

Total No. of Questions :4]

SEAT No. :

[Total No. of Pages :2

P433

[5215] - 201

S.Y.B.Sc. (Regular)

MATHEMATICS

MT-221: Linear Algebra

(2013 Pattern) (Semester - II) (81112) (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) Attempt any FIVE of the following:

[10]

- a) Is the set $W = \{(1, 1, 3), (2, 2, 6)\}$ linearly dependent? Justify.
- b) Let $W = \{(x, y, z), \in \mathbb{R}^3 / x = 0 \text{ or } y = 0\}$. Is W a subspace of $\mathbb{R}^3$? Why?
- c) Define Linear transformation.
- d) In an Euclidean inner product, find cosine of the angle between the vector's $\bar{u} = (1, 0)$ and $\bar{v} = (0, 1)$.
- e) State dimension theorem for Linear transformation.
- f) Find norm and distance between the vectors $\bar{u} = (1, 0, 1)$ and $\bar{v} = (-1, 1, 0)$.
- g) For any $a, b \in \mathbb{R}, \theta \in \mathbb{R}$, show that $(a \cos \theta + b \sin \theta)^2 \leq a^2 + b^2$.

Q2) Attempt any two of the following:

[10]

- a) Prove that any two bases of finite dimensional vector space V have same number of elements.
- b) Find range and Kernel of $T: \mathbb{R}^2 \rightarrow \mathbb{R}^3$ defined by $T(x, y) = (x, x + y, y)$.
- c) Show that the set $S = \{(1, 1, 2), (1, 2, 5), (5, 3, 4)\}$ do not form basis for $\mathbb{R}^3$.

P.T.O.

Q3) Attempt any two of the following:

[10]

a) If $\bar{u}, \bar{v}$ and $\bar{w}$ are vectors in a real inner product space and K is any constant scalar then prove that

i) $\langle \bar{v}, \bar{0} \rangle = \langle \bar{0}, \bar{v} \rangle = 0$

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

iii) $\langle \bar{u}, k \bar{v} \rangle = k \langle \bar{u}, \bar{v} \rangle$

b) Using Euclidean inner product on $\mathbb{R}^3$, show that $\bar{u} = (-3, 1, 0)$ and $\bar{v} = (2, -1, 3)$ satisfy Cauchy Schwartz inequality.

c) Let $T: \mathbb{R}^3 \rightarrow \mathbb{R}^3$ be the linear transformation defined by

$$T(x, y, z) = (x - 2y, y + z, x + 2z). \text{ Find basis and dimension of } \text{Ker}(T).$$

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 $B = \{(1, 1, 1), (0, 1, 1), (0, 0, 1)\}$ into orthonormal basis.

b) i) Let $T: \mathbb{R}^3 \rightarrow \mathbb{R}^3$ be the linear transformation such that $T(1, 0, 0) = (2, 4, -1)$, $T(0, 1, 0) = (1, 3, -2)$, $T(0, 0, 1) = (0, -2, 2)$. Compute $T(-2, 4, -1)$ and $T(1, 1, 1)$.

ii) Find coordinate vectors of $(1, 0, 0)$, $(0, 1, 0)$ and $(0, 0, 1)$ with respect to the basis $B = \{(1, 2, 1), (2, 1, 0), (1, -1, 2)\}$ of Euclidean space $\mathbb{R}^3$.

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SEAT No. :

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[Total No. of Pages :2

[5215] - 202

S.Y.B.Sc. (Regular)

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) Find $\lim_{t \rightarrow 2} \left(\frac{t^2 - 4}{t - 2} \right) \bar{i} + \frac{\sin(t^2 - 2t)}{(t - 2)} \bar{j} + t^2 \bar{k}$

b) If $\bar{a} = (2xy - x^2) \bar{i} + (e^{xy} + x \cos y) \bar{j} + x^2 \sin y \bar{k}$ then find

i) $\frac{\partial \bar{a}}{\partial x}$ ii) $\frac{\partial \bar{a}}{\partial y}$

c) Find the unit tangent vector to the curve represented by

$$\bar{r} = (t^2 - 2) \bar{i} + (t + 3) \bar{j} + (t^4 + 4t + 1) \bar{k} \text{ at } t = 1$$

d) Find gradient of function $\phi = x^2 y + 2z$ at the point P(2,1,0)

e) State Gauss Divergence Theorem.

f) Show that the vector field $\bar{F} = y \sin z \bar{i} + x \sin z \bar{j} + xy \cos z \bar{k}$ is conservative.

g) If $\bar{f} = (3x^2 + 6y) \bar{i} - 14yz \bar{j} + 20xz^2 \bar{k}$ evaluate $\int_C \bar{f} \cdot d\bar{r}$ from (0,0,0) to

(1,1,1) along the path: $x=t, y=t^2, z=t^3$

P.T.O.

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

- a) Show that a differentiable vector function $\bar{u}$ of a scalar variable t to be of constant direction if and only if $\bar{u} \times \frac{d\bar{u}}{dt} = \bar{0}$.
- b) Show that $\bar{f} = (e^x \cos y + yz)\bar{i} + (xz - e^x \sin y)\bar{j} + (xy + z)\bar{k}$ is conservative and find a potential function for it.
- c) Find $\bar{T}$ and $\bar{N}$ for the plane curve $\bar{r}(t) = \cos 2t \bar{i} + \sin 2t \bar{j}$; $t > 0$.

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

- a) Evaluate by using Green's theorem $\oint_C (2xy - x^2)dx + (x + y^2)dy$ where C is the closed curve of the region bounded by $y = x^2$ and $x = y^2$.
- b) Let $\bar{f}(t) = f_1(t)\bar{i} + f_2(t)\bar{j} + f_3(t)\bar{k}$ be a vector function of scalar variable t and $\bar{l} = l_1\bar{i} + l_2\bar{j} + l_3\bar{k}$ be a constant vector function. Then prove that $\lim_{t \rightarrow t_0} \bar{f}(t) = \bar{l}$ if and only if $\lim_{t \rightarrow t_0} f_1(t) = l_1$, $\lim_{t \rightarrow t_0} f_2(t) = l_2$, $\lim_{t \rightarrow t_0} f_3(t) = l_3$.
- c) Find divergence and curl of $x^2 y \bar{i} + xz \bar{j} + yz \bar{k}$ at $(4, 3, 2)$.

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

- a)
 - i) Evaluate $\int (2x - y + 4)dx + (5y + 3x - 6)dy$ around a triangle C in xy plane with vertices $(0, 0)$, $(3, 0)$, $(3, 2)$ traversed in counter clockwise direction.
 - ii) Using Gauss Divergence theorem, evaluate $\iint_S \bar{F} \cdot \hat{n} ds$ where S is the rectangular parallelopiped $0 \leq x \leq a, 0 \leq y \leq b, 0 \leq z \leq c$.
- b)
 - i) Prove that a vector field $\bar{F}$ is conservative on region D if and only if $\oint_C \bar{F} \cdot d\bar{r} = 0$ for every closed curve C in D .
 - ii) Prove by using Stoke's theorem that $\oint_C (\sin z dx - \cos x dy + \sin y dz) = 2$ where C is the boundary of the rectangle $0 \leq x \leq \pi, 0 \leq y \leq 1; z = 3$.



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[5215]-203

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 necessary.*
- 4) *Use of logtable and calculator is allowed.*

Q1) Attempt all of the following.

[10]

- a) Define angular simple harmonic motion.
- b) Define intensity of wave. Give it's unit.
- c) Give the differential equation for damped harmonic motion.
- d) Give any two industrial applications of Lissajous figures.
- e) The frequency of damped oscillator of mass 6 gram is 10 Hz. If the Q value is 600, determine the damping coefficient.
- f) What is velocity resonance?
- g) What is violet shift?
- h) Define reverberation and reverberation time.
- i) The velocity of transverse waves over a stretched string is 400 cm/sec. If its mass per unit length is 10 gm/cm. Find tension in the string.
- j) Draw kinetic energy, potential energy and total energy with position curves for undamped simple harmonic oscillator.

Q2) Attempt any two of the following.

- a) Show that the rate of absorption of energy is equal to the rate of dissipation of energy in case of forced oscillator. **[5]**
- b) Obtain an expression for velocity of longitudinal waves propagating through a medium of density ρ and bulk modulus of elasticity k **[5]**
- c) Describe stroboscopic method to determine frequency of tuning fork and A.C. signal. **[5]**

P.T.O.

Q3) Attempt any two of the following:

- a) The equation of damped motion is given by

$$8\left(\frac{d^2x}{dt^2}\right) + 24\left(\frac{dx}{dt}\right) + 48x = 0$$

Find the frequency of damped oscillation. [5]

- b) Electrons in an oscilloscope are deflected by two mutually perpendicular fields in such a manner that the displacement at any instant is given by $x = 4\sin(\omega t + 30^\circ)$ and

$$y = 4\sin \omega t$$

Find the nature and equation of resultant path. [5]

- c) An alternating emf of peak value 200 volt is applied across the series combination of an inductor of inductance 20 mH, a capacitor of capacitance $2\mu\text{f}$ and resistance of 50Ω . Determine resonant frequency, quality factor (Q) and band width. [5]

Q4) A) Attempt any one:

- a) i) $\phi = a e^{ik(x-ct)}$,

Does it represent the equation of wave motion? [4]

- ii) Show that the Doppler effect in sound is asymmetric in nature. [4]

- b) i) What are Lissajous figures? Describe optical method to demonstrate Lissajous figures. [4]

- ii) The amplitude of a pendulum of period 0.5 sec falls to half of its initial value in 230.3 sec. Determine the quality factor (Q). [4]

B) Attempt any one of the following:

- i) The intensity of two sounds are $1.2 \times 10^{-9} \text{ W/m}^2$ and $5 \times 10^{-10} \text{ W/m}^2$ respectively. Determine their relative loudness in decibels. [2]

- ii) What is seismology? Give any two applications of it. [2]



Total No. of Questions : 4]

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[5215]-204

S.Y.B.Sc. (Regular)

PHYSICS

PH-222 : Optics

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

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

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

Q1) Attempt all of the following: (One mark each)

[10]

- a) Write the lens maker's formula.
- b) State the cause of spherical aberration.
- c) Determine the focal length of convex lens of power 20 diopter.
- d) State the law of Malus.
- e) Define the term grating element.
- f) Why crosswires cannot be used in the Huygen's eyepiece?
- g) Calculate the focal length of biconvex lens for which the radius of curvature of each face is 25 cm. (Given - $\mu = 1.5$)
- h) What do you mean by resolving power of an optical instrument?
- i) What do you mean by Negative crystal?
- j) Define term linear magnification.

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

[10]

- a) Discuss the phenomenon of interference in the thin parallel sided film due to transmitted light. Obtain the expressions for minima and maxima for transmitted rays.
- b) Draw ray diagram of Ramsden's eyepiece and explain image formation. Obtain the expressions of principal points of Ramsden's eyepiece.
- c) Show that the distance of second principal plane from the second lens

of optical system of two waxial lenses is given by $\beta = \frac{-xF}{f_1}$.

P.T.O.

Q3) Attempt any two of the following: (Five marks each)

[10]

- a) Diameter of 10th dark ring in Newton's rings experiment is 0.5 cm. Calculate the radius of curvature of the lens and air thickness at the position of the ring. (Given: $\lambda = 5000\text{\AA}$)
- b) Two thin convex lenses of focal lengths 15 cm and 20 cm are co-axially 10 cm apart. Determine the positions of Principal points, focal points and sketch the points.
- c) Two thin convex lenses of same material having focal lengths f_1 and f_2 are separated by distance 10 cm. The combination of lenses satisfies condition of minimum spherical aberration and no chromatic aberration. Find the values of f_1 , f_2 and F .

Q4) a) Attempt the following:

- i) Draw ray diagram of simple microscope. Derive an expression for magnifying power of the simple microscope. **[4]**
- ii) Distinguish between Interference and diffraction. **[4]**

OR

- i) Derive the condition for achromatic combination of two thin lenses separated by finite distance. **[4]**
- ii) Distinguish between the Fraunhofer diffraction and Fresnel diffraction. **[4]**

b) Attempt any one of the following:

- i) Glass plate is to be used as a polarizer. Find the angle of polarization and angle of refraction. (Given: $\mu = 1.54$ for the glass) **[2]**
- ii) State the magnifying power of a compound microscope and sketch the ray diagram of compound microscope. **[2]**



Total No. of Questions :6]

SEAT No. :

[Total No. of Pages :3

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[5215] - 205

S.Y.B.Sc. (Regular)

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

SECTION - I

[Physical Chemistry]

Q1) Answer the following:

[5]

- a) Explain the term: Gibbs free energy.
- b) Define the term: Non ideal solution.
- c) State Raoult's law.
- d) Explain the term: Conjugate solutions.
- e) State Henry's law.

Q2) a) Attempt any two of the following:

[6]

- i) Explain the applications of Clapeyron's equation.
- ii) Derive the following relations:

1) $\left[\frac{\partial A}{\partial T} \right]_V = -S$ and

2) $\left[\frac{\partial A}{\partial V} \right]_T = -P$

- iii) Explain the maximum and minimum critical solution temperature systems.

P.T.O.

b) Attempt any TWO of the following: [4]

- i) What are K_p & K_c ? Give the relation between K_p & K_c .
- ii) Define :
 - 1) Molarity and
 - 2) Normality
- iii) Draw the P-N diagrams of solution with positive deviation.

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

- a) Calculate the free energy change, when two moles of an ideal gas are expanded isothermally from 0.05 dm^3 to 0.5 dm^3 at 25°C
(Given : $R = 8.314 \text{ J/K/mole}$)
- b) The vapour pressure of benzene at 20°C is 0.99×10^4 Pascal and at 30°C is 1.57×10^4 Pascal.
Calculate the heat of vapourisation of benzene (Given : $R = 8.314 \text{ J/K/mole}$).
- c) In a mixture of A & B, the percent by weight of A is 80. Calculate mole fraction of A & B.
(Given : Molecular weight of A=120 and B=90)

SECTION - II
(Analytical Chemistry)

Q4) Answer the following: [5]

- a) Define the term 'Molarity'.
- b) What do you mean by suitable indicator used in acid-base titration?
- c) Define the term 'Primary Standard Substances'.
- d) What is 'Universal Indicator'?
- e) What is 'Iodometry'?

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

- i) Explain the titration curve of sodium hydroxide and acetic acid.
- ii) Explain complexometric titration with suitable example.
- iii) Write a note on 'Calibration of burette'.

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

- i) Give the pH transition range and colour in acid and base form for
 - 1) Bromothymol blue
 - 2) Methyl orange
- ii) How will you prepare 0.1N KIO_3 solution? How will you standardize sodium thiosulphate solution by using KIO_3 solution?
- iii) Explain the terms-
 - 1) Parts per thousand
 - 2) Parts per million

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

- a) What is the pH of solution after adding 30 ml 0.1N NaOH to 50 ml 0.1 N HCl?
- b) In a redox titration, Calculate the emf of the cell (E_{cell}) when 40 ml of 0.1M Ce^{4+} solution is added to 100 ml 0.1M Fe^{2+} solution.

(Given : $E^0_{\text{Fe}^{3+}/\text{Fe}^{2+}} = 0.771\text{V}$)

- c) When 20 ml of 0.1N NaOH reacts with 12 ml of HCl, Calculate normality and strength of HCl. (Given : Mol. weight of HCl = 36.5)



Total No. of Questions : 6]

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[5215]-206

S.Y.B.Sc. (Regular)

CHEMISTRY

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

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

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

SECTION - I

(Organic Chemistry)

Q1) Attempt the following questions :

[5]

- a) What is oxidation? Give one example of oxidising agent.
- b) Give application of biochemistry in environmental balance.
- c) Define Huckel rule with example.
- d) Draw structure of maltose.
- e) Explain the use of Jone's reagent for oxidation of alcohol.

Q2) a) Answer any two of the following :

[6]

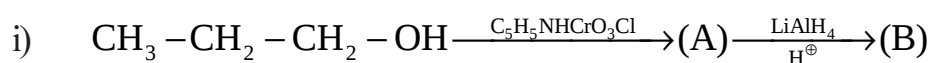
- i) Give synthesis of thiophene. What is the action of following on thiophene?



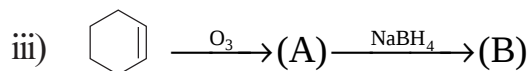
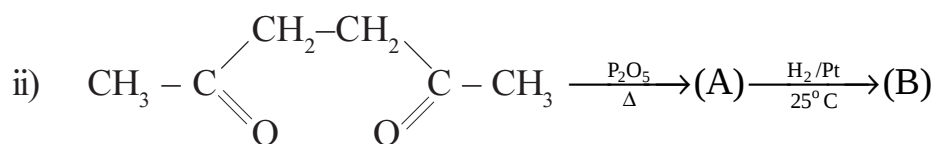
- ii) Explain Ruff degradation method for aldohexose.
- iii) Give any three applications of NaBH_4 , with suitable example.

b) Assign (A) and (B) of the following (any two) :

[4]



P.T.O.



Q3) Attempt ANY TWO of the following : **[5]**

- Explain α -helical structure of proteins.
- Give Skraup's synthesis of quinoline.
- Give classification of α -amino acid with one example of each class.

SECTION - II **(Inorganic Chemistry)**

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

- Give the general electronic configuration of transition metals.
- How many bridging carbonyls present in $\text{CO}_2(\text{CO})_8$?
- Define conjugate acid-base pair and explain it with suitable example.
- Which disease is caused due to cadmium ion?
- Identify Lewis acid from the following :
 Ag^+ , Cu^{+2} , CN^- , H_2O .

Q5) a) Answer ANY TWO of the following : **[6]**

- What are transition elements? Explain the following properties of these elements.
 - Complex formation ability.
 - Size of atoms and ions.
- Explain the methods of synthesis of metal carbonyls.
- What are oxyacids? Explain relation between strength of oxyacids and number of non-hydrogenated oxygen atom with example.

- b) Attempt ANY TWO of the following : [4]
- i) Write the toxic elements in water and toxic chemicals elements in air.
 - ii) “ CuSO_4 is blue in colour”. Explain.
 - iii) Why BBr_3 is stronger Lewis acid than BF_3 ?

Q6) Answer ANY TWO of the following : [5]

- a) Write short note on Biochemical effect of lead.
- b) What is spin-only formula? Calculate magnetic moment of Zn^{+2} and Ni^{+2} by using spin-only formula. (Atomic number of Zn = 30 and Ni = 28)
- c) Define $18e^-$ rule? Find out valence electrons in the following metal carbonyls.
 - i) Mo(CO)_6 .
 - ii) Os(CO)_5(Atomic number of Mo = 42 and Os = 76)



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[5215] -207

S.Y.B.Sc.(Regular)

BOTANY

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

Q1) Answer the following:

[10]

- a) Define Anatomy
- b) What is epidermal tissue system?
- c) Define normal secondary growth
- d) What is inflexibility?
- e) What are lenticels?
- f) Define double fertilization
- g) What is porogamy?
- h) Define anemophily?
- i) What is endosperm?
- j) Define megasporogenesis

P.T.O.

Q2) Answer any two of the following:

[10]

- a) Explain the structure and functions of xylem
- b) Describe the secondary growth in Annona stem
- c) Describe the development of cellular endoperm

Q3) Write notes on (any two)

[10]

- a) Principle of inextensibility.
- b) Tetrasporangiate anther.
- c) Structure of mature seed.

Q4) a) What is embryosac? Explain the development of monosporic embryo sac.

[10]

OR

- b) What is anomalous secondary growth? Describe anomalous secondary growth in Bignonia stem

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Total No. of Questions :4]

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[5215] - 208

S.Y.B.Sc. (Regular)

BOTANY

BO -222:Plant Biotechnology

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

Time : 2 Hours]

[Max. Marks :40

Instructions to the candidates:

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

Q1) Answer the following :

[10]

- a) Define Biotechnology.
- b) What is scp?
- c) What is rhizofiltration?
- d) Define genetic engineering.
- e) What are nanopesticides
- f) Enlist the vectors used in plant genetic engineering
- g) What is bioreactor?
- h) Define enzyme immobilization.
- i) Write the principle of electrophoresis.
- j) What is nucleoside?

P.T.O.

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

- a) Give the concept of environmental sustainability.
- b) Describe industrial applications of fermentation.
- c) Explain the applications of plant genetic engineering in improving insect-pest resistance.

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

- a) Principles of microbial growth.
- b) Structure of DNA.
- c) Uses of SCP.

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

OR

What is direct gene transfer? Describe any two methods in detail. **[10]**

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[5215]-209

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

Q1) Attempt the following:

[10]

- a) State the function of scroll valve.
- b) What is clasper?
- c) Define diastole.
- d) What is mesovarium?
- e) Define venous heart.
- f) Give any two examples of class Eutheria.
- g) Give functions of membranous labyrinth.
- h) Enlist any two aquatic mammals.
- i) What is longitudinal migration?
- j) Give any two examples of subclass diapsida.

Q2) Write short notes on(Any Two):

[10]

- a) Aerial adaptation in birds.
- b) Write distinguishing characters of subclass neornithes.
- c) Placoid scales.

P.T.O.

Q3) Attempt the following(Any Two):

[10]

- a) Sketch and label digestive system of Scoliodon.
- b) Write distinguishing characters of subclass archosauria.
- c) Raptorial and Perching feet.

Q4) Describe male urinogential system of Scoliodon.

[10]

OR

Give an account of general characters of mammalia and distinguishing characters of subclass theria.



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[5215] - 210

S.Y.B.Sc. (Regular)

ZOOLOGY - II

ZY-222: Applied Zoology - II

(Apiculture and Sericulture)

(51222) (Revised 2013 Pattern) (Paper - II) (Semester - II) (Theory)

Time : 2 Hours]

[Max. Marks :40

Instructions to the candidates:

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

Q1) Attempt the following :

[10]

- a) What is Apiculture?
- b) Write the biological name of Giant bee?
- c) What is Moriculture?
- d) What is sun drying?
- e) Mention any two uses of Royal jelly.
- f) Write biological name of Eri silkworm.
- g) What is the use of smoker.
- h) Mention any two pests of silk worm.
- i) Mention the names of any two broad diseases of Honey bee.
- j) What is pruning?

P.T.O.

Q2) Write short Notes on : (Any Two) : **[10]**

- a) Composition and uses of Bee wax.
- b) Bee veil.
- c) Shelf Rearing method in sericulture.

Q3) Attempt the following : (Any Two) : **[10]**

- a) Sketch and label - Bee Hive (Honey comb).
- b) Describe shoot rearing method in sericulture.
- c) Mountages in sericulture.

Q4) Describe life cycle of Honey bee. **[10]**

OR

What is harvesting? Describe various methods of mulberry harvesting.



Total No. of Questions :4]

SEAT No. :

[Total No. of Pages :2

P443

[5215] - 211

S.Y.B.Sc. (Regular)

GEOLOGY

GL - 221:Petrology

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

Time : 2 Hours]

[Max. Marks :40

Instructions to the candidates:

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

Q1) Answer the following questions.

[10]

- a) Define ophitic texture.
- b) Define sphericity of Sedimentary particle.
- c) Mention any two factors determining texture of Igneous rocks.
- d) Define Diagenesis.
- e) Define intersertal texture.
- f) Name two modes of mechanical transport.
- g) Define spherulitic structure.
- h) Define competency of transporting medium.
- i) Mention all the volatile constituents of magma.
- j) What is cement in the sediments?

P.T.O.

Q2) Write notes on (Any Two)

[10]

- a) Laterite and Bauxite.
- b) Regional metamorphism of Argillaceous rocks.
- c) Stress and Antistress minerals.

Q3) Write notes on (Any Two)

[10]

- a) Cataclasis and any two of its products.
- b) Classification of Igneous rocks based on the depth of formation with examples.
- c) 1) Mica Garnet schist 2) Gneiss

Q4) Define Primary Sedimentary structures. Explain the origin and environmental significance of Ripple marks and Graded Bedding

[10]

OR

Describe the crystallization of Bicomponent magma with the help of solid solution series (mixed crystals - plagioclase series).

& & &

Total No. of Questions :4]

SEAT No. :

[Total No. of Pages :2

P444

[5215] - 212

S.Y.B.Sc. (Regular)

GEOLOGY

GL : 222 : Stratigraphy and Palaeontology

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

Time : 2 Hours]

[Max. Marks :40

Instructions to the candidates:

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

Q1) Answer the following questions.

[10]

- a) Define stratigraphy.
- b) Name lithostratigraphic units.
- c) Define macroevolution in organisms.
- d) Give any two principles of stratigraphy.
- e) Define micropalaentology.
- f) Assemblage zone.
- g) Define glabella in Trilobites.
- h) Types of microfossils.
- i) Define chronozone.
- j) Spinosity of Trilobites.

Q2) Write short notes on (any two).

[10]

- a) Use of marker beds and radioactivity in correlation.
- b) Morphology of Radiolaria.
- c) Non - uniform deposition in controlling stratification.

P.T.O.

Q3) Explain the following (any two). **[10]**

- a) Cycles in vertical succession.
- b) Types of hinges in ostracods.
- c) Give systematic position and palaeo - ecological significance of foraminifers.

Q4) Explain various surface stratigraphic procedures used for collection of stratigraphic field data. **[10]**

OR

Define evolution. Explain evolutionary trends in ammonoids. **[10]**



Total No. of Questions :4]

SEAT No. :

[Total No. of Pages :4

P445

[5215] - 213

S.Y.B.Sc. (Regular)

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 abbreviations have their usual meaning.*

Q1) Attempt each of the following:

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

a) The multiple correlation coefficient lies between

- | | |
|--------------|---------------------------|
| i) 0 to 1 | ii) 0 to ∞ |
| iii) -1 to 1 | iv) $-\infty$ to ∞ |

b) Type I error is

- i) accept H_0 when it is true
- ii) reject H_0 when it is true
- iii) accept H_0 when it is false
- iv) reject H_0 when it is false.

P.T.O.

- c) The following death rate is used for comparison of mortality of two populations A and B.
- i) CDR
 - ii) infant death rate
 - iii) male death rate
 - iv) standardized death rate
- B) State whether the given statement is true or false in each of the following: **[1 each]**
- a) Larger is the value of $R^2_{Y \cdot X_1 X_2}$ (ie $R^2_{1.23}$), stronger is the linear relation between the three variables.
 - b) Null hypothesis is rejected if p-value is greater than the level of significance.
 - c) If $\lambda = 12$ per hour and $\mu = 15$ per hour in M/M/1 model then average number of customers in the system is equal to 4.
- C) Define general fertility rate (G.F.R.). **[1]**
- D) Define the 'queue' in queuing theory. **[1]**
- E) Write the command in R - software to draw a sample of size 10 from a population of 120 units by SRSWR. **[1]**
- F) Define p - value. **[1]**

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

- a) Derive the expression for multiple correlation coefficient $R_{Y \cdot X_1 X_2}$ (ie $R_{1.23}$) in terms of total correlation coefficients.
- b) Explain a large sample test to test $H_0: \mu_1 = \mu_2$ against $H_1: \mu_1 > \mu_2$, where 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.

- c) The yields (in kg. per plot) of jute from 9 plots in subdivision A and 7 plots in subdivision B are given below:

Subdivision A : 57, 81, 71, 85, 86, 37, 72, 51, 63

Subdivision B : 55, 56, 54, 45, 72, 80, 60.

Write commands in R- software to test at 2% level of significance whether subdivision A has greater variability regarding yield per plot as compared to subdivision B.

Q3) Attempt any two of the following:

[5 each]

- Explain the test for testing $H_0: P_1 = P_2$ against $H_1: P_1 \neq P_2$, where P_1 and P_2 are population proportions of two populations. The sizes n_1 and n_2 of random samples, taken from these two populations, are large.
- Explain M/M/1: FIFO model. Derive the expression for the average number of customers in queue under this model.
- Find G.F.R. and T.F.R. for the following data:

Age - group (in yrs.)	15-25	25-35	35-45	45-55
No. of Females	2400	2000	1500	500
No. of Births	80	120	75	01

Q4) Attempt any one of the following:

- Explain how to construct a $100(1 - \alpha)\%$ confidence interval for population mean (μ) of normal distribution when standard deviation σ is known, while testing $H_0: \mu = \mu_0$ against $H_1: \mu \neq \mu_0$. **[5]**

- ii) Define multiple correlation coefficient $R_{Y \cdot X_1 X_2}$, and partial correlation coefficient $r_{YX_2 \cdot X_1}$, hence prove that

$$(1 - R_{Y \cdot X_1 X_2}^2) = (1 - r_{YX_1}^2)(1 - r_{YX_2 \cdot X_1}^2)$$

$$\text{i.e. } (1 - R_{1.23}^2) = (1 - r_{12}^2)(1 - r_{13.2}^2) \quad [5]$$

- b) i) A machine is designed to fill plastic bags with one litre of milk, with a standard deviation of 0.10 litre. A random sample of 100 filled up bags was examined and the average volume was found to be 0.95 litre. Carry out a test of hypothesis to test whether the population mean is one litre or not, for the machine. State your conclusion (use 5% level of significance). [5]
- ii) In a trivariate data the total correlation coefficients are $r_{12} = 0.7$, $r_{13} = -0.8$ and $r_{23} = 0.9$. Are these values consistent? [3]
- iii) Interpret the cases: $N.R.R. = 1$ and $N.R.R. > 1$. [2]



Total No. of Questions :4]

SEAT No. :

[Total No. of Pages :4

P446

[5215] - 214

S.Y.B.Sc. (Regular)

STATISTICS

**ST-222: Sampling Distributions and Inference
(2013 Pattern) (Semester - II) (Paper - II) (Theory)**

Time : 2 Hours]

[Max. Marks :40

Instructions to the candidates:

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

Q1) Attempt each of the following:

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

a) 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 is

i) 10

ii) 44

iii) 22

iv) 20

b) If $X_1, X_2, \dots, X_{25}$ is a random sample from $N(\mu, \sigma^2)$ and

$\sum_{i=1}^{25} (X_i - \bar{X})^2 = 120$ then the distribution of $\sqrt{5}(\bar{X} - \mu)$ is

i) t_{26}

ii) t_{24}

iii) t_{50}

iv) t_{25}

P.T.O.

- b) State and prove the limiting distribution of a random variable T which follows t -distribution with n d.f.
- c) i) Let $X_i, i=1,2,\dots,6$ be independent standard normal variates.

Identify the distribution of $U = \frac{5X_2^2}{X_1^2 + X_3^2 + X_4^2 + X_5^2 + X_6^2}$.

Hence find the value of 'C' such that $P(U \geq C) = 0.01$.

- ii) Let X be a random variable follows t -distribution with 6 d.f. Find 'a' such that $P(X^2 \leq a) = 0.01$.

Q3) Attempt any two of the following:

[5 each]

- a) If $X_1, X_2, \dots, X_{n_1}$ is a random sample from $N(\mu_1, \sigma_1^2)$ distribution and $Y_1, Y_2, \dots, Y_{n_2}$ is another independent random sample from $N(\mu_2, \sigma_2^2)$ distribution then explain the test procedure for testing $H_0: \sigma_1^2 = \sigma_2^2$ against $H_1: \sigma_1^2 \neq \sigma_2^2$.
- b) If $X_1, X_2, \dots, X_{10}$ is a random sample from $N(4, 9)$ then find
- i) $E(S^2)$ ii) $\text{Var}(S^2)$ iii) $P(S^2 \geq 17.711)$.

where S^2 is a sample variance.

- c) Following are the average weekly losses of work hours due to accidents in 8 industrial plants before and after a certain safety programme was put into operation.

Plant number	1	2	3	4	5	6	7	8
Before	45	73	46	124	33	57	83	34
After	36	60	44	119	35	51	77	29

Test at 5% level of significance (l.o.s.) whether the safety programme is effective.

Q4) Attempt any one of the following:

- a) i) Let X and Y be independent χ^2 variates with m and n d.f. Show that $X+Y$ and $\frac{X}{Y}$ are independently distributed. [6]

- ii) The following table gives information about colour blindness of right and left eye of a group of people in certain city.

		Colour blindness in left eye	
		Present	Absent
Colour blindness in right eye	Present	100	17
	Absent	05	8

Test whether vision quality of two eyes is same as far as colour blindness is concerned. Use 5% L.O.S. [4]

- b) i) Let $X_1, X_2, \dots, X_n$ be a random sample from $N(5, \sigma^2)$. Derive the test statistic to test $H_0: \sigma^2 = \sigma_0^2$ against $H_1: \sigma^2 \neq \sigma_0^2$. Give a real life situation of it. [5]

- ii) Define the following terms:

I) Statistic

II) Parameter

III) Standard error of statistic [3]

- iii) State mean and mode of F-distribution. Hence discuss the nature of probability curve of it. [2]



Total No. of Questions :4]

SEAT No. :

[Total No. of Pages :2

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[5215] - 215

S.Y.B.Sc.

GEOGRAPHY

Gg-221: Geography of Resources - II (Paper - I)
(2013 Pattern) (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 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 the types of iron ore with iron content.
- b) Name any four leading bauxite producing countries in the world.
- c) Write four uses of mineral resources.
- d) Name any four leading coal producing states in India.
- e) Name any four wind energy generating countries in the world.
- f) Name any two nuclear energy producing countries in the world.
- g) Name any four non-conventional energy resources.
- h) What is meant by under population?
- i) Name any four factor's affecting the distribution of population.
- j) What is meant by population density?
- k) Write the sources of land pollution.
- l) Define the term resource planning.
- m) Write any two needs of resource planning.

P.T.O.

Q2) Write short notes on the following (Any Two):

[10]

- a) Production of iron ore in India.
- b) Need of resource planning.
- c) Factors affecting on distribution of population.
- d) Distribution of natural gas in the world.

Q3) Answer the following questions in 100 words each (Any Two):

[10]

- a) Give an account of distribution of bauxite in world.
- b) What are the advantages and disadvantages of over population.
- c) Explain the role of energy resources in economic development.
- d) Resource planning in India.

Q4) Answer the following questions in 200 words (Any One):

[10]

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

EEE

Total No. of Questions : 4]

SEAT No. :

[Total No. of Pages : 2

P448

[5215]-216

S.Y.B.Sc. (Regular)

GEOGRAPHY

Watershed Management - II

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

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

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

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

- a) What is resource appraisal?
- b) What is watershed?
- c) What is watershed planning?
- d) What is resource mapping?
- e) Define rainfed catchments.
- f) Write any two importance of watershed planning in national development.
- g) Write any two benefits of watershed planning.
- h) Write any two benefits of small rainfed catchments.
- i) Write any two benefits of soil conservation.
- j) What is a forestation?
- k) What is dryland farming?
- l) What is energy plants?
- m) Write any two benefits of Grass and Trees plantation.

P.T.O.

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

- a) Need of planning for small rainfed catchments.
- b) Contour bunding.
- c) Aforestation.
- d) House-roof rainwater harvesting.

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

- a) Explain the importance of watershed planning.
- b) Explain food security in watershed planning.
- c) Explain traditional methods of water conservation.
- d) Explain energy plants in watershed development programmes.

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

- a) Explain the methods of resource appraisal with examples.
- b) Explain the cost sharing and restoration of landscape in watershed planning.



Total No. of Questions : 4]

SEAT No. :

[Total No. of Pages : 2

P449

[5215]-217

S.Y.B.Sc. (Regular)

MICROBIOLOGY

MB-221: Bacterial Genetics

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

Q1) Attempt the following questions:

[10×1=10]

- a) DNA is the genetic material in bacteriophages was discovered by_____&_____.
- b) In case of Ti plasmid, Ti stands for_____.
- c) In prokaryotes, _____ is the first amino acid added into the growing polypeptide chain during translation.
- d) Non - sense mutation may result into premature termination of the polypeptide chain synthesis (T/F).
- e) Genetic code is non-overlapping in nature (T/F).
- f) What is the role of primase enzyme in DNA replication.
- g) Name any one agent used for curing of plasmid.
- h) Define - Induced mutation.
- i) Define - Transversion.
- j) Draw structure of Guanine.

Q2) Attempt Any two of the following:

[10]

- a) Diagrammatic representation of organization of bacterial DNA.
- b) Fluctuation test.
- c) λ -phage DNA replication.

P.T.O.

Q3) Answer any two of the following:

[10]

- a) Describe B-form of DNA.
- b) What are plasmids ? Enlist different types of plasmids. Add a note on curing of plasmids.
- c) Write a note on 'Reversion' mutation.

Q4) Attempt any one of the following:

[10]

- a) What are frameshift mutations ? Describe in detail mode of action of x-rays and ultra-violet rays as a mutagenic agent.
- b) Explain initiation and elongation stages of transcription. Add a note on RNA polymerase.



Total No. of Questions :4]

SEAT No. :

[Total No. of Pages :2

P450

[5215] - 218

S.Y.B.Sc.

MICROBIOLOGY

MB -222: Air & Water Microbiology

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

Time : 2 Hours]

[Max. Marks :40

Instructions to the candidates:

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

Q1) Attempt the following.

[10]

- a) Define
 - i) Aerosol.
 - ii) Demineralized water.
- b) Enlist any two agencies to implement bacteriological standards for potability of water.
- c) Total solids from waste water are removed by _____.
- d) Enlist organisms involved in Biomethanation.
- e) Permissible limit of BOD of any effluent water after treatment to release in natural water bodies is _____.
- f) What is the effect of lead on human health?
- g) Name the indicator organisms that indicates past fecal pollution of water.
- h) How will you determine typical colonies on Endo agar?
- i) Aspergillosis is a water borne infection. State true or false.

P.T.O.

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

- a) Diagrammatically describe Anderson's Air sampler.
- b) Enlist any five water borne infections with their causative agents.
- c) Write a short note on Eutrophication.

Q3) Answer any two of the following [10]

- a) What is air sanitation? Enlist various physical methods used for air sanitization. Describe the mechanism of action & applications of any one physical method in detail.
- b) Compare : MFT & MPN.
- c) Justify: Presence of Bifidobacterium as an indicator of fecal pollution.

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

- a) Enlist raw material used in biogas production. Describe the biochemical mechanism involved in biomethanation. Add a note on applications of biogas as renewable energy source.
- b) Describe presumptive coliform count test for bacteriological analysis of water for potability. Add a note on Elevated temperature test.



Total No. of Questions :4]

SEAT No. :

[Total No. of Pages :2

P451

[5215] - 219

S.Y.B.Sc.

PSYCHOLOGY

EP - 221 : Health Psychology

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

Time : 2 Hours]

[Max. Marks :40

Instructions to the candidates:

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

Q1) Answer in two or four sentences:

[16]

- a) What is conflict?
- b) What is illness?
- c) Define health psychology.
- d) What is AIDS?
- e) What is striking out at others.
- f) What is coping?
- g) Define stress.
- h) What is burnout?

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

[8]

- a) Explain Post-Traumatic Stress Disorders (PTSD).
- b) Explain the effect of overeating on health.
- c) Explain the mind and body connection.

P.T.O.

Q3) Write short notes (any two)

[8]

- a) Giving up.
- b) Biomedical model of illness.
- c) Lack of exercise and health.

Q4) Explain in detail potential effects of stress.

[8]

OR

Explain in detail common coping patterns.



Total No. of Questions :4]

SEAT No. :

[Total No. of Pages :2

P452

[5215] - 220

S.Y.B.Sc.

PSYCHOLOGY

EP - 222 : Psychological Testing and Assessment

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

Time : 2 Hours]

[Max. Marks :40

Instructions to the candidates:

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

Q1) Answer in two or four Sentences:

[16]

- a) Define Neuropsychology.
- b) Define mental disorder.
- c) Define aptitude.
- d) Define a psychological test.
- e) State the full form of SVIB.
- f) What is motivation?
- g) What is DSM?
- h) What is attitude?

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

[8]

- a) What is the difference between checklist and rating scale.
- b) Explain any one aptitude test used in educational assessment.
- c) Explain Minnesota Clerical test.

P.T.O.

Q3) Write short notes (any two)

[8]

- a) Scholastic Assessment Test (SAT).
- b) Forensic psychological assessment.
- c) Bender visual motor Gestalt test.

Q4) Define achievement. Explain any two types of achievement test.

[8]

OR

Explain any two types of tests used for personality measurement.



Total No. of Questions : 4]

SEAT No. :

[Total No. of Pages : 2

P453

[5215]-223

S.Y. B.Sc. (Regular)

ELECTRONIC SCIENCE-I

**EL -221 : Electronic Instrumentation
(2013 Pattern) (Semester-II) (Paper - I)**

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

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

Q1) Answer All of the following:

- a) State the role of inverter in UPS. [1]
- b) Define rms of the signal. [1]
- c) What is function generator? [1]
- d) State the advantages of digital thermometer. [1]
- e) "Speedometer is rpm meter".- Comment. [2]
- f) "In SMPS switching of the transistor is controlled as duty cycle of the pulse". Comment. [2]
- g) Find the static error if digital voltmeter reads 6.30v and true value is 6.25v. [2]
- h) Calculate the speed of tachometer in rpm. Given pulses per second is 400 and number of teeth on rotar is 40. [2]

Q2) Attempt any TWO of the following:

- a) Explain signal generator with block diagram and state the use of attenuation knots. [4]
- b) Draw block diagram of measurement system and explain each block in short. [4]
- c) Explain various blocks of SMPS. [4]

P.T.O.

Q3) Attempt any TWO of the following:

- a) Draw the circuit diagram of DC ammeter and explain its working. [4]
- b) Distinguish between alternate mode and chop mode of a dual trace CRO. [4]
- c) Explain with neat diagram regulated fixed DC power supply. [4]

Q4) Attempt the following:

- a) What is digital storage oscilloscope? Draw its block diagram and explain it in brief. [6]
- b) Explain the working principle of DFM with suitable block diagram. How time period can be measured using DFM. [6]

OR

- a) Calculate % duty cycle of the square wave when $T_{ON}=0.4\text{ms}$ and $T_{OFF}=0.6\text{ms}$. Also determine the percentage duty cycle when $T_{ON}=T_{OFF}$. [4]
- b) Design a multirange voltmeter for ranges $v = 0-50\text{v}$ and $0-100\text{v}$ when internal resistance R_m is 50Ω and full scale deflection current is 1mA . [4]
- c) Calculate output voltage of a variable power supply having $R_1=1.5\text{k}\Omega$ and $R_2=1\text{K}\Omega$ when regulated input voltage is 5V . [4]



Total No. of Questions :4]

SEAT No. :

[Total No. of Pages :2

P454

[5215] - 224

S.Y.B.Sc.

ELECTRONIC SCIENCE

**EL-222: Communication Electronics
(2013 Pattern) (Semester - II) (Paper - II)**

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 of question.*

Q1) Attempt ALL of the following :

- a) State the role of hook switch in basic telephone handset. [1]
- b) What do you mean by full duplex? [1]
- c) Define distortion in radio receiver. [1]
- d) List various types of emphasis in FM. [1]
- e) "In ringing tone ringing current usually has double ring pattern." Comment. [2]
- f) "FM is less noisy than AM". Comment. [2]
- g) Calculate bandwidth required for transmission of FM signal (Given $f_d = 10\text{kHz}$ and $F_m = 2\text{kHz}$) [2]
- h) Determine signal to noise ratio if a receiver has an input signal power of $1.6\mu\text{ Watt}$ and the noise power is $0.4\mu\text{ Watt}$. [2]

Q2) Attempt any TWO of the following :

- a) Draw the block diagram of communication system. Explain the role of each block. [4]
- b) Define amplitude modulation and derive the equation for AM wave. [4]
- c) Explain FM generation using Varactor diode. [4]

P.T.O.

Q3) Attempt any TWO of the following:

- a) What are the different tones in telephone system. Explain with proper waveform. [4]
- b) What is MODEM? Draw the block diagram of MODEM. [4]
- c) Compare serial and parallel communication system. [4]

Q4) Attempt all of the following :

- a) Draw block diagram of super heterodyne receiver and explain the role of each block. [6]
- b) Explain the concept of PAM and PWM in detail. [6]

OR

- a) Calculate the r.m.s. noise voltage appearing across $10\text{k}\Omega$ resistor at room temperature for an effective noise bandwidth 10kHz . [4]
- b) The output voltage of AM transmitter is given by $300(1 + 0.4\sin 6280t)\sin(3.14 \times 10^7)t$. This voltage is fed to a load of 500Ω resistance. Determine
 - i) Carrier frequency
 - ii) Modulating frequency
 - iii) Carrier power
 - iv) Total power output [4]
- c) Determine the percent modulation of FM wave with a frequency deviation of 12kHz for
 - i) FM broadcast
 - ii) TV broadcast [4]



Total No. of Questions :4]

SEAT No. :

[Total No. of Pages :2

P455

[5215] - 225

S.Y.B.Sc.

DEFENCE AND STRATEGIC STUDIES

DS - 201 ; Conflict Management and Resolution

(2013 Pattern) (Semester - II) (New) (Theory) (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 2 or 4 Sentences each:

[16]

- a) Write the meaning of world order.
- b) Define Conflict studies.
- c) State the meaning of conflict Transformation.
- d) Define peace Research.
- e) Define Arms control.
- f) Define municipal law.
- g) What are the methods of pacific settlement?
- h) Define human security.

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

[8]

- a) Write a note on the role of U.N.O in arms control.
- b) Explain legal means of conflict resolution.
- c) Discuss U.N and human rights.
- d) What are the sources of International law? Discuss.

P.T.O.

Q3) Write short notes on (any two)

[8]

- a) Conflict management.
- b) Political functions of U.N.
- c) Role of communication in conflict management.
- d) Specialized agencies of U.N.O

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

[8]

- a) Describe role of international law in maintaining global peace.
- b) Write a note on the achievement and challenges of peace research.



Total No. of Questions :4]

SEAT No. :

[Total No. of Pages :2

P456

[5215] - 226

S.Y.B.Sc.

DEFENCE AND STRATEGIC STUDIES

DS. No. 202:- Geopolitics

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

Time : 2 Hours]

[Max. Marks :40

Instructions to the candidates:

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

Q1) Answer in 2 or 4 sentences each.

[16]

- a) Define “Geopolitics”.
- b) Where the Andaman & Nicobar Islands located?
- c) Define “state”.
- d) What do you mean by “ Maritime Boundaries”?
- e) State the long form of E.E.Z.
- f) What do you understand by strategic minerals?
- g) State the location of “Diego Garcia Islands”
- h) Define “Frontier”

Q2) Answer in 8 or 10 sentences [Any Two]

[8]

- a) Explain the concept of “Nation”
- b) Write in brief geostrategic position of Jammu & Kashmir
- c) Explain the “Territory” as a field of geopolitics.

P.T.O.

Q3) Write short notes on [Any Two]

[8]

- a) Population as a field of geopolitics.
- b) Nature of strategic Minerals.
- c) Geostrategic importance of Sia-chen glacier.

Q4) Answer in 16 To 20 sentences.[Any One]

[8]

- a) Highlight on geostrategic position & importance of Andaman & Nicobar Islands with special reference to Indias Maritime Security.
- b) Explain the vital basic elements for creation of state.



Total No. of Questions :4]

SEAT No. :

[Total No. of Pages :2

P457

[5215] - 227

S.Y.B.Sc. (Regular)

DEFENCE AND STRATEGIC STUDIES

DS -203: Contemporary World and Security

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

Time : 2 Hours]

[Max. Marks :40

Instructions to the candidates:

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

Q1) Answer in 2 to 4 sentences each.

[16]

- a) Define National Security.
- b) What is meant by Contemporary Strategy?
- c) Define Cyber War.
- d) Introduce about India's National Values.
- e) What is Non-Military Threats?
- f) What is meant by Food Security?
- g) What is meant by Military Strategy?
- h) What is meant by National Interest?

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

[8]

- a) Discuss India's strategic position in South Asia?
- b) Write about Environmental Issues and its relation to world security.
- c) Explain about Human Rights and its violations.

P.T.O.

Q3) Write short notes on (any two)

[8]

- a) Dynamics of Geopolitics in Indian sub Continent.
- b) India and West Asia.
- c) India and Central Asia.

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

[8]

- a) Discuss about the problem of Terrorism and Insurgency in Asia.
- b) Discuss coercive presence of USA in Asia.



Total No. of Questions :4]

SEAT No. :

[Total No. of Pages :2

P458

[5215] - 228

S.Y.B.Sc.

ENVIRONMENTAL SCIENCE

**EVS-201: Biological Diversity & its Conservation (Paper - I)
(2013 Pattern) (New) (Semester - II)**

Time : 2 Hours]

[Max. Marks :40

Instructions to the candidates:

- 1) All questions are compulsory.*
- 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 each:

[10]

- a) Define: Biological diversity and give its type.
- b) State the difference between species Richness & species abundance.
- c) Write significance of molecular Marker Technique.
- d) Write non-ecological significance of Biodiversity.
- e) What are Genetically Modified Organisms.
- f) Write the importance of Ex-situ conservation technique.
- g) Give the full form of CITES and IUCN.
- h) Name any two world Heritage sites?
- i) What are Sacred groves? Give one example from Maharashtra.
- j) Define: Endemism.

P.T.O.

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

- a) Biodiversity at National level.
- b) Threats to Biodiversity with examples.
- c) In-situ conservation methods.

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

- a) Explain in detail Environment Protection Act.
- b) Discuss Silent Valley Movement.
- c) Describe the traditional methods of Biodiversity conservation.

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

- a) Explain Udvardy's and Bailey's classification of ecosystem in detail.
- b) Discuss in detail international efforts for conservation of Biodiversity.

EEE

Total No. of Questions :4]

SEAT No. :

[Total No. of Pages :2

P459

[5215] - 229

S.Y.B.Sc. (Regular)

ENVIRONMENTAL SCIENCE

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

Time : 2 Hours]

[Max. Marks :40

Instructions to the candidates:

- 1) All questions are compulsory and carry equal marks.*
- 2) Neat 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) Mention any two drawbacks associated with 'Incineration'.
- b) What are 'Injection Wells'?
- c) What is principle behind 'Wet Scrubbing' of air pollutants?
- d) Define the term 'Bio remediation'.
- e) Write the importance of 'Reverse Osmosis' in control of water pollution.
- f) What is meant by 'Vibration Damping'?
- g) Write the names of any two sound proofing materials.
- h) What is the principle behind 'Activated Sludge Process'?
- i) Write any two benefits associated with biological waste management.
- j) What are 'Spray Ponds'?

P.T.O.

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

[10]

- a) Cooling Tower's.
- b) Electrostatic precipitator.
- c) Control of Nuclear Pollution.

Q3) Attempt ANY TWO questions from the following:

[10]

- a) What are trickling filters? Discuss mechanism with suitable diagram.
- b) What is meant by solid waste management? Discuss importance of sanitary landfill and pyrolysis.
- c) Write an account on various noise control techniques.

Q4) Attempt ANY ONE of the following:

[10]

- a) What is tertiary treatment? Discuss any three advanced tertiary treatments used in control of water pollution.
- b) Define Soil Pollution. Discuss any three methods used to control soil pollution.



Total No. of Questions :4]

SEAT No. :

[Total No. of Pages :4

P460

[5215] - 230

S.Y.B.Sc. (Regular)

ENGLISH (Optional)

Text Book: Literary Vistas

(2013 Pattern-Revised) (Semester - II)

Time : 2 Hours]

[Max. Marks :40

Instructions to the candidates:

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

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

- i) Why did Rosemary Fell ask Miss Smith to leave her home?
- ii) Explain the central idea of the essay 'With the Photographer'.

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

- i) What is the significance of the little box that Rosemary Fell wanted to buy?
- ii) Why does the narrator say about his own photograph as a 'worthless trifle'?

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

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

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

- i) Analyse Wordsworth's attitude to nature, memory and imagination.
- ii) Explain the significance of the final lines from the poem 'If'.

'Yours is earth and everything that's in it

And which is more-you'll be a man, my son'.

P.T.O.

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

- a) Write a short paragraph of about 100 words on 'An Importance of Education'.
- b) Imagine that you are facing an Interview for the post of an Executive Engineer in a corporation. Anticipate any five questions and write down your responses to them.
- c) Write a transcript of a group discussion on 'Global Warming' using the following points:

Increase in earth's average temperature, accumulations of certain gases, necessary ban on CFCs, Chlorofluorocarbon eating the ozone layer, tree plantation.

- d) Prepare five slides of 20 words each for a power point presentation on one of the topics from your textbook.

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

- a) Write an essay on the impacts of mobile phones on the lives of young people in the present times.
- b) Write a review of your favorite movie.
- c) Write a report of two short paragraphs on 'Flood situation' in the month of July this year, for your college magazine.
- d) Summarize the following paragraph-

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



Total No. of Questions :4]

P460

[5215] - 230

S.Y.B.Sc. (Regular)

ENGLISH (Optional)

(2013 Pattern) (Semester-II) (Old)

Time : 2 Hours]

[Max. Marks :40

Instructions to the candidates:

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

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

- i) What is the central idea of the poem 'Purdah'? Explain.
- ii) What does the poet compare our heartbeats to in the poem 'A Psalm of life'? Why?

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

- i) Do you agree with the view that the poem 'Purdah' is about every woman? Give reasons.
- ii) What images of war are present in the poem 'A Psalm of Life'? What effect does such imagery create?

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

- i) What is the central theme of the poem 'Daffodils'?
- ii) Explain the significance of the title of the poem 'If'.

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

- i) How does the poem 'Ozymandias' portray the idea that human life and power is temporary?
- ii) Describe the tone of the poem 'Daffodils'.

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

- a) You have applied for the post of a senior college lecturer and have been asked to attend an Interview. Think of five questions that you could be asked and write them down along with your possible responses.
- b) John, Mary, Henry and Jane are given the topic 'Are Indian films losing their charm'? For a group discussion. Write the transcript of the discussion in a dialogue form.
- c) Give any five opening remarks of presentation skills.
- d) Prepare five slides for the power point presentation on the topic 'Communication skills'.

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

- a) Write a paragraph on 'My views on college Life'.
- b) Write an essay on 'The Benefits of Meditation'.
- c) Write a review of a film you have seen recently.
- d) Write a summary of the following paragraph.

The earth itself becomes our enemy when an earthquake strikes. Every country in the world is threatened by the tremendous fury of earthquakes. Their power exceeds all the forces released by humankind. When a city is hit, buildings fall and explosions and fires are started. Underground railways are wrecked. Gaping crevices appear on streets. Bridges and dams fall. Huge tidal waves rise on the sea. Avalanches roar down the mountain sides. An earthquake in Lisbon in 1755 destroyed the city and killed 450 persons.

In Peru, 50,000 people died in an earthquake in 1970. The subcontinent of Alaska was pushed 80 feet into the sea in 1968. Faced with such tremendous forces, which cannot be resisted, scientists can only pinpoint the earthquake areas and take suitable steps to minimise the harm.



Total No. of Questions : 3]

SEAT No. :

P461

[Total No. of Pages : 3

[5215] - 231

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

मराठी (Marathi) (Theory)

व्यावहारिक मराठी (Vyavharik Marathi)

(2013 Pattern)

वेळ : 2 तास]

[एकूण गुण : 40

सूचना :- 1) सर्व प्रश्न सोडविणे आवश्यक आहेत.

2) उजवीकडील अंक प्रश्नांचे पूर्ण गुण दर्शवितात.

प्रश्न 1)अ) पुढील उताऱ्याचे मराठीत भाषांतर करा.

[10]

Mother Teresa was an Albanian, born agnes Gonxha Bojaxhiu in Skopje, in what is now Macedonia. At eighteen she joined the order of the sisters of our Lady of Loreto in Ireland, where she took the name sister' Teresa. She was sent to Calcutta to teach at saint Mary's High School, where she was beloved by the children, who gave her the nickname Ma. She later became principal of Saint Mary's. During this time she learned Hindi and Bengali and helped in the care of the sick. In 1946, while traveling by train to be treated for tuberculosis, she received an inner" call within a call" and left Saint Mary's to minister to the sick and poor in the slums of Calcutta. Two years later she left the Loreto cummunity, received nursing training, and went to live among the poor.

In 1950 Mother Teresa founded her own order, the Missionaries of Charity. In addition to the vows of poverty, chastity, and obedience, she embraced a fourth, vow of service to the poor. Soon after she opened the Nirmal Hirday. Home for Dying Destituter in Calcutta.

In the following years her work spred throughout the world. This small stooped woman, always dressed in a white traditional Indian Sari trimmed with blue, become an international celebrity. Willing to go virtually anywhere and meet with anyone to further her work of aiding the poorest of the poor She initiated programs for the sick, hungry, and homeless, and she opened treatement centers for alcoholics and drug addicts. In her later years she was forced to scale back her activities because of ill health but remained head of her order until 1996, a year before her death.

P.T.O.

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

[10]

आकाशवाणीवरील भाषण हे जरी भाषण असले तरी इतर ठिकाणी वक्ता जसा एखाद्या विषयावर उत्स्फूर्तपणे भाषण करतो तसे ते नसते. ह्या भाषणाचा कालावधीदेखील सार्वजनिक ठिकाणच्या भाषणाप्रमाणे तासादीड तासाचा नसतो. आकाशवाणीवरील भाषणे सर्वसाधारणपणे पाच मिनिटांपासून ते साधारणपणे पंधरावीस मिनिटांपर्यंत असतात. शिवाय सार्वजनिक ठिकाणच्या भाषणांप्रमाणे तासादीड तासाचा नसतो. आकाशवाणीवरील भाषणे सर्वसाधारणपणे पाच मिनिटांपासून ते साधारणपणे पंधरावीस मिनिटांपर्यंत असतात. शिवाय सार्वजनिक ठिकाणच्या भाषणांमध्ये वक्ता जरी भरकटत गेला तरी किंवा अधूनमधून अडखळला तरी ऐकणारे श्रोते त्याचा फारसा गांभीर्याने विचार करीत नाहीत. पण आकाशवाणीवरील भाषणांमध्ये मात्र असे होऊन चालत नाही. आकाशवाणीवरून जी भाषणे प्रसारीत होत असतात ती ज्या प्रकारची व जेवढ्या कालावधीची असतात त्यानुसार त्या भाषणांची भाषा असावी. उदा. चिंतन कार्यक्रमातील भाषण पाच मिनिटांचे असते. आरोग्यविषयक कार्यक्रमांमधील भाषण पाच ते दहा मिनिटांचे असते. शेतीविषयक कार्यक्रमांमधील भाषण दहापंधरा मिनिटांचे असते. एखाद्या वाङ्मयीन विषयावरील भाषण सर्वसाधारणपणे दहा मिनिटांचे असते. एखादे भाषण एखाद्या संताच्या अभंगावर निरूपणात्मक असते. अशी वेगवेगळ्या विषयावर वेगवेगळ्या कालावधीची आकाशवाणीवरील भाषणे असतात. त्यामुळे भाषणांचा जसा विषय असेल त्या विषयाला साजेशी त्या भाषणाची भाषा असते.

आकाशवाणीवरील भाषणाचा विषय कोणताही असो, त्या भाषणात निरर्थक शब्दांची भरती असता कामा नये. तसेच नेहमीच्या व्यासपीठावरून नेहमीचे वक्ते ज्याप्रमाणे आत्मविश्वासाने भाषण करत असतात तसा आत्मविश्वास जरी आकाशवाणीवरून भाषण करणाऱ्या वक्त्याजवळ असला तरीदेखील त्या वक्त्याला आकाशवाणीवरून तसे भाषण करता येत नाही किंवा करू दिले जात नाही. कारण आकाशवाणी हे शासनाच्या नियंत्रणाखाली असणारे संवेदनशील माध्यम आहे. उत्स्फूर्तपणे बोलणारा वक्ता बोलण्याच्या ओघात एखाद्या वेळी समाजाच्या भावना दुखावल्या जातील असे वक्तव्य करू शकतो. असे बोलणे एखाद्या व्यासपीठावरून झाले तर क्षम्य होऊ शकते; पण आकाशवाणीवरून अशा प्रकारचे वक्तव्य झाले तर त्याच्या समाजातून संतप्त प्रतिक्रिया उमटतात. त्यामुळे भाषण तरी उत्स्फूर्तपणे करायचे असले तरी ते आधी लिहून काढणे गरजेचे असते, हे लेखन करताना आपल्याला आकाशवाणीवरून जो विशिष्ट वेळ मिळणार आहे. त्या विशिष्ट वेळेत ते बसले पाहिजे याची दक्षता घेतली पाहिजे. तसेच आपल्या वक्तव्यामध्ये कोणताही समाजाच्या भावना दुखावला जाणारा संदर्भ येणार नाही याची दक्षता घेतली पाहिजे.

(शब्द संख्या - 295)

प्रश्न 2) पुढीलपैकी कोणत्याही दोन प्रश्नांची उत्तरे लिहा.

[15]

अ) 'जलयुक्त शिवार' या विषयावर आकाशवाणीसाठी 200 शब्दांत भाषण संहिता तयार करा.

ब) 'मतदार जागृती' या विषयावर वृत्तपत्रासाठी 200 शब्दांत लेख तयार करा.

क) 'संसर्गजन्य रोग' या विषयावर 'आरोग्य अधिकारी' यांची दूरदर्शनच्या निवेदकाने दूरदर्शनसाठी घेतलेली मुलाखत तयार करा. (वेळ पाच मिनिटे)

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

[5]

- i) Surgery
- ii) Proofreading
- iii) Attendant
- iv) Pesticide
- v) Option
- vi) Lift
- vii) Counsellor
- viii) Message
- ix) Editor
- x) Workshop



Total No. of Questions : 4]

SEAT No. :

P462

[Total No. of Pages : 3

[5215]-232

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

हिंदी (HINDI) (General)

(2013 Pattern)

नयापाठ्यक्रम : सामान्य हिंदी

पाठ्यपुस्तकें : 1) भारतीय गद्य-संग्रह सं: डॉ. मधुधवन

2) कवितायन सं. डॉ. भोलानाथ तिवारी.

समय : 2 घंटे]

[पूर्णांक : 40

सूचनाएँ : 1) सभी प्रश्न अनिवार्य हैं।

2) दाहिनी ओर लिखे अंक प्रश्न के पूर्णांक हैं

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

[8]

i) Absorbent

ii) Atom

iii) Botany

iv) Circumference

v) Diagnosis

vi) Ecology

vii) Fleet

viii) Light Year

ix) Nutrition

x) Stimulus

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

आज समस्त मानव जाति अणु युग के द्वार पर खड़ी है। अणु शक्ति ने मानव-जीवन के सभी क्षेत्रों में एक अभूतपूर्व क्रांति कर दी है और भविष्य की रूपरेखा बिल्कुल ही बदल दी है। यदि मनुष्य मानव-कल्याण और प्रगति के लिए अणु शक्ति का उपयोग करता है तो निश्चित ही यह प्रलयकारी शक्ति मानवता के विनाश का कारण न बन, मनुष्य के लिए जीवन का बरदान बन जाएगी। लेकिन अणु शक्ति के इस युग में भी भारत मशीन उपकरण उद्योग की उपेक्षा नहीं कर सकता, क्योंकि आधुनिक उद्योग-प्रधान समाज में बिना मशीनों और उपकरणों के कोई भी देश प्रगति नहीं कर सकता।

P.T.O.

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

- i) “अगर मैं आज जीवन के पहिए के नीचे हूँ तो क्या शिकायत करूँ, मुझसे बहुत बड़े, बहुत निर्दोष, बहुत पावन जीवन के पहिए के नीचे आ चुके हैं।”

अथवा

‘रेशम कीट से रेशम प्राप्त करने वाले रहस्य को यदि कोई चीनी किसी विदेशी को बतलाएगा तो उसे मृत्युदण्ड दे दिया जाएगा।’

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

- ii) “मेरे जैसे करोड़ों हैं

जिनसे इतिहास का काम

इसी तरह सधता है:

कि थे-नहीं हैं।”

अथवा

“तुम मुझको दोषी ठहराओ

मैंने तुम्हारे सुनसान का गला घोंटा है

पर मैं गाऊँगा

चाहे इस प्रार्थना सभा में

तुम सब मुझ पर गोलियाँ चलाओ।”

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

- i) विकिरण के प्रयोग से उन्नत पौधों का विकास किस प्रकार होता है?
- ii) खाद्य-पदार्थ के संरक्षण के लिए परमाणु ऊर्जा किस प्रकार उपयोगी है?
- iii) श्री निवास रामानुजन के कार्य का संक्षेप में परिचय दीजिए।

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

[10]

- i) 'कालिदास! सच-सच बतलाना!' ऐसा कवि नागार्जुन क्यों कहते हैं?
- ii) भवानी प्रसाद मिश्र ने 'दैनिक' कविता द्वारा किस वस्तुस्थिति का चित्रण किया है?
- iii) 'बृहन्नला' कविता का आशय स्पष्ट कीजिए।



Total No. of Questions : 4]

SEAT No. :

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

SANSKRIT

गीर्वाणभारती (Girvaṇabhārāṭi)

(2013 Pattern)

Time : 2 Hours]

[Max. Marks : 40

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

[16]

पुढील प्रश्नांची 2-4 ओळीत उत्तरे लिहा.

a) From which Book सद्धर्मपुण्डरीककथा is taken?

सद्धर्मपुण्डरीककथा कोणत्या ग्रंथातून घेतली आहे?

b) What is meant by आस्तिक दर्शन?

आस्तिकदर्शन म्हणजे काय?

c) State any two types of applied science.

व्यवहारोपयोगी शास्त्राचे कोणतेही दोन प्रकार सांगा.

d) In which book types of चुम्बक's are mentioned. State any two types.

कोणत्या ग्रंथात चुम्बकाचे प्रकार सांगितले आहेत? कोणतेही दोन प्रकार लिहा.

e) Who is the author of सिद्धान्तशिरोमणि :?

‘सिद्धान्तशिरोमणिः’ ग्रंथाचा रचयिता कोण?

f) What is वैनायकम्?

वैनायकम् काय आहे?

g) Explain the meaning of ‘परोक्षो न स्वर्गो बहुगुणमिहैवेस फलती’। स्पष्ट करा: परोक्षो न स्वर्गो

बहुगुणमिहैवेस फलती?

h) Explain स्पष्ट करा – ‘प्रसन्नानां वाचः फलमपरिमेयं प्रसुवते।’

P.T.O.

Q2) Write short note on any two of the following in 8-10 lines.

[8]

पुढीलपैकी कोणत्याही दोहोंवर 8-10 ओळीत संक्षिप्त टीपा लिहा.

- a) प्राचीनशास्त्रस्थः पायथागोरस सिध्दान्तः
- b) शास्त्रम्
- c) रसशाला

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

[8]

पुढीलपैकी कोणत्याही दोहोंवर 8-10 ओळीत संक्षिप्त टीपा लिहा.

- a) सिध्दान्तशिरोमणिः
- b) अमरसन्देशः
- c) Magha's opinion regarding friend and enemy.
माघाचे मित्र व शत्रुसंबंधी मत

Q4) Answer any one of the following in 16-20 lines.

[8]

पुढीलपैकी कोणत्याही एका प्रश्नाचे 16-20 ओळीत उत्तर लिहा.

- a) Write the summary of सद्धर्मपुण्डरीक कथा
सद्धर्मपुण्डरीक कथेचा सारांश लिहा.

- b) Explain the meaning of following verse

खालील श्लोकाचा अर्थ स्पष्ट करा.

यातं हंसकुलस्य मूलदशकं मेघागमे मानसं।

प्रोड्डीय स्थलपद्मिनीवनमगा दष्टांशकोडम्भस्तटात्।

बाले बालमृणाल शालिनि जले केलिक्रिया लालसम्।

दृष्टं हंसयुगत्रयं च सकलां यूथस्य संख्यां वद॥



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

Functional Arabic

(2013 Pattern)

Time : 2 Hours]

[Max. Marks :40

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

(الف) اللَّهُ مَوْجُودٌ - الْإِسْلَامُ حَقٌّ - الْإِسْلَامُ
لَيْسَ بِإِطْلَاقٍ - الْفِرْدُ حَيَوَانٌ - الْمَاءُ كَثِيرٌ
الَّتَيْنِ لَيْسَ بِحَامِضٍ - مَتَى امْتِحَانُكَ ؟
أَهْوَقَرِيْبٌ - لَا امْتِحَانٌ كَعِيدٌ جَدًّا -
أَذَكَ الْإِسْتِاذِ وَاجِبٌ - دَرَسْتُ الْكِتَابَ
سَهْلًا - تَمَرَّتِ الدَّرْسُ سَهْلًا -
(ب) مَنْ مَعَ ذَلِكَ الْوَلَدِ ؟ مَعَهُ صَدِيقُهُ
وَهُوَ أُمَامَةٌ - أَيْنَ بَيْتُكَ ؟ بَيْتُكَ وَرَاءَ
الْمَدْرَسَةِ - قَلَّ امْتِحَانُكَ قَبْلَ الْعُطْلَةِ ؟
ذَلِكَ الْوَلَدُ مَشْغُولٌ بِالْقِرَاءَةِ - فِي هَذَا
الرَّسْمِ أَصِيحٌ - وَفِي ذَلِكَ الْأَصِيحِ غَرَسٌ -
ذَلِكَ الْأَصِيحُ لِدَاكَ الرَّجُلِ -

(ج) أَنَا عِدِّي - وَأَنْتَ رَبِّي وَرَبُّ كُلِّ شَيْءٍ -
 أَنْتَ خَالِقِي - وَخَالِقُ كُلِّ شَيْءٍ - أَنَا عَبْدٌ صَغِيرٌ
 وَأَنْتَ رَبُّ كَبِيرٍ وَهُوَ اللَّهُ فِي الْأَرْضِ
 وَفِي السَّمَاءِ فَضْلُهُ كَبِيرٌ كُلُّ شَيْءٍ مِنْ
 عِنْدِهِ - فَهُوَ خَالِقُ وَرَازِقٌ - فَشُكْرُهُ
 وَاجِبٌ عَلَى الْإِنْسَانِ -

2. Translate and Explain any five Verses of the following Poetry. [10]

دُنْيَا لَمْ حَبِيَّةٌ — بِحُسْنِهَا وَالطَّيِّبَةِ
 لَكِنَّمَا غَدَاةٌ — خَدَاعَةٌ غَرَّابَةٌ
 لَيْسَ لَهَا حَبِيبٌ — زُوَالُهَا قَرِيبٌ
 عَزِيزٌ هَذَا لَيْلٌ — كَثِيرٌ هَذَا قَلِيلٌ
 يَكْظِي بِهَا الْجَهْلُ — وَتَنْتَعِمُ الْإِنْدَالُ
 لَيْسَتْ فِيهَا اللَّيْبُ — وَيَتَعَبُ الْأَدِيبُ

3. Write answers in Arabic any five of the following : [10]

(١) مَنْ أَنْتَ ؟
 (٢) كَيْفَ أَنْتَ ؟

(٣) أَيْنَ الْأُسْتَاذُ؟

(٤) كَيْفَ هُوَ؟

(٥) أَيْنَ مَكَّةُ؟

(٦) هَلِ الْقُرْآنُ فِي الْحَرْتِ؟

(٧) أَيْنَ الطَّائِرُ؟

4. Write the letter into Arabic to the bank Manager or Company Manager: [10]

اكتب الرسالة في العربية الى
مدير البنك أو مدير الشركة



Total No. of Questions :4]

SEAT No. :

[Total No. of Pages :2

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[5215] - 235

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 indicate full marks.*
- 3) All questions carry equal marks.*

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

[10]

- a) Enlist any two methods used in aspetic technique?
- b) What are macronutrients?
- c) Define: Micropropagation.
- d) Give any two applications of primary culture.
- e) Give the role of 70% ethanol in plant tissue culture.
- f) State the role of serum in Animal tissue culture medium.
- g) Define: Stem cells.
- h) What is cell line?
- i) Give the role of trypan blue in viable cell counting.
- j) State the importance of organ culture.

P.T.O.

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

- a) Cell banks.
- b) Primary culture.
- c) Plant growth regulators.

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

- a) What is viable cell count? State its importance in initiation of culture.
- b) What is micropropagation? Give its importance in regeneration of endangered plants.
- c) Describe various methods of surface sterilisation.

Q4) a) Write a note on cell line characterisation. [5]

b) What is protoplast culture? How we initiate it. [5]

OR

a) What is organ culture? Describe any one method of organ culture. [5]

b) Enumerate the process of hardening. [5]

EEE

Total No. of Questions :4]

SEAT No. :

[Total No. of Pages :2

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[5215] - 236

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 drawn wherever necessary.*

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

- a) Ethanol to acetaldehyde.
- b) Toluene to benzoic acid.
- c) Aniline to chlorobenzene.
- d) Acetanilide to p-nitroacetanilide.
- e) Ethyl benzene to styrene.
- f) m-Dinitrobenzene to m-nitroaniline.
- g) Benzene to iodobenzene.
- h) Cellulose to cellulose acetate.

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

- a) What is nitration? Describe the role of concentrated H_2SO_4 in nitration reaction.
- b) Write a note on Friedal-Craft alkylation reaction.
- c) What is a reducing agent? Explain the reducing action of
 - i) LiAlH_4
 - ii) Na-Hg with suitable examples.

P.T.O.

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

- a) “Aniline on bromination gives predominantly 4-bromoaniline while on nitration gives 3-nitroaniline”. Explain.
- b) Define oxidation and oxidising agent. What is the role of dichromate in different oxidising reactions?
- c) Explain the use of ozonolysis reaction in synthesis of carbonyl compounds.

Q4) Describe the synthesis of ethyl benzene with the help of flow sheet diagram. **[8]**

OR

Describe the manufacture of chloral with the help of flow sheet diagram.

EEE

Total No. of Questions :4]

SEAT No. :

[Total No. of Pages :2

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[5215] - 237

S.Y.B.Sc. (Vocational)

PHOTOGRAPHY AND AUDIO-VISUAL PRODUCTION

VOC: 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 in short:

[16]

- a) What is the advantage of a CMOS sensor over a CCD sensor?
- b) Why is green a 'lighter' colour for human eye?
- c) Convert the colour temperature of 6500 K to Mired.
- d) What are complementary colours? Give two examples.
- e) What are colour attributes?
- f) What is the use of 'histogram' in digital photography?
- g) State the law of transmission and absorption of light.
- h) What is the difference between continuous and intermittent light source? Give one example of each.

P.T.O.

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 RGB and the CMYK colour models in photography.

Q3) Write short notes on ANY TWO of the following: [8]

- a) Digital image processing.
- b) Colour vision.
- c) Architectural photography.

Q4) Attempt ANY ONE of the following: [8]

- a) Discuss the importance of colours in digital photography.
- b) Draw a suitable diagram and explain the construction of a typical sensor used in a digital camera. Explain the purpose of each 'layer' of the sensor. Discuss the sequence of events taking place when the sensor is exposed to a 'scene'.

EEE

Total No. of Questions :4]

SEAT No. :

[Total No. of Pages :2

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[5215] - 238

S.Y.B.Sc. (Vocational)

ELECTRONIC EQUIPMENT MAINTENANCE -I

VOC-EEM - 221:Troubleshooting 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) Neat diagrams must be drawn wherever necessary.*
- 3) Figures to the right indicate full marks.*
- 4) Use of calculator is allowed.*

Q1) Answer the following:

- a) The prime motivation for introduction of surface mount technology is density _____ and board _____. [1]
- b) Name four digital test and service aids. [1]
- c) Reworking faulty SMT assemblies usually requires component _____ and _____. [1]
- d) Name two basic techniques used to provide regulated DC voltages. [1]
- e) What care is necessary in handling a CRT? [2]
- f) What is tri-state logic? [2]
- g) State the safety/protection features of three terminal regulator. [2]
- h) Why are 'quad-packs' called so? [2]

P.T.O.

Q2) Answer Any two :

- a) What are the precautions to be taken while handling electronic devices prone to damage by static electricity? [4]
- b) Write a short note on SMPS (Switched Mode Power Supply). [4]
- c) What functions does a typical dc power supply perform? Which functional blocks are required for this purpose? [4]

Q3) Answer Any two:

- a) Write a note on 'logic probe'. [4]
- b) What are the two basic heating methods for reworking PCBs on which SMDs are mounted? Describe in brief. [4]
- c) State the problems, which are commonly encountered by SMPS along with typical causes behind these problems. [4]

Q4) Answer the following:

- a) Draw a block diagram of an CRT oscilloscope and describe. What are the typical faults that may be looked into during preliminary fault diagnosis of a CRO? [6]
- b) State the consideration helpful in fault diagnosis of digital circuits. [6]

OR

- a) What are the precautions taken in maintenance of a cordless phone? [6]
- b) Write a note on logic current tracer. [6]

EEE

Total No. of Questions :4]

SEAT No. :

[Total No. of Pages :2

P469

[5215] - 239

S.Y.B.Sc. (Vocational)

COMPUTER HARDWARE & NETWORK ADMINISTRATION

Microprocessor & Interfacing Techniques -II

(2013 Pattern) (New 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 Flash drive?
- ii) List various input and out devices used in PC.
- iii) List the different types of mouse available in market.
- iv) What is the advantage of parallel communication over serial?

b) Attempt the following: [4×2=8]

- i) What is Flash BIOS?
- ii) What is the function of display adaptors?
- iii) State different types of device controllers used in PC.
- iv) What is WAN?

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

- a) What is Green PC? Explain the concept of thick and thin configuration.
- b) List various types of storage devices available. Explain in brief anyone them.
- c) What is a Network? State the advantages of computer Network.

P.T.O.

Q3) Attempt any two of the following:

[2×4=8]

- a) Write a short note on Multimedia PC.
- b) What are the different types of Printers? Explain in brief the advantages and disadvantages of any one.
- c) What is LAN? Explain features of LAN.

Q4) Attempt any two of the following:

[2×6=12]

- a) List various ADD ON cards available for interface. Explain in brief features of any one.
- b) State the advantages of serial communication system? Explain in brief asynchronous and synchronous communication protocol.
- c) What are the advantages of wireless communication system? List various wireless protocols and explain any one in brief.

EEE

Total No. of Questions :4]

SEAT No. :

[Total No. of Pages :2

P470

[5215] - 240

S.Y.B.Sc. (Vocational)

SEED TECHNOLOGY

VOC-SETE-221: Vegetable Seed Production

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

Time : 2 Hours]

[Max. Marks :40

Instructions to the candidates:

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

Q1) Answer the following:

[10]

- a) What is megasporogenesis?
- b) Define cytoplasmic male sterility.
- c) What is pollen viability?
- d) Define mass selection.
- e) Give the isolation distance for Tomato.
- f) Which type of bed is required for raising Brinjal seedlings.
- g) Define seed drying.
- h) Give any two applications of population improvement.
- i) Give any two objectives of hybridization.
- j) Enlist various hybridization techniques in vegetable crops.

P.T.O.

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

- a) Give the classification of vegetable crops based on growing season.
- b) Comment on sexual reproduction.
- c) Explain the process of microsporogenesis.

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

- a) Cytoplasmic - Genetic male sterility.
- b) Pureline selection.
- c) Application and achievements of population improvement.

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

OR

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

EEE

Total No. of Questions :4]

SEAT No. :

[Total No. of Pages :2

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[5215] - 241

S.Y.B.Sc. (Vocational)

INDUSTRIAL MICROBIOLOGY

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

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

- a) Vitamin B12 is also called as _____.
- b) Ion exchange chromatography is used for the separation and purification of the product on the basis of _____.
- c) Fill in the blank:
_____ is used for precipitation of calcium citrate in the downstream processing of citric acid.
- d) Enlist any two methods used for coagulation of milk in manufacturing of cheese.
- e) Glutamic acid is primary metabolite. (T/F)
- f) Write action of detergent in the recovery of intracellular product.
- g) Name two free living nitrogen fixing bacteria used as biofertilizers.
- h) Vinegar contains minimum _____ acetic acid.
- i) Name two amino acid which make chemical structure of penicillin.
- j) Write biochemical equation for acetic acid production.

P.T.O.

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

- a) Enlist the range of filters used for separation of microbial cells from harvested fermentation broth and describe any one in detail.
- b) Explain continuous liquid extraction process.
- c) With the help of flow sheet describe recovery of citric acid from fermented broth.

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

- a) Explain the control points for quality assurance in cheese production.
- b) Describe the process of batch distillation and its importance in solvent recovery.
- c) What is bioinoculant? Explain the process of manufacturing of bioinoculant.

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

- a) Explain the principle of following chromatography techniques with the help of suitable examples:
 - i) gel exclusion chromatography,
 - ii) affinity chromatography.
- b) With the help of flow sheet, describe the production of Penicillin G by fermentation.

EEE

Total No. of Questions : 4]

SEAT No. :

P472

[5215]-242

[Total No. of Pages : 2

S.Y.B.Sc.

INDUSTRIAL CHEMISTRY (Vocational)

222 : Industrial Pollution

(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) Neat diagrams must be drawn wherever necessary.*

Q1) Answer the following :

[16]

- a) What is transport noise?
- b) Describe the hazards of pesticide pollution.
- c) What is meant by “nitrogen fixation”?
- d) Name the chemical constituents of photochemical smog.
- e) Name the chemical constituents responsible for temporary hardness of water.
- f) Define Dose equivalent.
- g) Write the major constituents of atmosphere.
- h) Define soil profile.

Q2) Attempt any two of the following :

[8]

- a) Describe the process of sedimentation to remove suspended matter.
- b) Discuss global warming.
- c) Write a note on “radioactivity in food and water”.

P.T.O.

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

- a) BOD.
- b) Tannery waste.
- c) Fabric bag separator.

Q4) What is the need to prevent pesticide contamination? What are the methods to minimize pesticide pollution? **[8]**

OR

Explain aerobic and anaerobic digestion process in sludge treatment.



Total No. of Questions : 4]

SEAT No. :

[Total No. of Pages : 2

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[5215]-243

S.Y.B.Sc.

BIOTECHNOLOGY

Voc.Biotech - 222 : Immunology

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

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

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

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

[10]

- a) Define immunity.
- b) Name any two Phagocytic cells.
- c) Give the role of primary lymphoid organs.
- d) Define epitope.
- e) Give two important functions of antibody.
- f) Name two pharmacologically active agent released during mast cell degranulation.
- g) Name two types of Vaccines.
- h) What is agglutination reaction?
- i) Give two examples of APCs.
- j) What is the principle role of CMI?

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

[10]

- a) Thymus.
- b) IgG.
- c) Type - I Hypersensitivity.

P.T.O.

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

- a) Compare and contrast Primary and Secondary Immune response.
- b) Describe the components of innate immune system.
- c) Describe DNA vaccines in detail.

Q4) Describe different types of ELISA in detail. **[10]**

OR

What is MHC? Describe in detail the structure of Class I and Class II MHC molecules. Add a note on MHC restriction.



Total No. of Questions : 4]

SEAT No. :

P474

[5215]-244

[Total No. of Pages : 2

S.Y.B.Sc. (Vocational)

PHOTOGRAPHY AND AUDIO-VISUAL PRODUCTION

Principles & Applications of Analog and Digital Communications

(2013 Pattern) (Paper - IV) (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) AGC is used to keep receiver output constant.
 - ii) Digital communication is preferred over Analogue communication.
- b) Comment on the following statements [4]
 - i) AM is preferred over FM.
 - ii) mQAM and mPSK are normally used in MODEM for high data transfer rate, where m denotes number of symbols.
- c) Attempt the following : [6]
 - i) For a PAM transmission of a voice signal with $W = 3$ kHz, calculate the transmission bandwidth B_T , if the width of each pulse, $\tau = 0.1 T_s$ and the sampling frequency $f_s = 8$ kHz.
 - ii) An ASK transmitter transmits 5 kbps. Calculate the minimum bandwidth. Assume transmission to be half duplex.
 - iii) A carrier is frequency modulated with a sinusoidal signal of 1 kHz resulting in a maximum frequency deviation of 5 kHz. Find modulation index.

P.T.O.

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

- a) Explain FDM system with the help of diagram.
- b) What are the different types of digital Modulation? Describe each with maximum one statement.
- c) Explain basic communication system.

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

- a) Explain the Sampling theorem on the Channel Capacity. What is the importance of Channel Bandwidth?
- b) Compare the Pulse Analog Modulation. (Hint : PAM, PWM and PPM).
- c) What is PSK? Explain 16PSK with constellation diagram.

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

- a) The Output voltage of transmitter is given by ' $500 (1 + 0.4 \sin 6280t) \sin 3.14 \times 10^7 t$ ' this voltage is fed to a load of 600Ω . Determine Carrier frequency, Modulating frequency, Carrier power and Mean power output.
- b) Explain data representation.
- c) Explain DPCM.

OR

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

- a) Explain DM.
- b) Explain Multiplexer and Concentrator MODEM.
- c) Draw super heterodyne AM receiver with a neat block diagram and explain in short.



Total No. of Questions : 4]

SEAT No. :

P475

[5215]-245

[Total No. of Pages : 2

S.Y.B.Sc. (Vocational)

ELECTRONIC EQUIPMENT MAINTENANCE - I
VOC - EEM - 222 : Audio, Video & Office Equipment - B
(2013 Pattern) (Paper - II) (Semester - II)

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

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

Q1) Answer the following :

- a) List multimedia softwares in PC. [1]
- b) State the applications of Touch-screen. [1]
- c) What is optical mouse? [1]
- d) What is rolling display? [1]
- e) Give principle of operation of FAX. [2]
- f) Write principle of operation of DLP. [2]
- g) What is barcode? [2]
- h) State principle of operation of Dot-matrix printer. [2]

Q2) Answer any two of the following :

- a) Explain principle of operation of EPABX. State its features. [4]
- b) Compare LCD projector with DLP projector. [4]
- c) Why is it necessary to use transparent sheets for OHP? Give the principle of operation of OHP. [4]

P.T.O.

Q3) Answer any two of the following :

- a) Explain the performance parameters of video adapter. List different video standards. [4]
- b) Write in brief - Major components of motherboard of PC. [4]
- c) What are the different types of memories used in PC. State size of memory used in PC motherboard. [4]

- Q4)**
- a) Describe the features of latest microprocessor used in PC. How do you obtain information about hardware devices? [6]
 - b) With the help of necessary diagram, explain how information is printed using Ink-jet printer. [6]

OR

- a) Explain the working of photocopier in brief and list functional elements present there in. [6]
- b) Write short note on - PC Keyboard. [6]



Total No. of Questions : 4]

SEAT No. :

[Total No. of Pages : 2

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[5215]-246

S.Y.B.Sc. (Vocational)

COMPUTER HARDWARE & NETWORK ADMINISTRATION

Computer System Management - II

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

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

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

Q1) a) Attempt the following :

[4 × 1 = 4]

- i) List various utility softwares.
- ii) What is PDA?
- iii) List various hardware components of PC.
- iv) What is function HUB?

b) Attempt the following :

[4 × 2 = 8]

- i) What is the need of Antivirus?
- ii) State is advantages of upgrading RAM?
- iii) State advantages of flash memories.
- iv) List any four USB devices that can be interfaced to a computer system.

Q2) Attempt any two of the following :

[2 × 4 = 8]

- a) Explain in brief installation procedure Windows XP.
- b) Write a note on maintenance and disposal of storage media.
- c) State features and application of Android.

P.T.O.

Q3) Attempt any two of the following :

[2 × 4 = 8]

- a) What is software? List various application softwares. State features of any one.
- b) State various Network operations. Explain in brief LAN controls.
- c) What is iPhone? Explain features available in iPhone.

Q4) Attempt any two of the following :

[2 × 6 = 12]

- a) List various types of printers. Explain steps involved in installing a typical printer in windows XP.
- b) What do you mean by portable devices? List various portable devices. State features of Black Berry.
- c) List various network devices and explain them in brief.



Total No. of Questions : 4]

SEAT No. :

P477

[5215]-247

[Total No. of Pages : 2

S.Y.B.Sc. (Vocational)

SEED TECHNOLOGY

**VOC - SETE - 222 : Seed Quality Control
(2013 Pattern) (New) (Semester - II) (Paper - IV)**

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

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

Q1) Answer the following :

[10]

- a) Define Nucleus seed.
- b) What is Roughing?
- c) Name any two seed certification agencies.
- d) Define control legislation.
- e) Give the maximum period of a member on central seed committee.
- f) What are organic manures?
- g) Write any one responsibility of seed Inspector.
- h) Draw any one walking pattern of field inspection.
- i) What is foundation seed?
- j) Give any one duty of seed inspector.

Q2) Answer any two of the following :

[10]

- a) Describe general seed certification standards.
- b) Write an account on central seed testing laboratory.
- c) Explain concept of organic farming.

P.T.O.

Q3) Write notes on (any two) :

[10]

- a) Seed legislation in India.
- b) Seed certification agencies and its organization.
- c) Powers of seed inspectors.

Q4) Describe the technique of field inspection for hybrid seed production plot with suitable example. **[10]**

OR

Describe in detail procedure for seed certification.



Total No. of Questions : 4]

SEAT No. :

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[5215]-248

[Total No. of Pages : 2

S.Y. B.Sc. (Vocational)

INDUSTRIAL MICROBIOLOGY

VOC. IND. MIC. - 222 : Quality Assurance of Industrial

Fermentation Products

(Paper - II)

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

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

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

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

- a) Define "Pharmacopeia".
- b) Name the test organism used for microbiological assay of Vitamin B12.
- c) Name the test for detecting presence of pyrogens in industrial Fermentation products.
- d) In sterility testing, enumeration of aerobic microorganisms is carried out on _____ medium.
- e) Give the structural formula for Glutamic acid.
- f) Alpha Amylase enzyme is produced by fermentation using bacteria like _____.
- g) Name any food borne pathogen occurring in cheese.
- h) In microbiological assay for antibiotics, the cup-plate / cylinder plate method depends upon _____ of the antibiotic through the solidified agar layer in the plate.
- i) Two methods are used for sterility test for fermentation product. Name any one.
- j) For yeast viability test, _____ stain is used.

P.T.O.

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

- a) Describe Microbiological analysis of Baker's Yeast.
- b) What is meant by Bacterial Endotoxin test and give its protocol.
- c) Give the Specifications of Mycorrhizal biofertilizers under Quality management of Bioinoculants.

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

- a) Write in brief quality tests conducted for Identification, tests for presence of metals, and assay for purity of Citric acid.
- b) What are the aim's of the 'Pharmacopeias'?
- c) Elaborate on how is Lysine assay performed using *Tetrahymena pyriformis* W.

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

- a) What are different Quality Assurance tests carried out for vial of liquid Penicillin Injection. Elaborate on any two tests.
- b) Describe the microbiological assay for vitamin "Cyanocobalamin".



Total No. of Questions :4]

SEAT No. :

[Total No. of Pages :3

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S.Y.B.Sc. (Regular)

MATHEMATICS

MT - 222 (B) : Numerical Methods and It's Applications (Paper - II)
(2013 Pattern) (Semester - II) (811B2)

Time : 2 Hours]

[Max. Marks :40

Instructions to the candidates:

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

Q1) Attempt any five of the following:

[10]

- a) Find the relative error of the number 12.931 if all of its digits are correct.
- b) Round - off the following numbers to four decimal places.
3.3465827, 15.235387, 5.37582, 0.00457328
- c) Evaluate $\Delta^3 [(1-x) (1-2x) (1-3x)]$, where the interval of differencing being 1.
- d) Prove that $\delta \equiv E^{\frac{1}{2}} - E^{-\frac{1}{2}}$, where δ is central difference operator and E is shift operator.
- e) State normal equations to fit a straight line.
- f) State Simpson's $\frac{3^{th}}{8}$ rule for numerical integration.
- g) Given that $\frac{dy}{dx} = x + y$, $y(1) = 0$. Find the value of y at $x = 1.1$ by Euler's method. (Take $h=0.1$. Perform one iteration.)

P.T.O.

Q2) Attempt any two of the following:

[10]

- a) Derive Lagrange's interpolation formula.
- b) Find the approximate root of the equation $x^2 - 5x + 3 = 0$ using Newton - Raphson method. Take $x_0 = 4$.
- c) Determine the value of $\delta^4 y_3$ from the following data. (where δ is central difference operator.)

x	1	2	3	4	5
$y = f(x)$	2	5	10	17	26

Q3) Attempt any two of the following:

[10]

- a) Prove that divided difference is symmetrical in their arguments.
- b) The population of a country in census was as under. Estimate the population for the year 1975.

Year x	1941	1951	1961	1971	1981
Population (in lakhs) y	46	67	83	95	102

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

x	2	4	6	8
y	25	38	56	84

Q4) Attempt any one of the following:

[10]

- a) i) State general quadrature formula and hence derive Simpson's $\frac{1}{3}^{rd}$ rule for numerical integration.
- ii) Given that the differential equation $\frac{dy}{dx} = x^2 + y$, $y(0) = 1$. Find the value of $y(0.01)$, using Euler's modified method. Take $h = 0.01$.

b) i) Evaluate $\int_0^4 \sqrt{x+10} \, dx$ by using Trapezoidal rule. Take $h = 0.5$.

ii) By using Runge - Kutta second order formula, find $y(0.1)$ and $y(0.2)$ correct upto four decimal places for the differential equation

$$\frac{dy}{dx} = y-x, y(0) = 2. \text{ Take } h = 0.1.$$



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

Urdu (General Paper II)

(2013 Pattern)

Time : 2 Hours]

[Max. Marks :40

تمام سوالات کے جوابات لازمی ہیں۔

خوشخطی کا لحاظ رکھیں۔

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

یا

پریم چند کی افسانہ نگاری کی اہم خصوصیات بتائیے۔

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

یا

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

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

۱۔ نصیر ۲۔ آنندی ۳۔ شاکرہ ۴۔ بنسی دھر

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

- | | | |
|--------------------|----------------------|-------------------|
| 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 | | |

