii) Show that $\bar{F} = 2xy \bar{i} + (x^2 - z^2) \bar{j} - 2yz \bar{k}$ is conservative vector field and find potential function for it.



Total No. of Questions :4]

SEAT No. :

[Total No. of Pages :2

P180

[5422] - 203

S.Y.B.Sc. (Regular)

MATHEMATICS

MT - 222 (B) : Numerical Methods & its Applications

(2013 Pattern) (Semester - II) (Paper - II (B)) (811B2)

Time : 2 Hours]

[Max. Marks :40

Instructions to the candidates:

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

Q1) Attempt any five of the following.

[10]

- a) If the approximate value of 2.013 is 2, find percentage error.
- b) State the formula for Aitken's Δ^2 process.
- c) Show that $\Delta - \nabla = \Delta \nabla$.
- d) State Lagrange's interpolation formula.
- e) Fit a straight line to the data:

x	1	-2	3
y	-1	2	-3

- f) State Simpson's $\frac{3}{8}$ th rule.
- g) Evaluate $\int_0^1 x^2 dx$ by trapezoidal rule taking $h = 0.5$.

Q2) Attempt any two of the following.

[10]

- a) Derive Newton's backward difference interpolation formula.
- b) Find the real root of the equation $x^2 - 2x + 1 = 0$ lying between 1 and 3 by Regula - Falsi method. (Use 4 iterations)
- c) Find a real root of the equation $x \sin x + \cos x = 0$ correct to three decimal places using Newton - Raphson Method. (Take $x_0 = 2.5$)

P.T.O.

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

- a) Derive general quadrature formula for equidistant ordinates. Hence derive trapezoidal rule.
- b) The temperature T (in $^{\circ}\text{C}$) and length l (in mm) of a heated rod is given below. Find the best values of a and b to fit the straight line $l = a + b T$ to the given data.

T	20°	30°	40°	50°	60°	70°
l	600.3	600.4	600.6	600.7	600.9	601.0

- c) Using Lagrange's interpolation formula, find $f(5)$ given that $f(1) = 2$, $f(2) = 4$, $f(3) = 8$, $f(4) = 16$, $f(7) = 128$.

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

- a) i) Compute the value of $\log 2$ from the formula $\log 2 = \int_1^2 \frac{1}{x} dx$ using Simpson's rule taking 10 subintervals.
- ii) Use Runge -Kutta method of second order to approximate y when $x = 0.1$ and $x = 0.2$, given that $x = 0$ when $y = 1$ and $\frac{dy}{dx} = x + y$.
- b) i) Estimate the value of $\int_1^{10} \frac{dx}{1+x}$ by using Simpson's $\frac{3}{8}$ th rule.
- ii) Given $\frac{dy}{dx} = 1 - y$ with $y(0) = 0$, find $y(0.2)$ using Euler's modified method. (Take $h = 0.1$)



Total No. of Questions :4]

SEAT No. :

[Total No. of Pages :3

P181

[5422] - 204

S.Y.B.Sc.

PHYSICS

PH- 221 : Oscillations, Waves and Sound

(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 necessar.*
- 4) *Use of log table and calculator is allowed.*

Q1) Attempt all of the following:

[10]

- a) State various types of equilibria.
- b) Define resonance in forced oscillations.
- c) What is reverberation of a hall?
- d) What are the applications of seismic wave study.
- e) Determine the quality factor of damped oscillator of mass 4 gm and angular frequency 31.4 radians/sec and damping constant $0.31 \frac{\text{dyne}}{\text{cm}^2}$.
- f) What is Doppler shift?
- g) Define wave motion.
- h) Write sabine's formula for reverberation time.
- i) Define log decrement.
- j) Determine the number of dots in stroboscopic disc illuminated by neon lamp, was making 10 revolutions/ sec. The Frequency of A.C. is 50 Hz.

P.T.O.

Q2) Attempt any two of the following:

- a) Using the equation for damped oscillatory displacement $x = a e^{-\frac{R}{2m}t} \sin(pt + \theta)$ show that logarithmic decrement is denoted by $\lambda = \frac{RT}{4m}$. [5]
- b) A particle is moving simple harmonically along a straight line. If it possesses velocities v_1 and v_2 at positions x_1 and x_2 from equilibrium positions, prove that the periodic time is $T = 2\pi \sqrt{\frac{x_2^2 - x_1^2}{v_1^2 - v_2^2}}$. [5]
- c) Describe Rayleigh disc method for the measurement of acoustic intensity level. [5]

Q3) Attempt any two of the following.

- a) The equation of forced oscillation of an oscillator is given by [5]

$$4\left(\frac{d^2x}{dt^2}\right) + 2\left(\frac{dx}{dt}\right) + 144x = 25 \sin qt$$

Determine

- i) The resonant frequency
ii) The quality factor
iii) Half width
- b) A particle is subjected to two perpendicular SHMs given by $x = 2 \sin(wt + \frac{\pi}{4})$ and $y = 25 \sin wt$. Find equation and nature of the path. [5]
- c) A capacitor of $0.4 \mu\text{f}$, an inductor of 8mH and a resistor of 400 ohms are joined in series with source of e.m.f. can the circuit be oscillatory. [5]

Q4) A) Attempt (a) or (b) of the following:

- a) i) What are Lissajous figures? Explain its demonstration using electrical method. [4]
ii) A person blowing a whistle is moving with a speed of 10 m/s towards a rocky hill. Determine the apparent rise in frequency of echo heard by a person due to reflection from the hill. Assume air at rest, speed of sound 330 m/s , and frequency of whistle sound 200 Hz . [4]

OR

- b) i) Set up the differential equation of motion for damped oscillations and obtain the general solution. [4]
- ii) Obtain an expression for the velocity of transverse waves on a stretched string. [4]
- B) Attempt any one of the following.
- a) What is Red shift in Doppler effect? How it supports the idea of expanding universe. [2]
- b) Set up the differential equation of motion of torsional pendulum.[2]



Total No. of Questions :4]

SEAT No. :

[Total No. of Pages :2

P182

[5422] - 205

S.Y.B.Sc.

PHYSICS

PH- 222 : Optics

(2013 Pattern) (New Course) (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 table and calculator is allowed.*

Q1) Attempt All of the following: (one mark each)

[10]

- a) Write the lens formula for a thin lens.
- b) State the types of monochromatic aberration.
- c) Determine the power of convex lens if focal length is 5cm.
- d) What are the uses of polaroid?
- e) What is Rayleigh's criterion?
- f) What is an eyepiece?
- g) 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.
- h) Why is the center of Newton's rings darks?
- i) What are the types of anisotropic crystals?
- j) What is the range of vision of normal eye?

P.T.O.

Q2) Attempt any Two of the following: (Five marks each) **[10]**

- a) Discuss the formation of interference fringes due to a wedge -shaped thin film. Obtain the formula for the path difference.
- b) Describe the construction of a Huygen's eyepiece and it's action. Can a cross-wire be used in a Huygen's eye-piece?
- c) Prove that for a combination of two thin lenses of focal lengths f_1 and f_2 separated by a distance x , the focal length of the combination is given

by,
$$\frac{1}{F} = \frac{1}{f_1} + \frac{1}{f_2} - \frac{x}{f_1 f_2}.$$

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

- a) How many orders will be visible if the wavelength of incident radiation be 5000 \AA and the number of lines on the grating be 2620 to an inch?
- b) A thin converging lens and a thin diverging lens are placed co-axially at a distance of 6 cm apart. If the focal length of each lens is 10cm, find
 - i) The equivalent focal length of combination of lenses and
 - ii) Position of the principal points.
- c) A concave lens made up of crown glass has radii of curvature 50 cm and 15cm. Find the longitudinal chromatic aberration for an object situated at infinity.

Q4) a) Attempt the following:

- i) Distinguish between Huygen's and Ramsden's eye-pieces. **[4]**
- ii) Discuss the phase change on reflection of light from boundary of denser medium on the basis of stokes' treatment. **[4]**

OR

- i) Show that longitudinal chromatic aberration is equal to product of dispersive power and mean focal length. **[4]**
 - ii) Distinguish between Interference and diffraction. **[4]**
- b) Attempt any one of the following.
- i) The Polarizing angle for air and transparent material is 60° . Calculate refractive index of material. What is the angle of refraction in the medium? **[2]**
 - ii) State the magnifying power of a simple microscope and sketch the ray diagram of simple microscope. **[2]**



Total No. of Questions : 6]

SEAT No. :

P183

[5422]-206

[Total No. of Pages : 3

S.Y. B.Sc.

CHEMISTRY

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

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

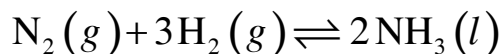
- 1) *All questions are compulsory.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right indicate full marks.*
- 4) *Use of calculator is allowed.*
- 5) *Answer to both sections should be written in same answer book.*

SECTION - I

(Physical Chemistry)

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

- a) Define Helmholtz free energy.
- b) Write equilibrium constant expression for the reaction.



- c) Define Molarity.
- d) State Henry's law.
- e) What is exothermic reaction?

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

- i) Derive the clapeyron equation.
- ii) Explain the working of fractionating column with the help of neat diagram.
- iii) Explain the term upper consolute and lower consolute temperature with suitable example.

b) Attempt any two of the following: **[4]**

i) Derive $\left[\frac{\partial G}{\partial T} \right]_p = -\frac{H}{T^2}$

- ii) Define the term Gibb's free energy. Give its physical significance.
- iii) Give different types of binary solution with examples.

P.T.O.

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

- a) 80 gms of Nitrogen compressed reversibly and isothermally at 30°C from 20 atm to 180 atm calculate the free energy change.

[R = 8.314 Joule mole⁻¹ k⁻¹, Atomic wt. of Nitrogen = 14]

- b) The vapour pressure of ethanol is 1.80×10^4 pascal at 40°C and 7.23×10^4 pascal at 70°C. Calculate molar heat of vaporization of ethanol.

[R = 8.314 Joule]

- c) A mixture of benzene and toluene contains 70% by weight of benzene. The vapour pressure of pure benzene is 1.575×10^4 N/m² and that of pure toluene is 4.892×10^3 N/m² at 30°C. Assuming that they form ideal solution. Calculate partial pressure of each constituent at 30°C.

[Given : Mol. wt. of benzene = 78 and toluene 92]

SECTION - II

(Analytical Chemistry)

Q4) Answer the following: [5]

- a) What is secondary standard substance?
- b) What is parts per billion?
- c) Define oxidising agent.
- d) What is Iodometry?
- e) Define End-Point.

Q5) A) Answer any two of the following: [6]

- a) What is calibration? How will you calibrate a burette?
- b) What is titration? Explain the titration curve for a strong base and a weak acid.
- c) What is starch indicator? How will you prepare 0.01N sodium thiosulphate.

(Mol. wt. of Na₂ S₂O₃ · 5H₂O = 248 gm)

- B) Answer any two of the following: [4]
- Give advantages and disadvantages of starch indicator.
 - Give the pH transition range and colour in acid form and base form for
 - Phenolphthalein
 - Bromophenol Blue
 - What is principle of potentiometry? Explain applications of potentiometric titrations.

Q6) Solve any two of the following: [5]

- How many ml of 0.2 N HCl are required to neutralise 50 ml of 0.1N NaOH?
- What is normality of a solution when 100 ml of 0.25 N NaOH mixed with 25 ml of 0.1 N NaDH?
- What is the pH of the solution which contains 2-1 millimoles of sodium formate and 10 millimoles of formic acid in 100 ml solution?
[$K_a = 1.7 \times 10^{-4}$].



Total No. of Questions : 6]

SEAT No. :

P184

[5422]-207

[Total No. of Pages : 3

S.Y. B.Sc. (Regular)

CHEMISTRY

**CH - 222 : Organic and Inorganic Chemistry
(2013 Pattern) (Semester - II) (Paper - II) (Theory)**

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Answer of the two sections should be written in same answer book.*

SECTION - I

(Organic Chemistry)

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

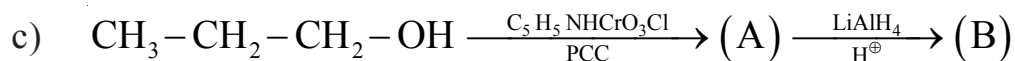
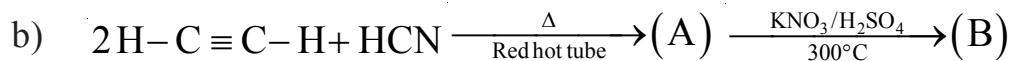
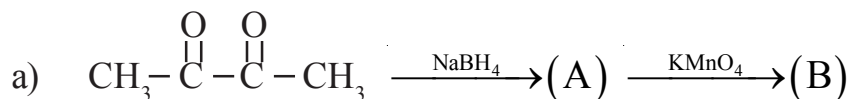
- a) What is reduction? Give one example of reducing agent.
- b) Define heterocyclic compounds. Give one example.
- c) Draw structure of sucrose.
- d) What is PCC? Give its one application.
- e) Define mutarotation.

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

- a) What are peracids? How are they prepared? Give one example.
- b) Give the synthesis of Furan. What is the action of following reagent on furan?
 - i) $\text{HNO}_3 / (\text{CH}_3\text{CO})_2\text{O}, 10^\circ\text{C}.$
 - ii) $\text{CH}_3 - \overset{\text{O}}{\parallel}{\text{C}} - \text{Cl} / \text{AlCl}_3$
- c) What are Carbohydrates? What is the action of following on glucose?
 - i) Br_2 Water
 - ii) H_2/Ni

P.T.O.

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



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

- What are α -amino acids? Discuss the classification of α -amino acids. Give example of each class.
- Distinguish between reducing agents, LiAlH_4 and NaBH_4 .
- What are proteins? Discuss the α -helical structure of proteins.

SECTION - II
(Inorganic Chemistry)

Q4) Answer the following: [5]

- Write the general electronic configuration of transition elements.
- How many bridge carbonyl present in $[\text{Fe}_2(\text{CO})_9]$.
- Define Acid-Base according to Arrhenious theory.
- Which disease is caused due to cadmium ion?
- What are protonic solvents?

Q5) A) Attempt any two of the following: [6]

- What are d-block elements? Explain the following properties of d-block elements.
 - Oxidation state
 - Colour
- Define EAN Rule. Find out number of valence electrons in the following metal carbonyls.
 - $\text{Ti}(\text{CO})_6$
 - $\text{Ni}(\text{CO})_4$(At. No. Ti = 22 and Ni = 28)
- Explain the concept of Acids and Bases according to Lewis theory. Give its merits and demerits.

- B) Attempt any two of the following: [4]
- Give the classification of toxic substances.
 - Explain the term 'Non-stoichiometry'.
 - What is conjugate Acid-Base pair? Explain with suitable example.

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

- Write a note on Biochemical effect of Mercury.
- Define paramagnetism. Calculate magnetic moment of Mn^{+2} and Cu^{+} by using spin - only formula.
(Atomic number of Mn = 25 and Cu = 29)
- Define π -acids. Draw the structure of $[Cr(CO)_6]$ and $[Fe_3(CO)_{12}]$



Total No. of Questions : 4]

SEAT No. :

P185

[5422]-208

[Total No. of Pages : 2

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.*

Q1) Answer the following:

[10]

- a) Enlist any two complex tissues.
- b) Give any two functions of collenchyma.
- c) What is epidermal tissue system?
- d) Define incompressibility.
- e) Give the components of phloem.
- f) Define embryology.
- g) Give the function of tapetum.
- h) Write an example of monosporic embryo sac.
- i) Define fertilization.
- j) What is endosperm?

Q2) Answer any two of the following:

[10]

- a) Describe the distribution of mechanical tissue in monocot stem.
- b) Describe the structure and functions of xylem.
- c) Explain the process of development of helobial endosperm.

P.T.O.

Q3) Write notes on (any two):

[10]

- a) Secondary growth in Annona stem.
- b) Mechanism of pollination.
- c) Structure of tetrasporangiate anther.

Q4) What is anomalous secondary growth? Describe the process of anomalous secondary growth in Bignonia and Dracaena stem. **[10]**

OR

What is embryo sac? Describe the development of monosporic embryo sac.



Total No. of Questions : 4]

SEAT No. :

[Total No. of Pages : 2

P186

[5422]-209

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.*

Q1) Answer the following:

[10]

- a) Define phytoextraction.
- b) What are transgenic plants?
- c) Enlist any two substrates used in fermentation.
- d) Give any two sources of SCP.
- e) What is gene cloning?
- f) Define biotechnology.
- g) Write any two properties of enzymes.
- h) What are nanofertilizers?
- i) Enlist any two transgenic plants.
- j) Write the principle of electrophoresis.

Q2) Answer any two of the following:

[10]

- a) Give an account of transgenics for storage protein quality.
- b) Give economic implications of SCP.
- c) Describe the structure of Ti plasmid.

P.T.O.

Q3) Write notes on (any two):

[10]

- a) Rhizofiltration.
- b) Watson and Crick model of DNA.
- c) Particle Bombardment Method.

Q4) What are enzymes? Describe production of Lipase and add a note on its applications. **[10]**

OR

What is bioreactor? Describe construction and working of stirred tank bioreactor.



Total No. of Questions : 4]

SEAT No. :

P187

[5422]-210

[Total No. of Pages : 2

S.Y. B.Sc. (Regular)

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) *Figures to the right indicate full marks.*
- 3) *Neat labelled diagrams must be drawn wherever necessary.*

Q1) Attempt the following:

[10]

- a) What is holobranch?
- b) What is Shagreen?
- c) What is homodont dentition?
- d) Define the term viviparous.
- e) Mention any two digestive glands in Scoliodon.
- f) What is the function of scrollvalve?
- g) Give an example of tearing and piercing beak.
- h) Give any two examples of non-poisonous snakes.
- i) Enlist any two cranial nerves in Scoliodon.
- j) Enlist any two eye ball muscles in Scoliodon.

Q2) Write short notes on (any two):

[10]

- a) Ampullae of Lorenzini.
- b) Egg laying mammals.
- c) Membranous labyrinth.

P.T.O.

Q3) Attempt the following: (any two)

[10]

- a) Sketch and label ventral view of brain of Scoliodon.
- b) Aquatic mammals.
- c) Desert adaptations in reptiles.

Q4) Describe the structure and working of heart of Scoliodon.

[10]

OR

What is migration? Give an account of different types of migrations in birds.



Total No. of Questions : 4]

SEAT No. :

[Total No. of Pages : 2

P188

[5422]-211

S.Y. B.Sc. (Regular)

ZOOLOGY

ZY - 222 : Applied Zoology - II

Apiculture and Sericulture

(Revised 2013 Pattern) (Semester - II) (Paper - II) (51522)

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 labelled diagrams must be drawn wherever necessary.*

Q1) Attempt the following:

[10]

- a) What is sericulture?
- b) Write the biological name of garden bee.
- c) Write the use of chopstick.
- d) What is queen excluder?
- e) Mention any two uses of bee venom.
- f) Write the biological name of muga silkworm.
- g) Write the use of hive tool.
- h) Mention any two bacterial diseases of silk worm.
- i) Mention the names of any two bee predators.
- j) What is multivoltine species?

Q2) Write short notes on (any two):

[10]

- a) Economic importance of honey.
- b) Honey extractor.
- c) Floor rearing method in sericulture.

P.T.O.

Q3) Attempt the following: (any two)

[10]

- a) Sketch and label - worker bee.
- b) Describe the leaf plucking method in sericulture.
- c) Describe bed cleaning methods in sericulture.

Q4) Describe morphology and life cycle of Mulberry Silk Worm.

[10]

OR

What is bee communication? Explain round dance and tail-wagging dance.



Total No. of Questions : 4]

SEAT No. :

[Total No. of Pages : 2

P189

[5422]-212

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 labelled diagrams must be drawn wherever necessary.*

Q1) Answer the following questions:

[10]

- a) Define metasomatism.
- b) Pegmatite.
- c) What are stress minerals?
- d) Soil.
- e) Define pyrometamorphism.
- f) Concretions.
- g) What is pneumatolytic metamorphism?
- h) What is cannel coal?
- i) What is mylonite?
- j) Enlist the equipments required for geological field study.

Q2) Write short notes on (any two):

[10]

- a) Ophitic and sub-ophitic texture.
- b) Authigenesis.
- c) Progressive changes in sediments during transport with respect to roundness.

P.T.O.

Q3) Write notes on (any two):

[10]

- a) Expansion cracks and reaction rims.
- b) Crystallisation of unicomponent magma.
- c) Graded bedding and its environmental significance.

Q4) What are biochemical deposits? Explain calcareous and phosphatic sedimentary deposits. **[10]**

OR

What is regional metamorphism? Explain its effects on argillaceous rocks.



Total No. of Questions : 4]

SEAT No. :

[Total No. of Pages : 2

P190

[5422]-213

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) *Figures to the right indicate full marks.*
- 3) *Neat diagrams must be drawn wherever necessary.*

Q1) Answer the following questions:

[10]

- a) Define stratigraphy.
- b) Name any two types of facial sutures in trilobites.
- c) Environmental significance of Dinoflagellates.
- d) What are Ostracods?
- e) Name any two suture lines in ammonoids.
- f) Systematic position of Radiolaria.
- g) Define Evolution.
- h) Spinosity of Trilobites.
- i) What are Diatoms?
- j) Name various laboratory techniques for separation of microfossils.

Q2) Write short notes on (any two):

[10]

- a) Chemical factors controlling stratification.
- b) Magnetostratigraphy.
- c) Use of lithological similarity and electrical logs in correlation.

P.T.O.

Q3) Explain the following: (any two)

[10]

- a) Lithostratigraphic Units.
- b) Varves.
- c) Mechanical well-logging

Q4) Define micropalaentology. State the branches of micropalaentology and Explain uses of microfossils. **[10]**

OR

Describe the morphology of spores. Add a note on palaeo ecological significance of spores.



Total No. of Questions : 4]

SEAT No. :

P191

[5422]-214

[Total No. of Pages : 3

S.Y. B.Sc.

STATISTICS

**ST - 221 : Statistical Methods and Use of R-Software
(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) *Use of scientific calculator and statistical tables is allowed.*
- 4) *Symbols and abbreviation have their usual meaning.*

Q1) Attempt each of the following:

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

i) If $3Y - 16X_1 + 12X_2 = 120$ is the equation of the regression plane

of Y on X_1 on X_2 then the value of $b_{YX_1.X_2}$ is equal to

- | | |
|--------------------|-------------------|
| a) -4 | b) 4 |
| c) $\frac{-16}{3}$ | d) $\frac{16}{3}$ |

ii) Type II error means:

- a) accepting H_0 when it is true
- b) accepting H_0 when it is false
- c) accepting H_1 when it is true
- d) accepting H_1 when it is false

iii) Population growth mainly depends on:

- | | |
|-------------------------|-----------------------|
| a) no. of female births | b) no. of male births |
| c) total no. of births | d) all the above |

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

- i) NRR can exceeds GRR.
- ii) When no. of arrivals have Poisson distribution, then interarrival service times follows exponential distribution.
- iii) Level of significance lies between 0 to 1.

c) Define Infant Mortality Rate (I.M.R.). **[1]**

d) Define the 'Customer' in queuing theory. **[1]**

e) Define Critical Region. **[1]**

f) Write the command in R-Software to draw a sample of size 10 from a population of 100 units by SRSWOR. **[1]**

P.T.O.

Q2) Attempt any two of the following:

[5 each]

- Derive the formula for the partial correlation coefficient $r_{yx_1.x_2}$ (ie $r_{12.3}$) in terms of total correlation coefficients.
- Describe the test procedure to test $H_0 : P_1 = P_2$ against the alternative $H_1 : P_1 \neq P_2$, where P_1 and P_2 are population proportions of two population. The sizes n_1 and n_2 of random samples, taken from these two populations, are large.
- Soft skill tests were taken for 5 persons before and after they were given a training. The scores before and after the training are as follows:

Scores (before)	42	58	38	61	72
Scores (after)	50	62	51	74	80

Write commands in R-software to carryout a appropriate test to check whether there is any effect on the scores after traing or not.

Q3) Attempt any two of the following:

[5 each]

- Explain a large sample test to test $H_0 : \mu_1 = \mu_2$ against $H_1 : \mu_1 < \mu_2$, where μ_1 and μ_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.
- From the following data, compute G.R.R. and M.R.R.

Age-group	Fertility rate per 1000 women	Percent survival rate
16-20	40.0	85
21-25	73.0	80
26-30	60.0	70
31-35	37.6	65
36-40	23.0	60
41-45	8.4	50
46-50	1.0	45

- A certain plant distributes its products by trucks. For this purpose trucks are loaded at the loading dock. The plant has own trucks and it also uses the trucks of a transport company. It is known that average arrival rate is 3 truck per hour and average service rate is 4 truck per hour. The transport company provides 40% of the total number of trucks. Assuming Poisson process, find
 - The probability that a truck has to wait.
 - The average waiting time of truck in queue.
 - Expected waiting time in queue for the trucks of transport company per day.

Q4) Attempt any one of the following:

- a) i) Derive the equation of regression plane of Y on X_1 and X_2 using the method of least squares. [6]
- ii) It is claimed that 10% of population is left handed. A sample of 1000 people is taken to test whether the proportion is 10% or less. If the sample contains 93 left handed, what would you conclude? Use 5% level of significance. [4]
- b) i) With usual notation, prove that [4]

$$(1 - R_{y.x_1x_2}^2) = (1 - r_{yx_1}^2)(1 - r_{yx_2.x_1}^2)$$

$$i.e. (1 - R_{1.23}^2) = (1 - r_{12}^2)(1 - r_{13.2}^2)$$

- ii) A company produces two types of tyres used for the trucks. Company collected the following information regarding their lives in miles.

Brand	A	B
Mean	26000	25000
Population S.D.	4200	2800
Sample size	100	100

Is the difference in their average life is significant? Use 5% l.o.s. Also obtain 95% confidence interval for $(\mu_1 - \mu_2)$. [6]



Total No. of Questions : 4]

SEAT No. :

P192

[5422]-215

[Total No. of Pages : 3

S.Y. B.Sc. (Regular)

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 random variable X has chi-square distribution with variance 4 then it's moment generating function is given by

i) $(1 - 2t)^{-1}$ ii) $(1 - 2t)^{-2}$

iii) $(1 - t)^{-1}$ iv) $(1 - t)^{-2}$

b) Suppose X_1, X_2, X_3, X_4, X_5 are independent and identically distributed $N(0, 1)$ variates then the probability distribution of

$$\frac{2X_5}{\sqrt{\sum_{i=1}^4 X_i^2}}$$
 is

i) χ_4^2 ii) χ_5^2

iii) t_4 iv) t_5

c) If $X \rightarrow F_{(8,8)}$ then mode of the distribution is

i) 8 ii) $\frac{1}{8}$

iii) $\frac{6}{10}$ iv) $\frac{10}{6}$

P.T.O.

- B) State whether each of the following statements is True or False: **[1 each]**
- If X and Y are two independent chi-square variates with 10 and 12 degrees of freedom (d.f.) respectively then mode of the distribution of $X + Y$ is 20.
 - The t -distribution with n d.f. is symmetric about 1.
 - If X_1, X_2, \dots, X_n from a random sample from $N(\mu, \sigma^2)$ then the distribution of \bar{X} is $N(\mu, n\sigma^2)$, where \bar{X} is sample mean.
- C) State the confidence interval for a population mean when population variance is unknown. **[1]**
- D) State additive property of chi-square distribution. **[1]**
- E) Explain the term “standard error of statistic”. **[1]**
- F) If a random variable F follows F -distribution with d.f. (4, 4) then state the value of it’s median. **[1]**

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

- Define chi-square distribution. Derive it’s moment generating function, hence find it’s mean.
- Define t -distribution. Find even ordered central moments (μ_{2r}) of t -distribution with n degrees of freedom.
- If X_1, X_2, \dots, X_{25} are the random sample from $N(5, 9)$ population then find $P [3.8 \leq \bar{X} \leq 5.6, 5.637 \leq S^2 \leq 11.951]$ where \bar{X} is sample mean and S^2 is sample variance.

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

- A random variable Y follows χ_{16}^2 distribution. Obtain
 - K such that $P [Y \leq K] = 0.05$
 - $P [11.152 \leq Y \leq 26.296]$
 - Median of Y
- Explain the test procedure for testing the equality of two population means when population variances are unknown and assuming they are equal. Also state 95% confidence interval for difference in population means.
- Define Snedecor’s F -distribution with n_1 and n_2 degree of freedom. Also find it’s mean and variance.

Q4) Attempt Any One of the following :

- A) a) Write a note on ‘McNemar’s test’. **[3]**
b) Explain the test procedure of paired t-test. Also give a real life situation where this test is applicable. **[4]**
c) Explain the following terms : **[3]**
i) Parameter
ii) Statistic
iii) Sampling distribution of statistic

- B) a) The table below gives the number of accidents that occurred in the certain factory on the various days of a particular week

Days of week	Sun	Mon	Tue	Wed	Thu	Fri	Sat
No. of accidents	6	4	9	7	8	10	12

Test whether the accidents are uniformly distributed over the different days, at 1% level of significance. **[5]**

- b) Life expectancy in 06 regions of India in 1950 and 08 regions of India in 1980 is as follows.

Regions	1	2	3	4	5	6	7	8
Life expectancy in 1950 (In years)	37	39	36	35	44	45	–	–
Life expectancy in 1980 (In years)	44	45	47	43	42	50	52	48

Test whether variability in life expectancy in 1950 is same as that in 1980. [Use 2% L.O.S.] **[5]**



Total No. of Questions : 4]

SEAT No. :

P193

[5422]-216

[Total No. of Pages : 2

S.Y. B.Sc.

GEOGRAPHY

**Gg-221:Geography of Resources-II
(2013 Pattern) (Paper - I) (Semester - II)**

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 and sketches wherever necessary.*
- 4) *Use of map stencils is allowed.*

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

- a) Name any four leading iron ore producing countries in the world.
- b) Name any four leading bauxite producing states in India.
- c) Name any two non-metallic minerals.
- d) Name the types of coal.
- e) Name any two natural gas producing countries in the world.
- f) What is meant by non-conventional energy resources?
- g) How do we calculate population density?
- h) Name the most densely populated states of India.
- i) What is land degradation?
- j) Write any two advantages of wind energy resources.
- k) Write any two uses of water resources.
- l) What is resource planning?
- m) Write any two needs of resource planning for Maharashtra.

P.T.O.

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

- a) Distribution of iron ore in India.
- b) Concept of over population.
- c) Role of land resource in economic development.
- d) Concept of resource planning.

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

- a) Give an account of distribution and production of bauxite in India.
- b) Significance of non-conventional energy resources.
- c) Give an account of distribution of population in India.
- d) Explain the need of resource planning.

Q4) Answer the following questions in 200 words (any-one) **[10]**

- a) Explain the distribution and production of coal in the world.
- b) Explain the role of water resources in economic development.



Total No. of Questions : 4]

SEAT No. :

P194

[5422]-217

[Total No. of Pages : 2

S.Y. B.Sc.

GEOGRAPHY

**Gg-222:Watershed Management-II
(2013 Pattern) (Paper - II) (Semester - II)**

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 and sketches wherever necessary.*
- 4) *Use of map stencils is allowed.*

Q1) Answer the following questions in two or three sentences each (Any Ten):**[10]**

- a) What is resource appraisal?
- b) Write any two benefits of survey.
- c) What is climatic data?
- d) Write any two importance of Watershed Planning.
- e) What is Watershed Planning?
- f) Write any two disadvantages of Participatory Planning.
- g) What is meant by capacity building?
- h) What is water conservation?
- i) Write any two components of livelihood security.
- j) What is restoration of landscape?
- k) What is dryland farming?
- l) Define energy plants.
- m) Write any two watershed based farming system.

P.T.O.

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

- a) Survey methods of resource appraisal.
- b) Need of Watershed Planning.
- c) Cost sharing.
- d) Aforestation.

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

- a) Explain the resource mapping.
- b) Explain the food security.
- c) Waterharvesting techniques.
- d) Explain plantation of grass and trees.

Q4) Answer the following questions in 200 words (any one): **[10]**

- a) Explain the importance of watershed planning in national development.
- b) Explain the various methods of soil conservation.



Total No. of Questions : 4]

SEAT No. :

P195

[5422]-218

[Total No. of Pages : 2

S.Y. B.Sc.

MICROBIOLOGY (Regular)

MB-221:Bacterial Genetics

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

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 labelled diagrams wherever necessary.*

Q1) Attempt all following:

[10]

- a) Define Nonsense mutations.
- b) Define Base pair Substitution.
- c) Define Plasmid amplification.
- d) Write 2 examples of base analogues.
- e) Structure of Guanine.
- f) What are Alkylating agents?
- g) Write 2 examples of DNA crosslinking agents.
- h) CCC plasmid refers to _____.
- i) State True or False: Z form of DNA is a right handed helix.
- j) State True or False: Supercoiling of DNA in prokaryotes is carried out by enzyme Topoisomerase.

P.T.O.

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

- a) What are spontaneous mutations? Explain Replica Plate technique for the isolation of mutants.
- b) Define Plasmids. Explain any two types of plasmids in detail.
- c) What is suppression? Explain Intragenic and Inter-genic suppression using examples.

Q3) Diagrammatically represent any two of the following: [10]

- a) Replication fork.
- b) Fraenkel-Conrat and Singers Reconstitution experiment.
- c) B form of DNA.

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

- a) What is frameshift mutations? Explain in detail the mechanism of action of Ethidium bromide and Acridine orange on DNA.
- b) What is gene expression? Explain in detail the mechanism of Transcription in bacteria.



Total No. of Questions : 4]

SEAT No. :

P196

[5422]-219

[Total No. of Pages : 2

S.Y. B.Sc. (Regular)

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 right indicate full marks.*
- 3) Draw the neat and labelled diagrams wherever necessary.*

Q1) Answer the following.

[10]

- a) Define: Aerosols.
- b) _____ is an air-borne infection.
- c) Name any two chemical agents used in air sanitation.
- d) Pore size of membrane filter is _____.
- e) Write the role of eosin and methylene blue in EMB agar.
- f) BIS stands for _____.
- g) Define: Ground water.
- h) What is zoogloal film formation in waste water treatment?
- i) Write the effect of lead (Pb) on human health.
- j) Name the two organisms playing role in biometanation.

P.T.O.

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

- a) Diagrammatically explain Hollander and Dalla-valle's air sampler.
- b) Explain Campylobacter sp. and Pseudomonas sp. as indices of fecal pollution.
- c) What is B.O.D.? Explain its method for determination.

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

- a) What is air sanitation? Describe chemical methods of air sanitation?
- b) Write a note on – Membrane Filter Technique.
- c) Explain : Eutrophication.

Q4) What are characteristics of an ideal indicator of fecal contamination of water. Describe) as an indicator organism. **[10]**

OR

What is waste water? Describe the secondary treatment methods of waste water.



Total No. of Questions : 4]

SEAT No. :

[Total No. of Pages : 2

P197

[5422]-220

S.Y.B.Sc.

PSYCHOLOGY

HEALTH PSYCHOLOGY

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

Time : 2 Hours]

[Max. Marks :40

Instructions to the candidates:

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

Q1) Answer in two or four sentences.

[16]

- a) Define illness.
- b) Define pressure.
- c) What Burnout?
- d) What physical illness?
- e) Define coping.
- f) What is Blaming yourself?
- g) Define overeating.
- h) Define task performance

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

[8]

- a) Describe the smoking habites effect on health.
- b) Explain the Bio- medical model of illness.
- c) Explain post traumatic stress Disorder.

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

[8]

- a) Behaviour and AIDS.
- b) Problem focused constructive coping.
- c) Frustration.

P.T.O.

Q4) a) What is stress? Describe the major types of stress.

[8]

OR

b) Explain in detail the effect of life style on helth.



Total No. of Questions : 4]

SEAT No. :

[Total No. of Pages : 2

P198

[5422]-221

S.Y.B.Sc

PSYCHOLOGY

Psychological Testing and Assessment

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

Time : 2Hours]

[Max. Marks :40

Instructions to the candidates:

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

Q1) Answer in two or four sentences.

[16]

- a) Name of any two tests of personality.
- b) Define mental disorder.
- c) What is a Psychological test?
- d) What is forensic Psychology?
- e) Define Neuropsychology.
- f) What is checklist?
- g) What is personality?
- h) What is Attitude?

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

[8]

- a) Explain work preference Inventory.
- b) Explain the strong vocational Interest Blank.
- c) Describe the case History data?

P.T.O.

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

- a) Clinical Interview.
- b) Liraduate Record Examination Test.
- c) Observational method.

Q4) a) What is importance of mental status examination in Neuropsychological Examination? **[8]**

OR

b) What is Aptitude? Discuss the any two tests of Aptitude test?



Total No. of Questions : 4]

SEAT No. :

[Total No. of Pages : 2

P199

[5422]-224

S.Y.B.Sc

ELECTRONIC SCIENCE

EL- 221: Electronic Instrumentation

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

Time : 2Hours]

[Max. Marks :40

Instructions to the candidates:

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

Q1) Answer all of the following:

- a) Define sensitivity of measurement system. [1]
- b) What is meant by SMPS? [1]
- c) Define sweep generator? [1]
- d) Give the application of Lux meter. [1]
- e) Speedometer is RPM meter “comment”. [2]
- f) Common ground in dual power supply be properly combined with ground of application circuit “comment”. [2]
- g) Determine static error if a digital voltmeter reads 5.68 V and true value of the voltage is 5.6V. [2]
- h) Calculate speed in RPS. [2]

Given : Number of pulses per second 500

Number of teeth on rotor 50

Q2) Answer any two of the following.

- a) Draw the block diagram of measurement system explain each block. [4]
- b) State various types of CRO probes. Explain any one in detail. [4]
- c) Draw and explain working of DC to DC converter. [4]

P.T.O.

Q3) Answer any two of the following.

- a) Explain with suitable diagram PH meter. [4]
- b) Draw the block diagram of OFF line UPS and explain it. [4]
- c) Explain with block diagram electronic voltmeter. [4]

Q4) Answer all of the following.

- a) What is techometer? List the types of contactless electrical techometer. Explain any one in detail. [6]
- b) Draw the block diagram of single trace CRO and explain each block in detail. [6]

OR

- a) Calculate the output voltage change, if change in input voltage is 10V for $\pm 2\%$ of line regulation. [4]
- b) Design voltmeter for 0 to 100 V, if D' Arsonval movement has internal resistance of 600Ω and full scale deflection current is 1mA. [4]
- c) For signal generator 40 V output voltage value and 4V in range value find attenuation in dB. [4]



Total No. of Questions :4]

SEAT No. :

P200

[Total No. of Pages :2

[5422] - 225

S.Y.B. Sc. (Regular)

ELECTRONIC SCIENCE

EL-222: Communication Electronics

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

Time : 2 Hours]

[Max. Marks :40

Instructions to the candidates:

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

Q1) Attempt all of the following:

- a) What is interdigit gap in pulse dialing? [1]
- b) Define modulation index in AM. [1]
- c) State the role of pre-emphasis in FM transmitter. [1]
- d) What is space and mark in asynchronous transmission. [1]
- e) "Now days Set-top box is more popular than ordinary television"-
Comment. [2]
- f) "FM is less noisy than AM"- Comment. [2]
- g) Calculate noise temperature if noise factor is 1.5. [2]
- h) If carrier power is 1200w and percentage modulation index is 90%.
Calculate the total power transmitted. [2]

Q2) Attempt any two

- a) Differentiate between pulse dialing and tone dialing. [4]
- b) What is need of modulation? [4]
- c) Explain slope detector circuit in frequency Modulation? [4]

P.T.O.

Q3) Attempt any two.

- a) Derive Formula for noise voltage. [4]
- b) Differentiate between AM and FM. [4]
- c) Draw the waveforms of PAM and PWM. [4]

Q4) Attempt all of the following:

- a) Explain ASK, FSK and PSK with the help of proper waveforms. [6]
- b) Draw block diagram of Superhetrodyne AM receiver and explain each block. [6]

OR

- a) Two resistors of value $10\text{K}\Omega$ & $20\text{K}\Omega$ are in series at room temperature (290°k) Calculate the thermal noise voltage for a bandwidth of 100KHz . [4]
- b) An AM radio broadcast station operates at frequency of 550 KHz . find local oscillator frequency and image frequency. [4]
- c) If a FM wave is represented by the equation
 $e = 10 \sin (8 \times 10^8 t + 4 \sin 1500 t)$ calculate the carrier frequency, modulating frequency and Max. δ . [4]



Total No. of Questions :4]

SEAT No. :

[Total No. of Pages :2

P201

[5422] - 226

S.Y.B.Sc.

DEFENCE AND STRATEGIC STUDIES

DS-201: Conflicts Management And Resolution

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

Time : 2 Hours]

[Max. Marks :40

Instructions to the candidates:

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

Q1) Answer in two to Four sentences.

[8x2=16]

- a) Define Municipal law.
- b) State the meaning of ADR.
- c) Define cultural integration.
- d) Define Disarmament.
- e) State the meaning of pacific settlement.
- f) Write any two relationships between world order and IPKF.
- g) Write any two sources of International law.
- h) Write the meaning of strategic studies.

Q2) Answer in 8 to 10 sentences (Any two)

[2x4=8]

- a) Describe methods of conflict resolution.
- b) Write the causes of war.
- c) Discuss problems of disarmament.

P.T.O.

Q3) Write short notes on (any two)

[2x4=8]

- a) Role of the third world countries in world politics.
- b) Scope of peace studies.
- c) History of Detente.

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

[1x8=8]

- a) Write a note on the role of U.N in maintaining world peace.
- b) Explain role of IPKF in the maintenance of world peace.



Total No. of Questions :4]

SEAT No. :

P202

[Total No. of Pages :2

[5422] - 227

S.Y.B.Sc.

DEFENCE AND STRATEGIC STUDIES

DS-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 strategic Minerals.
- b) Write the limits of states for Teritorial sea.
- c) State any two factors of geopolitics.
- d) What do you mean by state?
- e) State the meaning of "Froutier".
- f) Write any two names of buffer states.
- g) What do you understand by Maritime Boudaries?
- h) State the location of Andaman Nicobar Islands of India.

Q2) Answer in 8 to 10 sentences (Any Two)

[8]

- a) Explain the problems of land locked states.
- b) Discuss Territory as a factor of geopolitics.
- c) Write a few lines on " Line of Actual Control in Jammu kashmir".

P.T.O.

Q3) Write short notes on (any two) [8]

- a) Diego garcio Islands.
- b) Concept of Border.
- c) Exclusive Economic Zone.

Q4) Answer in 16 to 20 sentences (any one) [8]

- a) Discuss Organizing capacity & power as a factor of geopolitics.
- b) Explain geostrategic position & importance of Sia-chen glaciers.



Total No. of Questions : 4]

SEAT No. :

P203

[Total No. of Pages : 2

[5422] - 228

S.Y.B.Sc.

DEFENCE AND STRATEGIC STUDIES

DS - 203 : Contemporary World And Security

(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.*

Q1) Answer in two to Four sentences.

[8×2=16]

- a) Define human rights.
- b) Define world politics.
- c) Write any two aims of national security.
- d) Write any two elements of nuclear power.
- e) Define Strategic studies.
- f) Write any two challenges to West Asian security.
- g) What do you mean by nation state?
- h) Define peace studies.

Q2) Answer any two in 8 to 10 sentences.

[2×4=8]

- a) Explain Objectives of national security.
- b) Discuss non military Issues of strategic concern.
- c) Describe issues of comprehensive security.

P.T.O.

Q3) Write short notes on (any two)

[2×4=8]

- a) Sources of conflict in Indian Ocean region.
- b) China's Indian Ocean strategy.
- c) India's role in SAARC.

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

[1×8=8]

- a) Write a note on the India's strategic relationship with US.
- b) Write a note on the struggle for power and pace in International politics.

* * *

Total No. of Questions :4]

SEAT No. :

P204

[Total No. of Pages :2

[5422] - 229

S.Y.B.Sc.

ENVIRONMENTAL SCIENCE

EVS-201: Biological Diversity & Its Conservation

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

Time : 2 Hours]

[Max. Marks :40

Instructions to the candidates:

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

Q1) Attempt the following in 1-2 lines.

[10]

- a) What do you mean by 'Species evenness'.
- b) Define 'Species'.
- c) What is 'Abundance'.
- d) Explain 'Endemism'.
- e) Define 'Domestication'.
- f) Give any two examples of over- exploitation of Biodiversity.
- g) What are 'Genetically modified organisms'.
- h) What is JFM.
- i) Give the objective of CBD.
- j) Explain PBR.

Q2) Write a short note on ANY TWO of the following.

[10]

- a) Measurement of Genetic Diversity.
- b) Centers of Agro - biodiversity.
- c) Western Ghat's.
- d) Human - Wildlife Conflict.

P.T.O.

Q3) Answer ANY TWO of the following. **[10]**

- a) Explain the factors affecting Genetic Diversity.
- b) Justify, Loss of traditional knowledge is major threat to biodiversity.
- c) Discuss diversity in domesticated species with examples.
- d) Comment on 'World Heritage Convention'.

Q4) Answer ANY ONE of the following. **[10]**

- a) What are major ecosystem types of India? Explain their physical and biological characteristics.
- b) Explain the factors affecting global distribution of species richness.



Total No. of Questions : 4]

SEAT No. :

P205

[5422]-230

[Total No. of Pages : 2

S.Y. B.Sc.

ENVIRONMENTAL SCIENCE

Pollution Control and Environmental Technology

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

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 the following in 1-2 lines each: **[10]**

- a) What is the purpose behind use of catalytic converters?
- b) Mention the difference between incineration and pyrolysis.
- c) What is the principal of electrostatic precipitator?
- d) Write name of any two materials used for sound absorption.
- e) What are sanitary landfill sites?
- f) Mention any two ways for ocean dumping of solid wastes.
- g) What is meant by phytoremediation?
- h) What are cooling ponds?
- i) Write any two methods for nuclear waste disposal.
- j) What are benefits of organic farming?

Q2) Write a short note on the following (Any two) **[10]**

- a) Activated Sludge Process
- b) Biological methods to control soil pollution
- c) Types of cooling Towers

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

- a) Explain the principle and function of trickling filters.
- b) Explain the control of solid wastes with respect to injection wells and biogasification.
- c) What are the chemical methods used to control soil pollution.

P.T.O.

Q4) Attempt any one of the following:

[10]

- a) What are advanced treatments in water pollution control? Discuss in detail on carbon adsorption and bioremediation.
- b) Discuss in detail various techniques used to control noise pollution.



Total No. of Questions : 4]

SEAT No. :

P206

[5422]-231

[Total No. of Pages : 2

S.Y. B.Sc.

ENGLISH (Optional)

Text Book : Literary Vistas

(2013 Pattern) (Semester - II) (Revised)

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

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

- Q1)** a) Attempt any one of the following in about 100 words. [5]
i) Explain the significance of the title 'A Cup of Tea'.
ii) Bring out the elements of humour in the essay 'With the Photographer'?
- b) Attempt any one of the following in about 100 words [5]
i) What is Rosemary's reaction when Philip refers to the lady as 'astonishingly pretty'?
- ii) Why is the author Stephen Leacock not pleased with the photographer?
- Q2)** a) Attempt any one of the following in about 100 words. [5]
i) What is the message of P.B.Shelley's poem 'Ozymandias'?
- ii) What is the central theme of the poem 'Daffodils'?
- b) Attempt any one of the following in about 100 words. [5]
i) What are the challenges that a person will have to face in life according to Rudyard Kipling in 'If'?
- ii) Does the poem 'Ozymandias' prove that art survives? Give reasons.
- Q3)** Attempt any two of the following [10]
a) Think of a product you want to promote in the market. It could be a detergent or electronic item. Prepare a presentation consisting of five charts or slides.
b) Write a short paragraph of about 100 word on 'Terrorism: irrational and inhumane'.
c) Write a transcript of a group discussion on 'Social Media: A boon or a bane for society and individuals.'
d) Imagine that you are facing an interview for the post of Sales Manager in an organization. Anticipate five questions and write down your responses to them.

P.T.O.

Q4) Attempt any two of the following

[10]

- a) Write a brief report on ‘The celebration of Annual Sport Day’ in your college.
- b) Write an essay on ‘The Wildlife Conservation’.
- c) Write a reviews on a new shopping mall in your town.
- d) Summarize the following paragraph to one third of its length.

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



Total No. of Questions : 3]

SEAT No. :

P207

[5422]-232

[Total No. of Pages : 3

S.Y. B.Sc. (Regular)

मराठी (MARATHI)

मराठी विज्ञान साहित्य आणि व्यावहारिक मराठी
(2013 पॅटर्न) (Semester - II) (Theory)

वेळ : 2 तास/

[एकूण गुण : 40

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

प्र.1) अ) खालील इंग्लिश परिच्छेदाचे मराठीत भाषांतर करा.

[10]

Intelligence, hardwork and determination give success. Some reach to the highest goals with these qualities. Those who step on their failure and continue efforts become the ideal of the human race.

Dr. A.P.J. Abdul Kalam is the President of India. His life is a bright ideal for every hardworking student. He was born in the ordinary family of a sailor in Rameshwarm, Tamilnadu. His family was illiterate, but by his own efforts he brought a revolution in the field of science and technology. He made every patriotic person proud by his miraculous progress in space science. Abdul Kalam was born on 15th Oct. 1931 in a middle class family at Rameshwarm. The financial condition of his father Jainuluddin was better. Asiyamma was perfect match for him. The historic holy temple of Rameshwarm was near his house. Laxman Shastri's son, Ramanatha became his best friend. Neither the conservative traditional atmosphere of their homes nor the religion troubled their friendship. Once there came a new teacher in their school, when Ramanatha and Kalam were in fifth standard. Kalam was wearing a Muslim cap on his head and Ramanatha was weaving holy thread of Brahmins. The new teacher did not believe that Muslim and Hindu could sit on the same bench. He ordered Kalam to sit on the last bench. Both of them did not like this. They told their parents in the evening. Laxman Shastri called the teacher and scolded him. He warned, 'don't poison the innocent children with social discrimination. Don't disturb them with ideas of religion and status'. After that no one could separate the friends.

[266 शब्द]

P.T.O.

ब) खालील परिच्छेदाचा 1/3 सारांश करा.

[10]

नॅशनल जिऑग्राफिक, डिस्कव्हरी, अॅनिमल प्लॅनेट या वाहिन्यांवरून प्रसारित होणारे कार्यक्रम खरोखरच उच्च दर्जाचे असतात, यात वादच नाही. विषयांचं वैविध्य, त्यांची अभ्यासपूर्ण आणि नियोजनपूर्वक हाताळणी, परिश्रम आणि कौशल्यपूर्ण प्रकाशचित्रण समजावून सांगण्याची आकर्षक धाटणी, सगळंच काही छान असतं. जगाच्या कानाकोपऱ्यात कुठं-काय-कसं आहे, हे आपण घरबसल्या बघू शकतो. इकडे आफ्रिकेच्या घनदाट जंगलात काय आहे तिकडे बर्फाळ ध्रुवावर कोण आहे, कसं राहतं; अॅमेझॉनच्या खोऱ्यातलं जीवन कस आहे; तिकडे अरबस्तानातल्या वाळवंटात वाळूखाली काय दडलंय, सागरी वनस्पतीसृष्टी आणि प्राणीसृष्टी कशी आहे.... ही सगळी माहिती आपल्याला मिळते. पण या माहितीचा नेमका उपयोग काय ?

इतकी माहिती आपण नीटपणे ग्रहण करू शकत नाही. सुसंगतपणे त्यावर प्रक्रिया करू शकत नाही. योग्य प्रकारे साठवून ठेवू शकत नाही आणि संगतवार पुन्हा आठवून वापरू शकत नाही; कारण स्पष्टपणे सांगायचं तर ती निरूपयोगी असते.

मला असं नाही म्हणायचं की, माहिती मिळवूच नये. असं म्हणणं चुकीचं होईल. व्यवहारात असंख्य गोष्टी करायच्या असतात, त्यासाठी जगातल्या अनेक बाबींची माहिती आपल्याला हवीच. आपल्या मेंदूची एक विशिष्ट कार्यपद्धती आहे. आत आलेल्या माहितीवर तो प्रक्रिया करतो. तिचं वर्गीकरण करतो. योग्य त्या कप्प्यांत ती साठवून ठेवतो, अन् याचबरोबर, विशिष्ट काळात वापरली न गेलेली माहिती तो पुसूनही टाकतो. आपण आज विविध माध्यमांद्वारे जी माहिती मिळवतो, त्यापैकी बऱ्याचशा माहितीचं हेच होतं. मेंदू ती अनावश्यक रद्दी फेकून देतो.

असं जर आहे, तर मुळात माहितीमागे इतकं उरीपोटी धावायचं कशाला? आवश्यक तवेढीच किमान माहिती आणि तीही योग्य तऱ्हेनं मिळवली तर मेंदूचं काम हलकं होईल, नाही का ?

अगदी 'डिस्कव्हरी' बघतानाही आपलं हेच होतं. आपण टी.व्ही. चे गुलाम बनून तो जे दाखविल ते बघत राहतो. ते आपल्याला आवश्यक आहे का, याचा विचार करत नाही. तिथं जे आणि जसं दाखवलं जातं ते आणि तसं बघत बसायचं. मग ते बघत असताना आपण किती आणि काय खातोय याकडे आपलं लक्ष नसतं. हरणाचा पाठलाग करणारा तिथला चपळ चित्ता नि अंतश्चित्रात त्याच्या लवचीक कण्याचं क्ष-चित्र पाहताना सतत कुबड काढून वा लोळत टी.व्ही. बघणाऱ्या आपल्या कण्याची मात्र पार वाट लागते आहे, हे आपण विसरतो. (304 शब्द)

प्र.2) खालीलपैकी कोणत्याही दोन प्रश्नांची उत्तरे लिहा.

[15]

- अ) 'स्त्रीभ्रूण हत्या' या विषयावर वृत्तपत्रासाठी दोनशे शब्दांपर्यंत लेख लिहा.
- ब) 'आरोग्यम् धनसंपदा' या विषयावर आकाशवाणीसाठी दोनशे शब्दांपर्यंत भाषण संहिता तयार करा.
- क) 'आधुनिक शेती व कृषितंत्रज्ञान' या विषयावर कृषितंत्रज्ञांची दूरदर्शनसाठी घेतलेली पाच मिनिटांची मुलाखत तयार करा.

प्र.3) इंग्लिश भाषेतील विज्ञानविषयक पारिभाषिक संज्ञांना मराठीतील पर्यायी पारिभाषिक संज्ञा लिहा. (कोणत्याही पाच)

[5]

- i) Aproval
- ii) Cashier
- iii) Superstition
- iv) Eligibility
- v) Research Methodology
- vi) Environmental Science
- vii) Fire proof
- viii) Surgery
- ix) Key board
- x) Engineer



Total No. of Questions : 3]

SEAT No. :

P208

[5422]-233

[Total No. of Pages : 2

S.Y. B.Sc.

हिंदी (Hindi)

सामान्य हिंदी (General Hindi)

(2013 Pattern) (Semester- II)

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

समय : 2 घंटे]

[पूर्णांक : 40

- सुचनाएँ :- 1) सभी प्रश्न अनिवार्य हैं।
2) दाहिनी ओर लिखे अंक प्रश्न के पूर्णांक हैं।

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

- i) Antibiotic
- ii) Breeding
- iii) Density
- iv) Ecology
- v) Fleet
- vi) Genetic
- vii) Hypertension
- viii) Light Year
- ix) Nutrition
- x) Vibration

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

उसके पास खड़ी एक कार में कोई साहब अपने परिवार के साथ जा रहे थे। कार की पिछली सीट पर काले रंग का उनका मोटा-ताजा नौकर बैठा था। जब देर तक साहब के झल्लाने के बाद भी वह सड़क से नहीं हटा तब उन्होंने अपने नौकर को इशारा किया। उनका नौकर कार का दरवाजा खोलते हुए तेजी से निकला और फुटबाल की तरह उसके ऊपर पैरों से वार करते हुए उस सड़क से अलग 'तिमुहाने' के पास छोड़ आया।

P.T.O.

- प्र.2) अ) निम्नलिखित गद्य अवतरण की ससंदर्भ व्याख्या कीजिए। [4]**
क) “न जाने अभी जीवन कितना है, और न जाने अभी कितनी बार ऐसे पहियों के नीचे होकर जाना है।”

अथवा

इल्ली का जीवनकाल सामान्यतया एक महीने का होता है किंतु शीत-प्रधान देशों में एक से अधिक महीने लग जाते हैं।

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

- ख) उनका सुख-दुख, पाना-खोना
अर्थ नहीं रखता, केवल होना
- या अन्ततः न होना।
वे नहीं जानते इतिहास, या अर्थ;
वे हँसते हैं। और लेते हैं
भगवान का नाम।

अथवा

उसमें भी लिखा था
मरने का मारने का, जीतने का हारने का
करूणाहीन स्वर में कहीं
धमकी थी मारने की
और यदि शरण में आओ,
शेखी थी तारने की।

- प्र.3) अ) निम्नलिखित में से किन्हीं दो प्रश्नों के उत्तर लिखिए। [10]**

- i) विज्ञान एवं प्रौद्योगिकी की उन्नति ने देश की उत्पादन-ऊर्जा में कैसे परिवर्तन किया है?
- ii) अनाज को कीटों से मुक्त किस प्रकार किया जा सकता है?
- iii) श्री रामानुजन अनुसंधान कार्य से कैसे जुड़ गए?

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

- i) ‘कालिदास से’ कविता द्वारा कवि ने विरह व्यथा को कैसे अभिव्यक्त किया है?
- ii) कवि ‘बृहन्नला’ कविता द्वारा क्या संदेश देना चाहते हैं?
- iii) कवि के अनुसार गाँधीजी फिर से जन्म लेकर क्या करेंगे?



Total No. of Questions : 4]

SEAT No. :

P209

[Total No. of Pages : 2

[5422]-234

S.Y. B.Sc.

संस्कृत (Sanskrit)

गीर्वाणभारती (Geervānabharati)

(2013 Pattern) (Semester - II)

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

- 1) *All questions are compulsory.*
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 प्रश्नांची 2-4 ओळीत उत्तरे लिहा.

- a) Who has described the consciousness of the trees and when?
वृक्षांच्या चेतनत्वाचे वर्णन कोणी केले आहे? व कधी?
- b) State the 3 names of scientist related to ज्योतिःशास्त्र.
ज्योतिःशास्त्राशी संबंधित तीन शास्त्रज्ञांची नावे लिहा.
- c) Explain the meaning of 'मूढः परप्रत्ययनेयबुद्धिः'
मूढः 'परप्रत्ययनेयबुद्धिः' चा अर्थ स्पष्ट करा.
- d) Explain the meaning of title 'सद्धर्मपुण्डरीक'
'सद्धर्मपुण्डरीक' या शीर्षकाचा अर्थ स्पष्ट करा.
- e) What is the meaning of the word आयुर्वेद? State the names of types of व्याधी.
'आयुर्वेद' शब्दाचा अर्थ कोणता? व्याधींच्या प्रकारांची नावे लिहा.
- f) Which are the types of trees?
वृक्षांचे भेद कोणते?
- g) How many types of चुम्बक and which are they?
चुम्बकाचे प्रकार किती व कोणते?
- h) Which is the epic of Dr. G. B. Palsule related to Svatantryavira Savarkar?
डॉ. ग. बा. पळसुले यांचे स्वातंत्र्यवीर सावरकरांशी संबंधित महाकाव्य कोणते?

P.T.O.

Q2) Write short note (any two) [8]

संक्षिप्त टीपा लिहा. (कोणत्याही दोन)

- पदार्थ विज्ञानम्
- आयुर्वेदः
- ज्योतिषशास्त्रम्

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

संक्षिप्त टीपा लिहा. (कोणत्याही दोन)

- Subhāsita
सुभासित
- Lilavatī
लीलावती
- Explain - काकोऽपि जीवति चिराय बलिञ्च भुङ्क्ते।
'काकोऽपि जीवति चिराय बलिञ्च भुङ्क्ते' स्पष्ट करा.

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

पुढीलपैकी कोणत्याही एका प्रश्नाचे उत्तर 16 ते 20 ओळीत लिहा.

- Explain रसायनशास्त्र and वास्तुशास्त्र.
रसायनशास्त्र व वास्तुशास्त्र स्पष्ट करा.
- Critically appreciate the lesson 'अमरसन्देशः'
'अमरसन्देशः' या पाठाचे चिकित्सक रसग्रहण करा.



Total No. of Questions : 4]

SEAT No. :

P-210

[Total No. of Pages :2

[5422] - 235

S.Y.B.Sc. (Regular)

ARABIC FUNCTIONAL
(2013 Pattern) (Semester - II)

Time : 2 Hours]

[Min. Marks : 40

1. Translate into English /Urdu/Marathi any two of the following Passages: (10)

(الف) الْقُرْآنُ كِتَابٌ الْعِمُّ مُفِيدٌ. الْكِتَابُ عَرَبِيٌّ.

أَلَا سَلَامٌ دِينٍ. الْأَدَبُ وَاجِبٌ. الدَّرْسُ سَهْلٌ.

أَجْمَلُ طَوِيلٌ. الْبَيْتُ جَدِيدٌ. الزُّهْرُ صَغِيرٌ.

أَشَجَرٌ كَبِيرٌ. اللَّعِبُ ضَرُورِيٌّ أَنَا جَنَيْتُ.

(ب) الْقُرْآنُ هِدَايَةٌ لِلْإِنْسَانِ. الْعَمَلُ ضَرُورِيٌّ

لِلْعَالَمِ. الْحَمْدُ ثَابِتٌ لِلَّهِ. الْأَسْتَاذُ جَالِسٌ

عَلَى الْكُرْسِيِّ. الْوَالِدُ وَقَفَ عَلَى الْأَرْضِ. الْقَلَمُ

لَا زِمٌ لِلْكِتَابَةِ. وَالْكِتَابُ لَا زِمٌ لِلْقِرَاءَةِ.

(ج) الْعِمُّ نِعْمَةٌ لِللِّسَانِ. أَنَا جَالِسٌ عَلَى الْكُرْسِيِّ. وَهُوَ وَقَفَ عَلَى الْأَرْضِ

أَنَا مَشْغُولٌ بِالْقِرَاءَةِ وَهُوَ مَشْغُولٌ بِاللَّعِبِ. أَنَا مُسْلِمٌ وَهُوَ الْيَهُودِيُّ مُسْلِمٌ.

هَذَا جَيِّدٌ فِي الْقِرَاءَةِ وَذَلِكَ جَيِّدٌ فِي اللَّعِبِ

P.T.O.

2. Translate and explain any five of the following verses : (10)

- (١) شَرُّ الْمَقَالِ الْكَذِبُ _____ خَيْرُ الْخِصَالِ الْأَدَبُ
(٢) أَمْحَلُّ حَلِيبٍ فَاضِحٍ _____ وَالْحَيُودُ سَتْرٌ صَالِحٌ
(٣) الْعَقْلُ قَاضٍ عَادِلٌ _____ وَالْعُحْبُ رَاءُ قَاتِلٍ
(٤) الْعُمُرُ ضَيْفٌ رَاجِلٌ _____ وَالْمَالُ ظِلٌّ زَائِلٌ-
(٥) أَكْبَرُ لِلْحُبِّ سَبَبٌ _____ إِنَّ الْبَخِيلَ لَا يُحِبُّ
(٦) الْكَذِبُ وَالنَّمِيمَةُ _____ وَالْغَدْرُ شَرُّ شَيْمَةٍ
(٧) وَأَعْحِيلَ إِلَى الْخَيْرَاتِ _____ مِنْ حَذَرِ الْفِرَاتِ

3. Answer in Arabic any five of the following:

- (١) مَنْ هَذَا ؟ (٢) كَيْفَ الرَّهْرُ؟
(٣) مَا ذَلِكَ ؟ (٤) هَلْ أَنْتِ صَغِيرٌ؟
(٥) هَلْ هَذَا كِتَابٌ؟ (٦) مَنْ أَنْتِ؟
(٧) أَيْنَ الْكُرْسِيِّ؟ (٨) أَيْنَ السَّمَكِ؟

4. Write the letter in Arabic to your mother: (10)

اَكْتُبِ الرِّسَالَةَ فِي الْعَرَبِيَّةِ إِلَى أُمِّكَ.

✓ ✓ ✓ ✓

Total No. of Questions : 4]

SEAT No. :

P-211

[Total No. of Pages : 1

[5422] - 236

S.Y.B.Sc. (Regular)

Urdu General (UR-G2)

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

Time : 2 Hours]

[Min. Marks : 40

ہدایات : (۱) تمام سوالات کے جوابات لازمی ہیں۔
(۲) خوشخطی کا لحاظ رکھیں۔

(10) سوال نمبر ۱: پریم چند کے افسانوں میں وہی مسائل پر لکھے ہوئے افسانوں کا جائزہ لیجئے۔

یا

پریم چند کی افسانہ نگاری کی اہم خصوصیات بتائیے۔

(10) سوال نمبر ۲: مختصر افسانے کا ارتقاء بیان کیجئے۔

یا

مختصر افسانے میں کردار اور مکالمے کی کیا اہمیت ہوتی ہے مثال کے ذریعے سمجھائیے

(10) سوال نمبر ۳: کسی دو کردار پر روشنی ڈالئے۔

۱۔ نصیر ۲۔ آنندی ۳۔ شاکرہ ۴۔ بنسی دھر

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

1. Atomic weight
2. Freezing Point
3. Compound
4. Nuclear force
5. Lunar Eclips
6. voltage
7. pesticide
8. Rotational motion
9. Density
10. Radiation
11. Decomposition
12. Microorganism
13. Magnetic field

✓ ✓ ✓ ✓

Total No. of Questions :4]

SEAT No. :

P212

[5422]-237

[Total No. of Pages : 1

S.Y.B.Sc. (Vocational)

BIOTECHNOLOGY

VOC - 221 : Plant and Animal Tissue Culture

(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 indicates full marks.*
- 3) *All questions carry equal marks.*

Q1) Answer each of the following in 1-2 lines. [10]

- a) What is mean by aseptic technique?
- b) Enlist important components of MS medium.
- c) Define: Explant
- d) Give any two applications of protoplast culture.
- e) Explain the use of mercuric chloride in plant tissue culture.
- f) State the role of methyl red in Animal tissue culture medium.
- g) Define: Embryonic stem cells?
- h) What is primary explant culture?
- i) What is the importance of cell line characterisation?
- j) State the importance of organ transplantation.

Q2) Write short notes on any two of the following. [10]

- a) Cell repository.
- b) Lymphocyte culture.
- c) Plant growth hormones.

Q3) Answer any two of the following in brief. [10]

- a) What is trypan blue exclusion ? How it is used in counting of cells.
- b) Give different applications of plant tissue culture.
- c) Explain the steps involved in clonal propagation.

Q4) a) Write a note on karyo typing. [5]

b) Write a protocol for initiation of callus culture [5]

OR

- a) What is Isoenzyme analysis? How it is used in cell line characterisation.
- b) What is somatic embryogenesis? How it is used for preparation of artificial seeds?



Total No. of Questions :4]

SEAT No. :

[Total No. of Pages :2

P213

[5422] - 238

S. Y. B. Sc. (Vocational)

INDUSTRIAL CHEMISTRY

221 : Unit Processes in Organic Chemical 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) *Neat diagrams must be draw wherever necessary.*

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

- a) Toluene to benzoic acid
- b) Acetanilide to N – Methylaniline
- c) Benzene to nitro benzene
- d) Chlorobenzene to aniline
- e) Benzene to Benzene sulphuric acid
- f) Acetic acid to chloroacetic acid
- g) Bromomethane to methanol
- h) Benzene to Dodecyl benzene

Q2) Answer Any Two of the following

[8]

- a) Discuss the types of esterification processes.
- b) Write two examples of reduction reactions carried out with metal under acidic conditions.
- c) Write a note on Friedal – Crafts alkylation.

P.T.O.

Q3) Answer Any Two of the following [8]

- a) Write a note on different nitrating agents.
- b) What is oxidation? Describe the role of dichromate under acidic conditions as an oxidising agent.
- c) Discuss the mechanism involved in nitration of nitrobenzene to m – dinitro benzene.

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

OR

What is halogenation? Describe the manufacture of chlorobenzene with the help of flow sheet diagram. [8]



Total No. of Questions :4]

SEAT No. :

[Total No. of Pages :2

P214

[5422] - 239

S. Y. B. Sc. (Vocational)

PHOTOGRAPHY AND AUDIO – VISUAL PRODUCTION - I

Colour Photography

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

Time : 2 Hours]

[Max. Marks :40

Instructions to the candidates:

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

Q1) Answer the following in short

[16]

- a) Define colour temperature of a light source.
- b) What is the importance of 'work space' in image processing?
- c) Explain two important points of comparison between a CCD sensor and a CMOS sensor.
- d) Explain what do you mean by 'brightness range' of a scene. How important is it for a photographer?
- e) What is a 'histogram'? What information does it provide to a photographer?
- f) What is 'crop factor'? How does it affect the image qualities?
- g) Explain the 'noise' in a digital sensor.
- h) What is 'grey scale'? Why is it important for a photographer?

Q2) Attempt Any Two of the following

[8]

- a) Draw a suitable diagram and explain what primary, secondary and complementary colours are. Give appropriate examples.
- b) Explain how the black body radiation curve is useful in defining the colour temperature of a light source.
- c) Discuss the social relevance of colours.

P.T.O.

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

- a) Artificial light sources.
- b) Colour vision.
- c) Use of layer mask in image processing.

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

- a)
 - i) Explain how the size of the sensor matters for a good image quality.
 - ii) Discuss the psychological impact of colours.
- b) Draw a suitable diagram and explain the construction of a typical sensor used in a digital camera. Explain the purpose of each 'layer' and component of the sensor. Discuss the sequence of events taking place when the sensor is exposed to a 'scene'.



Total No. of Questions :4]

SEAT No. :

[Total No. of Pages :2

P215

[5422] - 240

S. Y. B. Sc. (Vocational)

ELECTRONIC EQUIPMENT MAINTENANCE

Voc. EEM - 221 : Trouble Shooting Electronic Equipment – 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 the following.

- a) State any two logic IC families. [1]
- b) State the commonly used packages in digital ICs. [1]
- c) What is tri – state logic? [1]
- d) State difference between multiplexer & de – multiplexer. [1]
- e) State the precautions while handling digital ICs. [2]
- f) State advantages of surface mount technology. [2]
- g) State any two types of SMT packages. [2]
- h) State the tools required for repairing of surface mount PCBS. [2]

Q2) Answer Any Two of the following.

- a) Explain with neat diagram the working of logic clip. [4]
- b) Explain with diagram the working of logic probe. [4]
- c) Explain the method for testing of flip – flop. [4]

P.T.O.

Q3) Answer Any Two of the following.

- a) Discuss with neat diagram the working of Logic comparator. [4]
- b) Draw block diagram of dc power supply. Explain function of each block. [4]
- c) Explain the procedure for troubleshooting of SMPS. [4]

Q4) Answer the following.

- a) Explain the steps involved in repairing of oscilloscope. [6]
- b) Explain typical faults and their remedies in digital still camera. [6]

OR

- a) Explain with neat functional block diagram the operation of cordless telephone. [6]
- b) Explain common faults and their remedies in mobile phone. [6]



Total No. of Questions : 4]

SEAT No. :

P216

[5422]-241

[Total No. of Pages : 2

S.Y.B.Sc. (Vocational)

COMPUTER HARDWARE & NETWORK ADMINISTRATION

Microprocessor & Interfacing Techniques - II

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

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

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

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

- i) What is booting? What are types of booting?
- ii) What is function of card reader?
- iii) Which add-on card is needed to enhance the video performance of a PC?
- iv) State advantages of Laser Printer.

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

- i) What is the function of Ethernet card?
- ii) State various hardware and software components of computer.
- iii) State features of win8.
- iv) What is wi-fi? State applications of wi-fi.

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

- a) What is function of RAM and ROM? State minimum requirements for configuring a Multimedia PC.
- b) List various display adapters. Explain features of any one.
- c) Write a short note on Bluetooth.

P.T.O.

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

- a) What is advantage of flash BIOS? Explain the important functions of BIOS.
- b) What are advantages and disadvantages of matrix and laser printers?
- c) Write a note on speech recognition technology.

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

- a) What is Network? State various components of Network. Classify computer network according to area.
- b) What is a scanner? List different types of Scanner. Explain advantages and disadvantages of any one.
- c) What are advantages of serial communication? Differentiate between asynchronous and synchronous communication protocol.



Total No. of Questions : 4]

SEAT No. :

[Total No. of Pages : 2

P217

[5422]-242

S.Y.B.Sc. (Vocational)

SEED TECHNOLOGY

Vegetable Seed Production

(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 and labelled diagrams wherever necessary.*

Q1) Attempt the following :

[10 × 1 = 10]

- a) What is apomixis?
- b) Define pollination.
- c) Write any two objectives of hybridization.
- d) Enlist methods of population improvement.
- e) Write different methods of classification for vegetable crops.
- f) Give isolation distance for foundation seed production in Tomato.
- g) What is roughing?
- h) Which type of bed is required for growing seedlings in Brinjal?
- i) What is GMS?
- j) Give any two objectives of vegetable seed production.

P.T.O.

Q2) Attempt *any two* of the following : **[2 × 5 = 10]**

- a) What is megasporogenesis? Describe megaspore formation process with neat labelled diagram.
- b) Define self incompatibility? Explain any one type of it?
- c) Discuss procedure for hybridization in vegetable crops.

Q3) Write notes on (Any Two) : **[2 × 5 = 10]**

- a) Pedigree selection
- b) Achievements of population improvement
- c) Modes of pollination

Q4) Give seed production procedure in Tomato with reference to land requirement, isolation, nursery management, cultural practices, roughing, plant protection, harvesting, seed extraction drying and storage. **[10]**

OR

Describe in detail, the seed production procedure in onion.



Total No. of Questions : 4]

SEAT No. :

P218

[5422]-243

[Total No. of Pages : 2

S.Y.B.Sc. (Vocational)

INDUSTRIAL MICROBIOLOGY - I

**VOC-IND-MIC-221 : Fermentation Processes and Downstream Processing
(2013 Pattern) (Semester - II) (Paper - I) (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) *All questions carry equal marks.*
- 4) *Draw neat labeled diagrams wherever necessary.*
- 5) *Use of scientific calculators is allowed.*

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

- a) List the four major steps of downstream processing.
- b) Multistage countercurrent of liquid-liquid extraction type is the most efficient. (True/False)
- c) Increasing product solubility in fermentation broth by adding inorganic salts is called as precipitation. (True/False)
- d) Write the structure of Lysine.
- e) Which two amino acids are industrially produced by *C. glutamicum*?
- f) What is fractional distillation?
- g) Disadvantages of extraction process.
- h) _____ organism is employed for production of Vitamin B12.
- i) Uses of Microbial Biomass.
- j) Name any two types of cheese.

P.T.O.

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

- a) Describe in detail recovery of citric acid using flowchart.
- b) List the names of organism in bioinoculants and their benefits to crop plants.
- c) Describe the use of rotary vacuum filtration in penicillin production.

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

- a) Liquid-liquid extraction.
- b) Centrifugation in downstream processing.
- c) Cheese starter culture.

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

- a) What is vinegar? Explain the three methods employed in vinegar production.
- b) Discuss various cell disruption methods used in product recovery.



Total No. of Questions : 4]

SEAT No. :

P219

[5422]- 244

[Total No. of Pages : 1

S.Y. B.Sc. (Vocational)

INDUSTRIAL CHEMISTRY

222 : Industrial pollution

(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 . [16]

- a) Write two hazards of so_x pollution.
- b) Write chemical constituents of photo chemical smog.
- c) Write minor constituents present in air
- d) Explain the term electrodialysis
- e) Describe Flocculation process for waste water treatment.
- f) Write the chemical constituents present in permanent hard water.
- g) What is meant by nitrogen fixation?
- h) Write two important properties of activated sludge.

Q2) Attempt any Two of the following: [8]

- a) Explain the hazards of Co pollution.
- b) Discuss radiation pollution
- c) Write a note on cyclone separator.

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

- a) Global warming
- b) Tannery wastes.
- c) Quality characteristics of wates.

Q4) Describe the types of chlorinating agents used to disinfect water [8]

OR

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

✓ ✓ ✓

P.T.O.

Total No. of Questions : 4]

SEAT No. :

P220

[5422]-245

[Total No. of Pages : 2

S.Y. B.Sc.

BIOTECHNOLOGY (Vocational)

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.*

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

[10]

- a) Define antigen.
- b) What is antigenicity?
- c) Give the role of eosinophils.
- d) What are naive lymphocytes?
- e) Enlist any two immunological techniques to detect antibodies.
- f) What is MHC?
- g) Give two examples of type II hypersensitivity reactions.
- h) Name the etiological agent of sore throat.
- i) Give any two morphological features of Salmonella typhi.
- j) Name any 2 cytokines.

Q2) Write short note on any two of the following :

[10]

- a) Spleen.
- b) NK cells.
- c) VDRL test.

P.T.O.

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

- a) What are vaccines? Describe it in detail.
- b) Explain secondary immune response.
- c) What is HIV? Add a note on its structure, preventive measures and control.

Q4) Define antibodies. Explain in detail the types of antibody. **[10]**

OR

Describe tuberculosis with respect to etiological agent, characterization, morphology, preventive measures and control. **[10]**



Total No. of Questions : 4]

SEAT No. :

P221

[5422]-246

[Total No. of Pages : 2

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

PHOTOGRAPHY AND AUDIO-VISUAL PRODUCTION - II
Principles & Applications of Analog and Digital Communications
(2013 Pattern) (Semester - II)

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) Decibel (unit dB) is used to measure signal strength in communication.
 - ii) Duplexing is the method by which one-way communications are handled.
- b) Comment on the following statements. [4]
 - i) In an FDM system, the carrier for each modulator is on a different frequency these carriers are referred to as subcarriers.
 - ii) For a binary PCM system, the number of bits per transmitted word is 8 and sampling frequency is 8 kHz. Calculate the bit rate and baud rate.
- c) Attempt the following : [6]
 - i) Calculate the directional maximum bandwidth of a full duplex ASK system using contains range of frequencies from 1000 to 9000 Hz.
 - ii) Calculate the bandwidth of an FSK system in which the transmission takes at 4000 bits per second and the frequency difference between two carriers is 3000 Hz.
 - iii) Calculate the bit rate of a 500 baud 16 QAM signal.

P.T.O.

Q2) Attempt any two of the following : **[8]**

- a) What is the relation between DS service and T lines?
- b) What is ADSL? Explain.
- c) Explain the basic concept of cellular telephone system.

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

- a) Compare instantaneous, natural and flattop samples in PAM system.
- b) Explain natural PAM sampling and flat topped PAM sampling.
- c) Write short note on sampling theorem.

Q4) Attempt any two of the following : **[12]**

- a) Explain PCM.
- b) Explain DM.
- c) Explain companding.



Total No. of Questions : 4]

SEAT No. :

P222

[5422]-247

[Total No. of Pages : 2

S.Y. B.Sc. (Vocational)

ELECTRONIC EQUIPMENT MAINTENANCE

**voc.-eem-222 : Audio, Video and 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) What is motherboard? Why is it called so? [1]
- b) What is multimedia? [1]
- c) Give at least two applications of rolling display? [1]
- d) What is OHP? Give its one application. [1]
- e) Differentiate between scanner and photocopier. [2]
- f) Compare flat screen display with CRT display. [2]
- g) What is EPABX? Give its relevance today. [2]
- h) What is light pen? Where is it used? [2]

Q2) Answer any two of the following :

- a) What is data projector? With neat diagram explain DLP projector. [4]
- b) Explain the working principle of large screen display. [4]
- c) With neat diagram explain the working principle of FAX machine. [4]

P.T.O.

Q3) Answer any two of the following :

- a) Which softwares are used for multimedia computer? Discuss their roles. [4]
- b) What is a bar code? Explain the working principle of barcode reader.[4]
- c) What is mouse? Give its types. Which one you would prefer? [4]

- Q4)**
- a) Explain in details the working principle of LCD projector. [6]
 - b) With the help of neat diagram explain how photocopying machine works. [6]

OR

- a) What is inkjet printer? With neat diagram explain its working principle. [6]
- b) Explain in details the working principle of touch screen. Give its types. Also give its applications. [6]



Total No. of Questions : 4]

SEAT No. :

P223

[5422]-248

[Total No. of Pages : 2

S.Y. B.Sc. (Vocational)

COMPUTER HARDWARE & NETWORK ADMINISTRATION

Computer System Management - II

(2013 Course) (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) a) Attempt the following : [4 × 1 = 4]

- i) What is Modem?
- ii) What is USB? List any four USB devices that can be interfaced to a computer system.
- iii) List various resources that can be shared in a network.
- iv) What is function of Antivirus?

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

- i) State advantages of upgrading RAM.
- ii) List any two features of WAN.
- iii) What is client-server?
- iv) What is Wi-Fi? List various devices that can be interfaced through Wi-Fi.

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

- a) Write a short note on LAN.
- b) Explain in brief installation procedure of Windows XP.
- 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 features of iPhone.
- b) List various Network devices and explain any one in brief.
- c) Write a note on computer software.

Q4) Attempt any two of the following :

[2 × 6 = 12]

- a) List various hardware components of a desktop system with their specifications. Explain in detail assembly procedure of a desktop PC.
- b) What do you mean by portable devices? List various portable devices available. State features of any one.
- c) List various types of printers. Explain in brief installation procedure of printer.



Total No. of Questions : 4]

SEAT No. :

[Total No. of Pages : 2

P224

[5422]-249

**S.Y. B.Sc. (Vocational)
SEED TECHNOLOGY
Seed Quality Control
(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 labelled diagrams must be drawn wherever necessary.*

Q1) Attempt the following :

[10 × 1 = 10]

- a) What do you mean by seed quality?
- b) Define breeders seed.
- c) Give any two objectives of seed certification agency.
- d) What is field inspection?
- e) What is roughing?
- f) Enlist any two powers of seed inspector.
- g) Where is central seed testing laboratory located in India?
- h) Sketch any two walking patterns in field inspection.
- i) Central seed committee is constituted with how many members?
- j) Define seed legislation.

Q2) Attempt any two of the following :

[2 × 5 = 10]

- a) Describe in brief Biopesticides.
- b) Explain in detail the classes of seed.
- c) Write about the international organization for seed certification.

P.T.O.

Q3) Write notes on any two :

[2 × 5 = 10]

- a) Appellate authority.
- b) General seed certification standards.
- c) Central seed testing laboratory.

Q4) Describe in brief technique of field inspection with suitable example. **[10]**

OR

Give an account of objectives and general principles of field inspection. **[10]**



Total No. of Questions : 4]

SEAT No. :

P225

[5422]-250

[Total No. of Pages : 2

S.Y. B.Sc. (Vocational)

INDUSTRIAL MICROBIOLOGY

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

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

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicate full marks.*
- 3) *All questions carry equal marks.*
- 4) *Draw neat labelled diagrams wherever necessary.*
- 5) *Use of scientific calculators is allowed.*

Q1) Answer each sub-question in one or two lines :

[10]

- a) List the QA tests recommended for bioinoculants.
- b) The IP 2014 incorporates total of _____ monographs of drugs.
- c) State the full form of TGA.
- d) Comment on the test strains in QA/QC process.
- e) List the constituents of Fluid B.
- f) Test organism *Bacillus subtilis* is grown in _____ medium.
- g) List the agencies regulating quality assurance.
- h) What is 'negative control'?
- i) Comment on 'Method suitability test'.
- j) Greek word 'Pharmakon' means _____.

Q2) Answer any two of the following :

[10]

- a) Comment on the necessity of 'diluting fluid'.
- b) Describe the test for undue toxicity as per the USP.
- c) Discuss the difference between *In vitro* and *In vivo* tests for pyrogens.

P.T.O.

Q3) Write a short note on any two of the following :

[10]

- a) USP.
- b) Quality Assurance.
- c) Fluid thioglycolate medium.

Q4) Answer any one of the following :

[10]

- a) Using a suitable example discuss the need of Quality control in biotechnology based industries.
- b) Discuss the significance of 'sterility' of a product. How to check sterility of Streptomycin?

