

Total No. of Questions : 4]

SEAT No. :

P77

[5422]-101

[Total No. of Pages : 2

S.Y. B.Sc.

MATHEMATICS

MT - 211 : Multivariable Calculus - I
(2013 Pattern) (Semester - I) (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) Show that function $f(x,y,z) = x+y-z$ is continuous at every point in \mathbb{R}^3 .
- b) Show that the function $W = \tan(2x-2ct)$ is solution of the wave equation $\frac{\partial^2 W}{\partial t^2} = c^2 \frac{\partial^2 W}{\partial x^2}$.
- c) Find the equation of the tangent plane of the surface $x^2-xy-y^2-z=0$ at the point $(1,1,-1)$.
- d) In what two directions is the derivative of $f(x,y) = \frac{x^2-y^2}{2}$ at point $P(1,1)$ equal to zero?
- e) State necessary condition for extremum of function of two variables.
- f) Find all critical points of $f(x,y)=x^4+y^4+4xy$.
- g) State first form of Fubini's theorem for calculating double integral.

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

- a) Define simultaneous limit of function of two variables and find limit of the function $f(x,y) = \cos\left(\frac{x^3-y^3}{x^2+y^2}\right)$ as $(x,y) \rightarrow (0,0)$ if it exists.
- b) If resistors of R_1, R_2, R_3 ohms are connected in parallel to make an R-ohms resistors, the value of R is $\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$. Find $\frac{\partial R}{\partial R_2}$, where $R_1=30, R_2=45, R_3=90$ ohms.
- c) If w is a differentiable function of two variables u and v , u and v are differentiable functions of x and y then prove that composite function w is also differentiable function of x and y and obtain formulae for its partial derivatives.

P.T.O.

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

- a) Suppose $f(x,y)$ is a real valued function defined on neighbourhood of (x_0, y_0) . If $f(x,y)$ is differentiable at (x_0, y_0) then prove that $f_x(x_0, y_0)$, $f_y(x_0, y_0)$ both exists and $f(x,y)$ is continuous at (x_0, y_0) .
- b) Find parametric equations for the tangent line to the curve of intersection of surfaces $x^2+y^2+xz=4$; $x=1$ at the point $(1,1,1)$.
- c) Show that the shortest distance from (a,b,c) to the plane $Ax+By+Cz+D=0$

$$\text{is } \left| \frac{Aa + Bb + Cc + D}{\sqrt{A^2 + B^2 + C^2}} \right|.$$

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

- a) i) Evaluate $\int_0^2 \int_{r-2}^{\sqrt{4-r^2}} \int_0^{2\pi} (r \sin \theta + 1)r \, d\theta \, dz \, dr$.
- ii) Change the order of integration and show that $\int_0^1 \left(\int_y^1 e^{-x^2} \, dx \right) dy = \frac{e-1}{2e}$.
- b) i) Use the transformation $u = 3x+2y$, $v = x+4y$ to evaluate the integral $\iint_R (3x^2 + 14xy + 8y^2) \, dx \, dy$ for region R in the first quadrant bounded by the lines $y = -\frac{3}{2}x + 1$, $y = -\frac{3}{2}x + 3$, $y = -\frac{1}{4}x$ and $y = -\frac{1}{4}x + 1$.
- ii) Evaluate $\iint_R (y - 2x^2) \, dR$ where R is the region bounded by the square $|x| + |y| = 1$.



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S. Y. B. Sc.

MATHEMATICS

MT - 212 (A) : Discrete Mathematics

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

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 is not allowed.*

Q1) Attempt any FIVE of the following : [10]

- a) Find the value of x if 'Pune is in Karnataka iff $x + 3 \neq 10$ ' has truth value T.
- b) Find the truth set of ' $\exists x, x^3 < 4$ ' in the set of natural numbers.
- c) How many two-digit numbers can be formed using the digits 0, 1, 2, 3, 4 without repetitions of digits.
- d) Find $n(A)$ if $n(A \cup B) = 24$, $n(B) = 8$, $n(A \cap B) = 2$.
- e) Define logically equivalent statements.
- f) How many lines are determined by twelve points in a plane no three are on the same line.
- g) Find the number of five letter words using the letters of the word DADDY.

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

- a) Construct the truth table for $(p \leftrightarrow q) \leftrightarrow (q \leftrightarrow p)$.
- b) How many arrangements of the letters in MANAGEMENT are there in which two M are separated.
- c) Find the number of ways to choose
 - i) 3 out of 7 days with repetitions
 - ii) 7 out of 3 days with repetitions.

P.T.O.

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

- a) Explain methods of contrapositive and contradiction.
- b) Test the validity of argument : $R \rightarrow C, S \rightarrow \sim W, RVS, W \vdash C$.
- c) A student is to answer eight out of ten questions in an examination. Find the number of ways that
 - i) Student can choose eight questions.
 - ii) Student can choose eight questions if he must answer first three questions.

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

- a) Find the number of positive integers less than 30 which are relatively prime with 30 using inclusion - exclusion principle.
- b)
 - i) Find the number of ways that five large books, four medium books and three small books can be placed on a shelf so that all books of the same size are together.
 - ii) Find the number of five letter words which contain three different consonants and two different vowels.



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S. Y. B. Sc.

MATHEMATICS

MT - 212 (B) : Laplace Transform and Fourier Series

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

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 $L\{2t^3 + 3e^{5t} - 4 \sin 2t + 5\}$.
- b) By using Laplace transform of derivatives, Find $L\{t\}$.
- c) Prove that $\overline{n+1} = n!$, $n = 1, 2, 3, \dots$

d) Find $L^{-1}\left\{\frac{1}{(s-2)^3}\right\}$

e) Find $L^{-1}\left\{\frac{2s+1}{s(s+1)}\right\}$

f) If $f(x) = \begin{cases} 1, & -\pi < x < 0 \\ 2, & 0 < x < \pi \end{cases}$

Then find the value of a_0 in Fourier series expansion of $f(x)$.

- g) Solve the differential equation using Laplace transforms.
 $y'' + 2y = 0; y(0) = 1, y'(0) = 0.$

Q2) Attempt any two of the following :

[10]

- a) If $L\{F(t)\} = f(s)$ and for any real constant a ,
 $G(t)$ is the function defined by

$$G(t) = \begin{cases} 0, & \text{for } t < a \\ f(t-a), & \text{for } t > a \end{cases}$$

then prove that $L\{G(t)\} = e^{-as}f(s)$.

b) Evaluate $\int_0^{\infty} e^{-3t} t \sin t \, dt$.

c) Discuss the existence of $L\left\{\frac{\cos at}{t}\right\}$

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

a) If $L^{-1}\{f(s)\} = F(t)$ then prove that

$$L^{-1}\{f^{(n)}(s)\} = (-1)^n t^n F(t).$$

b) Solve the differential equation

$$y''(t) + 2y'(t) + 2y(t) = 0; y(0)=0, y'(0)=1.$$

c) Find $L^{-1}\left\{\frac{5s + 3}{(s - 1)(s^2 + 2s + 5)}\right\}$

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

a) Obtain Fourier series expansion of $f(x)$ defined by

$$f(x) = x + \frac{x^2}{4}, \quad -\pi < x < \pi.$$

b) i) Verify convolution theorem for $f(t)=t, g(t)=e^{2t}$.

ii) Find $L^{-1}\left\{\frac{1}{2}\left(\frac{1}{s + 3} + \frac{s + 3}{s^2 + 6s + 13}\right)\right\}$.



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S.Y. B.Sc

PHYSICS

**PH-211 : Mathematical Methodes in Physics-I
(2013 Pattern) (Semester - I) (Paper-I)**

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

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

Q1) Attempt all of the following.

[10]

- a) If $Z = i + i^2$, find x and y .
- b) Show that $\sinh(i\theta) = i \sin \theta$
- c) Define complex number and its complex conjugate.
- d) If $F = x^3 + xy + y^3$ then find $\frac{\partial F}{\partial x}$ and $\frac{\partial F}{\partial y}$.
- e) Write necessary condition for exact differential.
- f) Write I and II theorems of differentiation.
- g) Define concurrent and coplanar vectors.
- h) Define scalar field with examples.
- i) Prove that $\vec{V} = (x + 3y)\hat{i} + (y - 2z)\hat{j} + (x - 2z)\hat{k}$ is a solenoidal vector.
- j) State the condition on $P(x)$ and $Q(x)$ in the differential equation $y'' + P(x)y' + Q(x)y = 0$ such that a given point $x = x_0$ is an ordinary point.

Q2) Attempt any two of the following:

[10]

- a) For a particle moving along a curve in a plane, obtain expression for the radial and transverse components of velocity.
- b) Find the possible percentage error in computing the parallel resistance r of three resistances r_1, r_2, r_3 from the formula $\frac{1}{r} = \frac{1}{r_1} + \frac{1}{r_2} + \frac{1}{r_3}$ if r_1, r_2, r_3 are each in error by 1.2%.
- c) Explain the physical significance of $\text{grad } \phi$.

P.T.O.

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

- a) Find the approximate value of $\sqrt{(2.99)^2 + (3.99)^2}$ using method of differentials.
- b) Show that the curl of the linear velocity of any particle of rotating body is twice its angular velocity.
- c) Show that the point $x = \infty$ is an irregular singular point of differential equation $y'' + w^2 y = 0$

Q4) A) Attempt (a) or (b) of the following: **[8]**

- a) i) Transform $\frac{1}{(1-i)^2}$ to exponential form.
- ii) Illustrate degree, order, linearity and homogeneity of differential

$$\text{equation } \frac{d^3 y}{dx^3} + 6\sqrt{\left(\frac{dy}{dx}\right)^2 + y^2} = 0.$$

OR

- b) i) Find the work done in moving an object along a straight line from (3,2,-1) to (2,-1,4) in a force field given by
- ii) Show that the divergence of the curl of \vec{V} is

$$\text{zero. } \vec{\nabla} \cdot (\vec{\nabla} \times \vec{V}) = 0$$

B) Attempt any one of the following: **[2]**

- a) Prove that $\vec{A} = \vec{i} + 2\vec{j} + 8\vec{k}$ and $\vec{B} = 2\vec{i} + 3\vec{j} - \vec{k}$ are perpendicular to each other.
- b) Write any two examples of frequently occurring differential equations.



Total No. of Questions :4]

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[Total No. of Pages : 4

S.Y.B.Sc.

PHYSICS

PHY - 212 : Electronics-I

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

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

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

Q1) Answer all of the following:[1 mark each]

[10]

- a) Give any two characteristics of ideal op-amp.
- b) State Thevenin's Theorem.
- c) A change of 20 mv in base-emitter voltage causes a change of 100 μ A in base current. Find the input resistance of the transistor.
- d) Convert $(27)_{10}$ into equivalent binary number
- e) Give the limitations of unregulated power supply.
- f) Define electronic oscillator.
- g) State superposition theorem.
- h) Draw circuit diagram of transistor as a switch in ON-State.
- i) Define open loop gain of op. amp.
- j) Find the value of β if $\alpha=0.99$

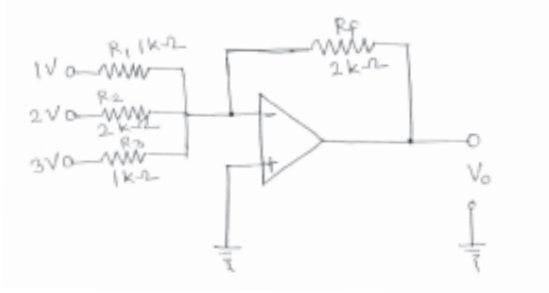
Q2) Answer any TWO of the following.

- a) What is regulated power supply? Explain with circuit diagram, the zener diode as voltage regulator. **[5]**
- b) Draw circuit diagram of common emitter (CE) configuration of transistor. Explain its input and output characteristics. **[5]**
- c) Give the symbol and truth table of NAND gate. construct OR, AND and NOT gates using NAND gate. **[5]**

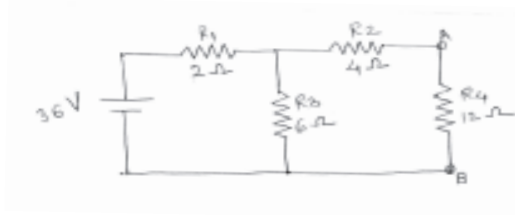
P.T.O.

Q3) Answer any Two of the following:

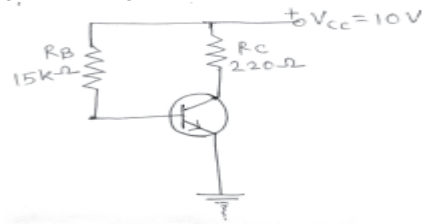
- a) Find the output voltage of the following circuit. [5]



- b) Using Norton's theorem determine current flowing through 12 Ω resistor. [5]

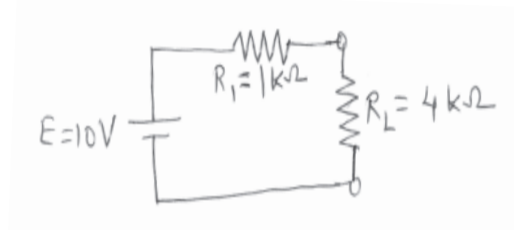


- c) Find V_{CE} and I_C for the following circuit, when $\beta=50$, $V_{\beta E} = 0.6V$ [5]



Q4) A) Answer (a) or (b) of the following.

- a) i) State and prove De-Morgan's theorems. [4]
 ii) Draw circuit diagram of op-amp as subtractor. Derive necessary formula for output. [4]
- b) i) Explain with block diagram the voltage series and voltage shunt feedback circuit of close loop amplifier. [4]
 ii) Explain construction and working of npn transistor. [4]
- B) Answer any ONE of the following.
- a) Determine the power across R_L of the given circuit. [2]



- b) Give advantages of full wave rectifier over half wave rectifier. [2]



Total No. of Questions :4]

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S.Y.B.Sc.

PHYSICS

PHY - 212 (B) : Instrumentation

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

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

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

Q1) Attempt All of the following:[1 mark each]

[10]

- a) Define atmospheric pressure.
- b) Draw the circuit diagram of buffer amplifier using OPAMP.
- c) State the principle used in variable capacitance transducer.
- d) Draw pin diagram of IC 741.
- e) Define accuracy of measuring system.
- f) Define dead zone of an instrument.
- g) State any two types of bourdon tubes.
- h) What are the types of analog recorder.
- i) State the principle used in liquid filled thermometer.
- j) State the use of Pyrometer.

Q2) Attempt any TWO of the following.

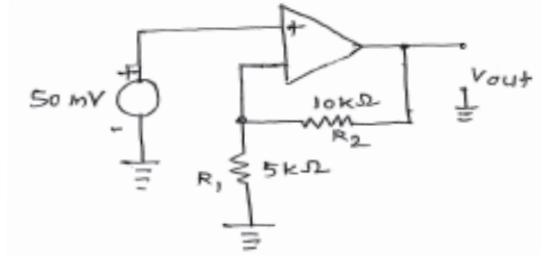
[10]

- a) Explain the working of inverting amplifier using OPAMP.
- b) Explain the principle and working of platinum resistance thermometer.
- c) What are functional element of a typical measurement system? Explain basic functional elements with block diagram.

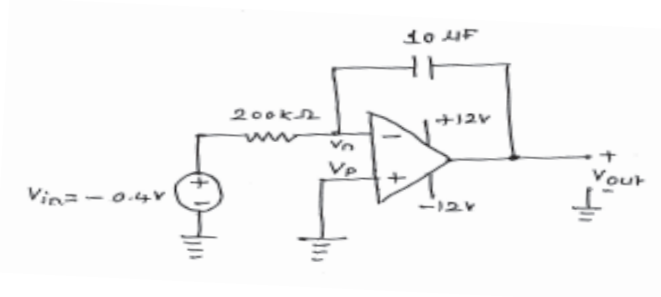
Q3) Attempt any TWO of the following.

[10]

- a) The non-inverting amplifier is shown in following Figure. find the output voltage.



- b) For certain thermistor, $\beta=3000$ k and resistance at 27°C is 1000Ω . When the thermistor is used for temperature measurement, the resistance measured is 2400Ω . Find the temperature measured.
- c) When will the output get saturated in following figure.



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

- a) i) Explain in detail oscillographic recorder. [4]
- ii) Explain the constructional features of linear and rotary potentiometer. [4]
- b) i) Describe with circuit diagram, an OPAMP as an integrator. [4]
- ii) Write a note on resistive transducer as a first order system. [4]

B) Attempt any ONE of the following.

- a) A manufacturer calibrates a temperature gauge of 100°C range with $\pm 0.5^\circ\text{C}$. If it is used for temperature of 50°C , what will be probable minimum and maximum value of temperature by gauge? [2]
- b) What is the difference between NTC and PTC [2]



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SEAT No :

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S.Y.B.Sc.

CHEMISTRY

**CH - 211 : Physical and Analytical Chemistry
(2013 Pattern) (Semester-I) (Paper-I) (Regular)**

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 indicate full marks.*
- 4) *Use of calculator is allowed.*
- 5) *Answer to both sections should be written in same answer book.*

SECTION-I

Physical Chemistry

Q1) Answer the following:

[5]

- a) Define pseudomolecular reaction.
- b) What is meant by zero reading?
- c) Define the term "Quantum yield".
- d) State Einstein's Law of photo chemical equivalence.
- e) Give any two applications of Distribution law.

Q2) a) Attempt any two of the following:

[6]

- i) Deduce the equation for velocity constant for second order reaction with equal initial concentration.
- ii) What is chemical actinometer? Explain in brief Uranyl oxalate actinometer.
- iii) What is first order reaction? Show that half life period of first order reaction is independent of initial concentration of the reactant.

P.T.O.

- b) Attempt any two of the following: [4]
- Explain the term “phosphorescence”.
 - What is Absorbance and Transmittance?
 - Give difference between the first and second order reaction with respect to half life period and unit.

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

- The rate constant of first order reaction is $3.2 \times 10^{-3} \text{sec}^{-1}$ at 25°C . Find the time required to complete 80% of the reaction.
- 0.022 moles of HI are decomposed after absorption of 6125 J of 260 nm radiation. Compute the quantum yield.
- 1.5 litre of a solution of benzoic acid in water of known concentration was extracted by 400 cm^3 of chloroform in a single lot; if partition coefficient of benzoic acid in water and chloroform is 0.45. Calculate the amount of benzoic acid extracted.

SECTION-II

Analytical Chemistry

Q4) Answer the following: [5]

- Define precision.
- What is quantitative analysis?
- Which is group reagent for group III B?
- Write chemical reaction for detection of base.
- Define ‘solubility product’.

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

- i) What is common ion effect? How it is used in qualitative analysis?
- ii) Explain sodium fusion test for detection of sulphur and phosphorous.
- iii) What is molecular formula? Explain Leibig's method for estimation of carbon and hydrogen.

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

- i) How are samples of solid obtained?
- ii) What is error? Give its classification.
- iii) Explain the method of removal of Borate in qualitative analysis.

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

- a) The percentage of component X in compound XY were found to be 48.32, 48.37, 48.23, 48.10 and 48.58%. Calculate mean deviation and relative mean deviation.
- b) An organic compound on elemental analysis was found to be carbon 34.6%; Hydrogen 3.85% and oxygen 61.55%. Calculate its empirical formula.
- c) The concentration of Cu^{2+} ion is 0.2M. What should be the concentration of sulphide ion required to just cause precipitation of CuS.
(K_{sp} of CuS = 8.5×10^{-45})

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Total No. of Questions : 6]

SEAT No. :

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[Total No. of Pages : 2

S.Y. B.Sc.

CHEMISTRY

CH - 212 : Organic and Inorganic Chemistry
(2013 Pattern) (Semester - I) (Paper - II) (Regular)

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Figures to the right side indicate full marks.
- 3) Neat diagrams must be drawn wherever necessary.
- 4) Answer of the two sections should be written on same answer book.

SECTION - I

(Organic Chemistry)

Q1) Attempt the following:

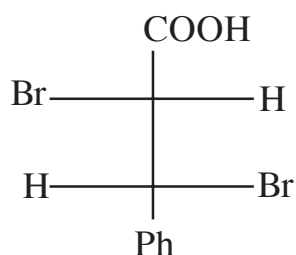
[5]

- a) Define the term 'enantiomers'.
- b) Draw the geometrical isomers of cis & trans 1, 2-dimethyl cyclohexane.
- c) What is Hofmann Elimination?
- d) What is absolute configuration?
- e) What are nucleophiles?

Q2) A) Attempt any two of the following:

[6]

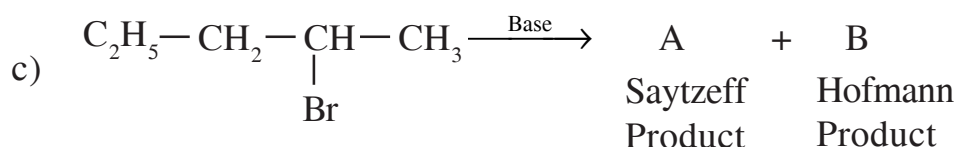
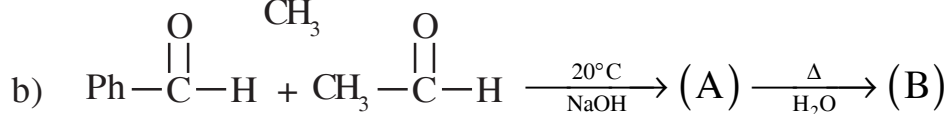
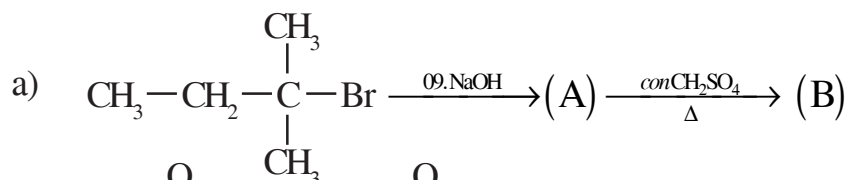
- a) Define Racemic Mixture. Assign 'R' & 'S' configuration to the following molecule.



- b) What is Aldol condensation reaction? Discuss the mechanism of Aldol condensation reaction with suitable example.
- c) Explain the following terms with suitable example.
 - i) Locking of conformation
 - ii) Angle strain

P.T.O.

B) Assign 'A' & 'B' of the following reaction (any two): [4]



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

- Draw the Newmann Projection for both conformers of methyl-cyclohexane. Explain why 'e-methyl cyclohexane is more stable than a-methyl cyclohexane'.
- What is S_{N}^1 reaction? Discuss the mechanism of S_{N}^1 reaction with suitable example.
- Distinguish between, 'Racemic mixture and meso compound'.

SECTION - II (Inorganic Chemistry)

Q4) Answer in one sentence: [5]

- Define the term 'Calcination'.
- Define 'flux'.
- What is corrosion?
- What is cryolite?
- Give the composition of wrought iron.

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

- Explain the manufacture of Cast Iron by Blast furnace method.
- What is passivity? Explain the physical theories of passivity.
- Mention the different types of ores with suitable examples.

b) Write notes on any two of the following: [4]

- Froth Floatation process.
- Pitting Corrosion.
- Applications of Aluminium.

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

- How is steel manufactured by Acid Bessemer process?
- Give the various methods of coating the surface of metal for preventing corrosion.
- Write a note on 'Electrolysis of purified Alumina'.



Total No. of Questions : 4]

SEAT No. :

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S. Y. B. Sc.

BOTANY

**BO - 211 : Taxonomy of Angiosperms and Plant Community
(2013 Pattern) (Semester - I) (Paper - I)**

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

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

Q1) Answer the following :

[10]

- a) Write an example of phylogenetic system of classification.
- b) Give name of any one journal of taxonomy.
- c) What is binomial nomenclature?
- d) Give the botanical names of any two plants of family Asclepiadaceae.
- e) Write the type of inflorescence of genus Euphorbia.
- f) What is herbarium?
- g) Give any two sources of data from phytochemistry for systematics.
- h) Define synecology.
- i) What are xerophytes?
- j) Enlist any two biotic components of ecosystem.

Q2) Answer any two of the following :

[10]

- a) Give merits and limitations of Bentham & Hooker's system of Classification.
- b) Explain anatomy as a data source for systematics.
- c) Write an account on coining of generic names.

P.T.O.

Q3) Write notes on (any two) :

[10]

- a) Economic importance of family Rubiaceae.
- b) Advantages of e-herbarium.
- c) Scope and importance of taxonomy.

Q4) Give distinguishing characters, floral formula, floral diagram and economic importance of family Amaryllidaceae. **[10]**

OR

What are halophytes? Describe external and internal ecological adaptations in halophytes.



Total No. of Questions : 4]

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S. Y. B. Sc.

BOTANY

BO - 212 : Plant Physiology

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

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

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

Q1) Answer the following :

[10]

- a) Define plant physiology.
- b) What is DPD?
- c) Define capillary water.
- d) Enlist any two factors affecting ascent of sap.
- e) Define Guttation.
- f) What is physical seed dormancy?
- g) Enlist types of transpiration.
- h) What are short day plants?
- i) Write any two applications of plant physiology.
- j) Enlist phases of growth in plants.

Q2) Answer any two of the following :

[10]

- a) Describe various factors affecting water absorption.
- b) Give practical applications of gibberellins.
- c) Describe metabolic changes occurring during seed germination.

P.T.O.

Q3) Write notes on (any two) :

[10]

- a) Antitranspirants.
- b) Capillary theory of ascent of sap.
- c) Vernalization.

Q4) Define osmosis. Describe it's mechanism and explain the role in plants. **[10]**

OR

Define symbiotic N_2 fixation. Explain the process of symbiotic N_2 fixation in Legumes.

❧❧❧❧

Total No. of Questions :4]

SEAT No. :

P85

[5422]-109

[Total No. of Pages : 1

S.Y.B.Sc.

ZOOLOGY

**ZY - 211 : Animal Systematics and Diversity-III
(2013 Pattern) (Semester-I) (Paper-I) (Revised) (Regular)**

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 hemimetabolous development?
- b) Write any two shell modifications in mollusca.
- c) Define detorsion.
- d) Give any two types of mimicry in insects.
- e) Write any two larval forms of Echinodermata
- f) Give any two examples of class crustacea
- g) Write any two characters of class Echinoidea
- h) Define autotomy in starfish.
- i) What is the function of dermal branchiae?
- j) Write any two characters of class myriapoda.

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

- a) Economic importance of insects
- b) Megalopa larva
- c) Pedicellariae in starfish.

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

- a) Describe the mechanism of locomotion in starfish.
- b) Sketch and label piercing and sucking type of mouth parts in insects
- c) Write distinguishing characters of class ophiuroidea.

Q4) Describe in detail the digestive system of starfish. [10]

OR

Give general characters of phylum Mollusca and distinguishing characters of class Gastropoda.



Total No. of Questions : 4]

SEAT No. :

[Total No. of Pages : 2

P86

[5422]-110

S.Y.B.Sc.

ZOOLOGY

ZY - 212 : Applied Zoology - I

Fisheries and Agricultural pests and their control

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

Time : 2Hours]

[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 brackish water fishery?
- b) Mention any two house hold pests.
- c) What is fish glue?
- d) What is physical control?
- e) What is stockingpond?
- f) Write any two damages caused by Rice weevil.
- g) Write the name of equipment used for mackerel harvesting.
- h) What is chilling?
- i) What is long form of IPM?
- j) Write the names of any two crafts.

Q2) Write short notes (Any Two):

[10]

- a) Salting and drying techniques in fish preservation.
- b) Describe the harvesting method of Bombay duck.
- c) Rats and Bandicoots as non-insect pests.

P.T.O.

Q3) Attempt the following (Any Two)

[10]

- a) Sketch and label Rampani net.
- b) Describe in brief knapsack sprayer.
- c) Describe Hazzards of pesticides on human being.

Q4) Describe marks of identification, Nature of damage and control measures of pulse beetle and jowar stem borer. **[10]**

OR

Describe Habit, Habitat and culture methods of Catla catla and macrobrachium rosenbergii.



Total No. of Questions :4]

SEAT No. :

[Total No. of Pages :2

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[5422] - 111

S.Y.B.Sc.

GEOLOGY

GL - 211: Mineralogy

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

Time : 2 Hours]

[Max. Marks :40

Instructions to the candidates:

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

Q1) Answer the following.

[10]

- a) Name 2 minerals belonging to feldspar group.
- b) State the hemihedral form of tetrahedron.
- c) Define chatoyancy.
- d) Define dichroism.
- e) Define a twin crystal.
- f) What is a tetrahedron?
- g) What is the other name for false cleavage?
- h) State the other name for yellow quartz.
- i) What is meant by birefringence?
- j) What are the different varieties of opal?

P.T.O.

Q2) Answer the following (any 2) [10]

- a) Internal imperfections in minerals.
- b) Phenomenon of anisotropism.
- c) Main attributes of gemstones.

Q3) Answer the following (any 2) [10]

- a) Physical and optical properties of feldspathoid.
- b) Mineral classification based on silicate structure.
- c) Classification of twins.

Q4) Answer any one. [10]

- a) Describe the structure, mineral composition, physical and optical properties and paragenesis of mica group of minerals.

OR

- b) Give the crystallographic axis, elements of symmetry and forms present with indices of cubic system, Type - pyrite and Type - tetrahedrite.



Total No. of Questions :4]

SEAT No. :

[Total No. of Pages :2

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[5422] - 112

S.Y.B.Sc.

GEOLOGY

GL - 212 : Structural Geology

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

Time : 2 Hours]

[Max. Marks :40

Instructions to the candidates:

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

Q1) Answer the following in 2/3 lines:

[10]

- a) Plunge and Rake of a linear feature.
- b) Non-tectonic structures.
- c) Overturned fold.
- d) Reverse fault.
- e) Unconformity.
- f) Dome and Basin.
- g) Strike joints.
- h) Chevron fold.
- i) Two uses of Brunton compass.
- j) True and vertical thickness of beds.

P.T.O.

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

- a) Plunging and non-plunging folds.
- b) Genetic classification of faults.
- c) Columnar and Sheeting Joints

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

- a) Angular Unconformity and Disconformity.
- b) Absolute and Relative movements along faults.
- c) Recognition of folds by;
 - i) Direct observation
 - ii) Topographic studies.

Q4) Describe the determination of top of bed with the help of primary sedimentary structures and igneous structures. **[10]**

OR

Define fold. Describe the parts of fold. Explain the following folds.

- a) Diapir fold.
- b) Disharmonic fold.
- c) open and close fold.



Total No. of Questions : 4]

SEAT No. :

P89

[5422]-113

[Total No. of Pages : 3

S.Y. B.Sc. (Regular)

STATISTICS

**ST - 211 : Discrete Probability Distributions, Time Series and R-Software
(2013 Pattern) (Paper - I) (Semester - I)**

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

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

Q1) Attempt each of the following:

[1 each]

A) Choose the correct alternative in each of the following:

- a) The relation between mean and variance of negative binomial distribution is
 - i) mean = variance
 - ii) mean > variance
 - iii) mean \geq variance
 - iv) mean < variance
- b) Reduced production in a factory due to strike amounts to following component in time series.
 - i) trend
 - ii) seasonal variation
 - iii) cyclical variation
 - iv) irregular variation
- c) if $(X_1, X_2, X_3) \rightarrow MD (n, p_1, p_2, p_3)$ then $R_{1,23}$ is equal to
 - i) 0
 - ii) 0.5
 - iii) 1
 - iv) -1

B) State whether the given statement is true or false in each of following

[1 each]

- a) The output of $> x = \text{rep}(4, 3)$ is 3, 3, 3, 3.
 - b) Truncated distribution is distribution over a reduced range of corresponding random variable.
 - c) The rank of variance-covariance matrix of MD (n, p_1, p_2, p_3, p_4) is 4.
- C) State the autoregressive model of order 1. **[1]**
- D) Give the R-command to compute $P(X=4)$ if $X \rightarrow B(7, 0.6)$. **[1]**
- E) State one real life situation where negative binomial distribution is observed. **[1]**
- F) State the two uses of exploratory data analysis of time series data. **[1]**

P.T.O.

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

- a) If X_1, X_2, \dots, X_k are independent and identically distributed random variables having geometric distribution with parameter p , obtain the probability distribution of $Y = \sum_{i=1}^k X_i$.
- b) Let $(X_1, X_2, \dots, X_k) \longrightarrow \text{MD}(n, p_1, p_2, \dots, p_k)$. State the moment generating function (m.g.f.) of (X_1, X_2, \dots, X_k) and hence find $\text{Cov}(X_i, X_j), i \neq j$.
- c) Four chips are selected at random with replacement from 10 chips of which 5 are red, 3 are white and 2 are black. Find the probability that (i) one white and one black chips are selected and (ii) at most two red chips are selected.

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

- a) Describe the method of ratio to moving averages for the estimation of seasonal indices and discuss its demerits.
- b) Estimate trend using exponential smoothing with $\alpha = 0.1$ for the following time series:

Year	2004	2005	2006	2007	2008	2009
Profit (in Rs. '000)	90	95	104	112	114	119

- c) Give the outputs of the following R-commands:
 - i) `> x = seq (10, 38, 6)`
`> x`
 - ii) `> x = c (3, 7, 4)`
`> y = rep (x, 2)`
`> y`
 - iii) `> z = c (54, 32, 67, 28, 86, 46)`
`> z [c (-3, -6)]`
 - iv) `> x = 5:8`
`> z = c (4, x, 9, 10)`
`> z`
 - v) `> x = c (10, 13, 15)`
`> y = seq (8, 10)`
`> data. frame (y, x).`

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

- a) i) Explain the terms ‘seasonal variations’ and ‘cyclical variations’ with suitable illustrations. [5]
- ii) Let X have Poisson distribution with parameter m . If the distribution is truncated by discarding the value zero, find the p.m.f. of the resulting distribution and its mean. [5]
- b) i) Write a note on double exponential smoothing using Holt-Winter’s method. [5]
- ii) If X_T is a binomial r.v. with $n = 6$ and $p = 0.4$, truncated to the left at $x = 0$ then find $P(X_T = 2)$. [2]
- iii) If $(X_1, X_2, X_3) \rightarrow MD(5, 0.2, 0.5, 0.3)$, find $P(X_2 = 1 | X_1 = 3)$. [3]



Total No. of Questions : 4]

SEAT No. :

[Total No. of Pages : 3

P90

[5422] - 114

S.Y.B.Sc. (Regular)

STATISTICS

ST- 212: Continuous Probability Distributions

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

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

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

Q1) Attempt each of the following:

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

a) If a r.v. X has p.d.f. $f(x) = \frac{c}{x}, 2 < x < 5$ then E(X) is

- | | |
|-----------|----------|
| i) c | ii) $2c$ |
| iii) $3c$ | iv) $4c$ |

b) The mean deviation about mean of N(20, 100) distribution is approximately

- | | |
|---------|--------|
| i) 6 | ii) 8 |
| iii) 70 | iv) 80 |

c) If mean and variance of G (α, λ) distribution are 2 and $\frac{1}{2}$ respectively then

- | | |
|--------------------|--------------------|
| i) $\lambda = 2$ | ii) $\lambda = 4$ |
| iii) $\lambda = 8$ | iv) $\lambda = 16$ |

P.T.O.

- B) State whether the given statement is true or false in each of the following: **[1 each]**
- If $U = X + Y$ and $V = X - Y$ then the Jacobian of the transformation from (X, Y) to (U, V) is equal to $\frac{1}{2}$.
 - The third cumulant of a positively skewed distribution is positive.
 - If X and Y are independent then conditional distribution of Y given $X = x$ is same as marginal distribution of Y .
- C) State the values of β_1 and β_2 for normal distribution. **[1]**
- D) If X and Y are independent exponential random variables with parameter α , state the probability distribution of $X + Y$. **[1]**
- E) Define raw moment of order (r, s) for a two-dimensional continuous r.v. (X, Y) . **[1]**
- F) If $X \rightarrow \text{Poisson}(m)$ then state the probability distribution of $\frac{X - m}{\sqrt{m}}$ as $m \rightarrow \infty$. **[1]**

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

- a) Find the distribution function of r.v. X whose p.d.f. is

$$f(x) = \frac{1}{x^2}, 1 \leq x < \infty$$

$$= 0, \text{ otherwise.}$$

Hence find $P(4 < X < 5)$.

- b) The joint p.d.f. of two-dimensional continuous r.v. (X, Y) is

$$f(x, y) = 2, x > 0, y > 0, x + y < 1$$

$$= 0; \text{ otherwise.}$$

Find

- $P(X + Y < \frac{1}{2})$ and
 - $E(XY)$.
- c) Define uniform distribution over an interval $[a, b]$. Find its mean and variance.

Q3) Attempt any two of the following:

[5 each]

- a) For a normal distribution with mean μ and variance σ^2 , prove that

$$\mu_{2k} = \frac{(2k)!}{2^k \cdot k!} \sigma^{2k}, \text{ k being a non-negative integer.}$$

- b) The p.d.f. of a continuous r.v. X is

$$f(x) = \frac{1}{2}, -1 \leq x \leq 1$$

$$= 0, \text{ otherwise.}$$

Find the m.g.f. of r.v X. Hence find E(X).

- c) Obtain mode of gamma distribution with parameters α and λ , $\lambda > 1$.

Q4) Attempt any one of the following:

- a) i) If X_1, X_2 and X_3 are independent $N(1, 9), N(2, 16)$ and $N(3, 144)$ variates respectively, find $P(-13 < (2X_1 + 3X_2 - X_3) < 32)$. **[4]**

- ii) Suppose that the life of a TV tube is exponentially distributed with mean 2000 hours. Find the probability that the tube will survive 2500 hours. **[3]**

- iii) The p.d.f. of a continuous r.v. X is given by

$$f(x) = 2xe^{-x^2}, x \geq 0$$

$$= 0, \text{ otherwise.}$$

Find the p.d.f. of $Y = 3X + 5$. **[3]**

- b) i) The joint p.d.f. of a two-dimensional continuous r.v. (X, Y) is

$$f(x, y) = x + y, \quad 0 \leq x \leq 1, 0 \leq y \leq 1$$

$$= 0, \quad \text{otherwise.}$$

Find the correlation coefficient between X and Y. **[7]**

- ii) If a continuous r.v. X has m.g.f. $M_X(t) = e^{8t+10t^2}$, identify the probability distribution of X and state its median and mode. **[3]**



Total No. of Questions : 4]

SEAT No. :

[Total No. of Pages : 2

P91

[5422] - 115

S.Y.B.Sc.

GEOGRAPHY

**Gg- 211: Geography of Resources - I
(2013 Pattern) (Paper - I) (Semester - I)**

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

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

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

- a) What do you mean by resource?
- b) What is meant by biotic resources?
- c) Give any two examples of abiotic non renewable resources.
- d) Write any four causes of deforestation.
- e) Write any two effects of deforestation.
- f) Give any two methods of forest conservation.
- g) Write any four uses of water resources.
- h) Write any two methods of water conservation in industrial sector.
- i) Write any four industrial uses of water resources.
- j) Give any two uses of land resources.
- k) Write any four causes of land degradation.
- l) Name any two crops require less water.
- m) Write any two effects of land degradation.

P.T.O.

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

- a) Importance of study of resources.
- b) Deforestation.
- c) Sources of water.
- d) Importance of land resources.

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

- a) Describe the components of human resources.
- b) Explain the methods of forest conservation.
- c) What are the different methods of water conservation.
- d) Describe the land degradation due to mining.

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

- a) Describe the abiotic non renewable resources in detail.
- b) Explain the uses of land resources in detail.



Total No. of Questions : 4]

SEAT No. :

[Total No. of Pages : 2

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[5422] - 116

S.Y.B.Sc.

GEOGRAPHY

Gg- 212: Watershed Management - I

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

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

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

Q1) Answer the following in two or three sentences each (any 10):

[10]

- a) Define watershed management.
- b) Give any one objective of watershed management.
- c) What is meant by surface run off?
- d) Name any two types of land uses.
- e) What is U.S.L E?
- f) Give any 2 causes of soil erosion.
- g) What is meant by delineation of watershed?
- h) Name the forms of precipitation.
- i) What is infiltration?
- j) Name the land capability classes.
- k) What are the sources of water?
- l) Give any two characteristics of soil?
- m) What is ground water flow?

P.T.O.

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

- a) Ecological characteristics of soil.
- b) Methods of measurement of soil erosion.
- c) Aerial aspects of watershed.
- d) Need for watershed management.

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

- a) Describe hydrological characteristics of soil.
- b) Explain the methods of soil classification.
- c) Examine the problems of watershed management.
- d) Describe the processes of soil erosion.

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

- a) Explain the hydrological cycle in detail.
- b) Describe the Land capability classification.

EEE

Total No. of Questions : 4]

SEAT No. :

P93

[5422]-117

[Total No. of Pages : 2

S.Y. B.Sc.

MICROBIOLOGY

MB - 211 : Bacterial Systematics and Physiology

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

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

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

Q1) Attempt the following:

[10]

- a) Define Anabolism.
- b) Define prosthetic group.
- c) Which bacterial genera contains mycolic acid in its cell wall?
- d) State True / False - Emp Pathway occurs in both aerobic and anaerobic organisms.
- e) State True/False ATPs are produced in fermentation process by oxidative phosphorylation.
- f) Write key enzyme of glyoxylate cycle.
- g) Draw structure of fructose 1, 6 diphosphate.
- h) The reaction $X+Y+ATP \longrightarrow XY+ADP+iP$ is catalysed by
 - i) Transferases
 - ii) Lyases
 - iii) Ligases
 - iv) isomerases
- i) 16sr RNA is a part of _____
 - i) 30s ribosome
 - ii) 50s ribosome
 - iii) 40s ribosome
 - iv) 60s ribosome
- j) Write types of reversible inhibitors

Q2) Attempt any two of the following:

[10]

- a) Explain induced fit model or enzyme catalysis.
- b) What are radioisotopes? Explain role of Pulse chase experiment in study of metabolic Pathway.
- c) What is numerical taxonomy? Describe different steps involved in it.

P.T.O.

Q3) Write short note on (any 2)

[10]

- a) Chemiosmotic hypothesis
- b) Effect of temperature on enzyme activity
- c) G+C content

Q4) Attempt any one of the following

[10]

- a) Describe TCA cycle with structures and add a note on amphibolism.
- b) What is DNA hybridization? Describe any one method of DNA hybridization.



Total No. of Questions : 4]

SEAT No. :

[Total No. of Pages : 2

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[5422]-118

S.Y. B.Sc.

MICROBIOLOGY

MB - 212 : Industrial and Soil Microbiology

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

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

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

Q1) Attempt the following

[10]

- a) Define -
 - i) Dual Fermentation
 - ii) Humus
- b) Write two examples of Precursors in fermentation.
- c) Enlist two lignin degraders.
- d) State true or False
 - i) Giant colony technique is used for antibiotic producers.
 - ii) Trichoderma species is a viral biocontrol agent.
- e) Vinegar is a _____ type of fermentation.
- f) Chu-10 medium is used for the isolation of _____ organism.
- g) CSTR stands for
 - i) Continuous Stirred Tank Reactor
 - ii) Continuous Storage Tank Reactor
 - iii) Constant Stirred Tank Reactor
- h) Conversion of organic nitrogen into ammonia is called as
 - i) Denitrification
 - ii) Ammonification
 - iii) Nitrogen fixation
 - iv) Nitrification

Q2) Write short notes (Any 2)

[10]

- a) Working and seed culture
- b) Composition of soil
- c) Lignin degradation

P.T.O.

Q3) Solve any two of the following [10]

- a) Describe nitrogen sources used in the formulation of fermentation medium.
- b) Describe desirable characters of industrially important micro organisms.
- c) Describe Symbiosis with two examples.

Q4) Attempt any one of the following [10]

- a) What are Biocontrol agents? Explain large scale production of fungal biocontrol agents.
- b) What is Bioreactor? Describe role of different parts of a typical CSTR.



Total No. of Questions :4]

SEAT No. :

[Total No. of Pages :2

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[5422] - 119

S.Y.B.Sc.

PSYCHOLOGY

EP-211: Psychology of Adjustment.

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

Time : 2 Hours]

[Max. Marks :40

Instructions to the candidates:

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

Q1) Answer in two or four sentences

[16]

- a) State the area of adjustment.
- b) Define Anxiety disorder.
- c) Define career.
- d) Define coping.
- e) Define Marriage.
- f) Define Co-habitation
- g) Define Divorce.
- h) Define work.

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

[8]

- a) Explain the Behaviorist approach of Adjustment.
- b) Describe the family influence on career choice.
- c) Explain various alternatives of marriage.

P.T.O.

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

- a) Sources of Job stress.
- b) Super model of career choice.
- c) Schizoid personality disorder.

Q4) a) Enumerate predictors of marital success. **[8]**

OR

- b) What is happiness? Discuss the routes of happiness.



Total No. of Questions :4]

SEAT No. :

[Total No. of Pages :2

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[5422] - 120

S.Y.B.Sc.

PSYCHOLOGY

**Experimental Psychology and Research Methodology
(2013 Pattern) (New Course) (Semester - I) (Paper - II)**

Time : 2 Hours]

[Max. Marks :40

Instructions to the candidates:

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

Q1) Answer in two or four sentences.

[16]

- a) Define Questionnaire.
- b) Define research.
- c) Define reinforcement.
- d) What is generalization?
- e) What mental image?
- f) Define problem solving.
- g) Define conditioning.
- h) What is hypothesis?

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

[8]

- a) Explain the validity in Research.
- b) Explain Instrumental conditioning.
- c) Describe the Abstraction process.

P.T.O.

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

- a) Interview.
- b) Characteristics of Questionnaire.
- c) Observation.

Q4) a) Describe the types of Research. **[8]**

OR

- b) Explain the types of Interview methods.



Total No. of Questions :4]

SEAT No. :

P97

[5422]-123

[Total No. of Pages : 2

S.Y.B.Sc.

ELECTRONIC SCIENCE

EL - 211 : Analog Circuit Design

(2013 Pattern) (Semester-I) (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 non-programmable calculator is allowed.*

Q1) Attempt all of the following:

- a) Define thermal runaway. [1]
- b) What is cascading of an amplifier? [1]
- c) List types of feedback. [1]
- d) Define voltage gain of an amplifier. [1]
- e) "Direct coupled amplifier are not suitable for audio frequencies." Comment. [2]
- f) "Heat sink are used to avoid thermal run away." Comment. [2]
- g) Calculate the effective resistance seen in the primary coil when turns ratio of a transformer is 5:1 and load of speaker is 12Ω . [2]
- h) A differential amplifier has a $A_{cm}=0.5$ and $A_{diff}=200$. Find CMRR in dB. [2]

Q2) Attempt any two of the following:

- a) Draw the circuit diagram of OPAMP as a differentiator and explain it's working. [4]
- b) Show that efficiency of class A power amplifier with transformer load is not more than 50% [4]
- c) Draw the circuit diagram of phase shift oscillator and explain its working. [4]

P.T.O.

Q3) Attempt any two of the following:

- a) Draw the circuit diagram of current to voltage converter using OPAMP. Derive the expression for output. [4]
- b) List different types of coupling used in amplifier. Write advantages and disadvantages of each. [4]
- c) Draw block diagram of voltage series and current series feedback. [4]

Q4) Attempt the following:

- a) State principle of push-pull amplifier. Draw the circuit diagram of class B push-pull amplifier and explain it's working. [6]
- b) Draw the circuit diagram of OPAMP as an integrator. Derive the expression for the output. [6]

OR

- a) Calculate the gain of negative feedback if β is 0.005 and gain without feedback $A= 40$. [4]
- b) A power transistor dissipate 8 W energy if maximum junction temperature is 90°c and the maximum ambient temperature is 30°c . Calculate thermal resistance θ . [4]
- c) Calculate bypass capacitor for designing signal stage RC coupled amplifier if lower cut off frequency is 400 Hz. Assume $R_E= 220\Omega$ [4]



Total No. of Questions : 4]

SEAT No. :

P98

[5422]-124

[Total No. of Pages : 2

S.Y. B.Sc.

ELECTRONIC SCIENCE

EL - 212 : Digital Circuit Design

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

Time : 2Hours]

[Max. Marks : 40

Instructions to the candidates:

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

Q1) Answer all of the following.

- a) Write excitation table for T flip-flop. [1]
- b) How many voltage comparators will be required for 4 bit flash type ADC? [1]
- c) Define redundant group in k-map. [1]
- d) What is interfacing? [1]
- e) Draw k-map for following equation
$$Y = \overline{A}B\overline{C} + A\overline{B}\overline{C} + ABC$$
 [2]
- f) "In resistive divider network MSB needs to handle large current than that of LSB" Comment. [2]
- g) "Sequential circuit is also a combinational circuit" Comment. [2]
- h) Calculate the value of series resistance (RS) for the following, $V_{cc} = 5V$, current through LED is 20 mA and voltage drop across LED is 1.7V. [2]

Q2) Attempt any two of the following:

- a) Using K-map design 4-bit even parity generator. [4]
- b) Explain any four specifications of Digital to Analog converter. [4]
- c) Draw a logic diagram of 4-bit UP/Down counter and explain its working. [4]

Q3) Attempt any two of the following:

- a) Explain the working of 4-bit R-2R ladder network. Derive the formula for equivalent analog voltage of it. [4]
- b) Draw block diagram and explain all to parking system. [4]
- c) Design a two bit magnitude comparator using K-map. [4]

P.T.O.

Q4) Attempt all of the following.

- a) Draw state table and state diagram of a sequential circuit described algebraically by following state equations.

$$\text{Output } z = X(t) \cdot Q_1(t)$$

$$Q_1(t+1) = X(t) + Q_1(t)$$

$$Q_2(t+1) = X(t) \cdot \overline{Q_2(t)} + \overline{X(t)} \cdot \overline{Q_1(t)}. \quad [6]$$

- b) Draw block diagram of digital clock system and explain minutes and hour counter with suitable diagram. [6]

OR

- a) If clock frequency is 1 MHz. Calculate total conversion time for 10 bit.

i) Successive approximation ADC &

ii) Counter type ADC. [4]

- b) Design synchronous MOD-5 counter using J-K flip-flop. [4]

- c) Design a full adder circuit using K-map. [4]



Total No. of Questions :4]

SEAT No. :

[Total No. of Pages :2

P99

[5422] - 125

S.Y.B.Sc.

DEFENCE AND STRATEGIC STUDIES

DS - 101: Study of Conflict and Peace

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

Time : 2 Hours]

[Max. Marks :40

Instructions to the candidates:

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

Q1) Answer in two to four sentences

[8×2=16]

- a) Define ethnic conflict.
- b) Define national values.
- c) Define social integration.
- d) Define Nation-State.
- e) Define self determination.
- f) What do you mean by world order?
- g) Define conflict management.
- h) What do you mean by power politics?

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

[2×4=8]

- a) Describe historical background of peace studies.
- b) Write a note on the scope and nature of war studies.
- c) Discuss pacific methods of conflict management.

P.T.O.

Q3) Write short notes on (any two)

[2×4=8]

- a) Problems of disarmament.
- b) Scope of Research in peace studies.
- c) Conflict transformation across cultures.

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

[1×8=8]

- a) Write a note on the problems and challenges to war studies.
- b) Discuss evolution of war and peace studies.



Total No. of Questions : 4]

SEAT No. :

P100

[5422]-126

[Total No. of Pages : 1

S.Y. B.Sc.

DEFENCE AND STRATEGIC STUDIES

DSSY - 102 : Military Geography

(Semester - I) (Paper - II)

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

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

Q1) Answer in 2 or 4 sentences each **[16]**

- a) Define Military Geography.
- b) What do you mean by ship of Desert?
- c) Define "Civil Defence".
- d) What do you mean by Disaster?
- e) State any two logistics resources.
- f) Define nuclear warfare
- g) Why the study of plain warfare is essential for us?
- h) State any two logistics problems of desert warfare.

Q2) Answer in 8 to 10 sentences (Any two) **[8]**

- a) Explain the concept of Grand strategy.
- b) How the tactics is the most important for local field commander?
- c) Highlight on the significance of logistics with examples.

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

- a) Significance of civil defence.
- b) Logistics problems of high altitude warfare.
- c) Nuclear warfare.

Q4) Answer in 16 to 20 sentences **[8]**

- a) Explain in detail Environment as a factor of national security.
- b) Highlight on India's grand strategy and strategy during Indo Pak war of 1971.



Total No. of Questions : 4]

SEAT No. :

P101

[5422]-127

[Total No. of Pages : 1

S.Y. B.Sc.

DEFENCE AND STRATEGIC STUDIES

DS - 103 : Contemporary strategy

(2013 Pattern) (Semester - I) (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 or 4 sentences each **[16]**

- a) Define "Strategy".
- b) State the duration of world war second.
- c) Write the long form of C.B.M.
- d) What do you mean by strategic Thinking?
- e) What do you mean by Nuclear strategy?
- f) Define "War"
- g) State any two examples of war.
- h) How you would like to define national security?

Q2) Answer in 8 to 10 sentences (Any two) **[8]**

- a) Write a few lines Indias operation shakti of 1998.
- b) Explain an examples of strategic causes of war.
- c) Write a few lines on Neclear club.

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

- a) Concept of conventional war.
- b) C.B.M in Indo-Pak relations
- c) Theory of Nuclear Determence

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

- a) Explain the Indias Nuclear "Doctrine" with special reference to the minimum nuclear determence.
- b) Discuss the "science and technology" as a components of national security strategy.



Total No. of Questions : 4]

SEAT No. :

P102

[5422]-128

[Total No. of Pages : 2

S.Y. B.Sc.

ENVIRONMENTAL SCIENCE

EVS - 201 : Ecology And Ecosystem

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

Time : 2Hours]

[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) Answer the followings in 1 or 2 lines.

[10]

- a) What is 'Biome'.
- b) Define 'Food web'.
- c) What is intra-system cycling of nutrient?
- d) Define fecundity.
- e) Explain the concept of succession.
- f) What is 'Logistic growth curve'?
- g) Define invasion.
- h) What is Habitat?
- i) What is primary productivity?
- j) What do you mean by ecotone?

Q2) Write notes on any two of the following:

[10]

- a) Ecological spectrum.
- b) Nutrient Budget.
- c) Ecosystem structure.
- d) Survivorship curves.

P.T.O.

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

- a) Explain the concept of carrying capacity with suitable example.
- b) What is 'ecological energetics'? Explain with suitable diagram.
- c) Comment on cycling of organic nutrients.
- d) Explain the various causes and types of succession.

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

- a) Explain in detail characteristics of community.
- b) Explain terrestrial and aquatic habitat types with suitable example.



Total No. of Questions : 4]

SEAT No. :

[Total No. of Pages : 2

P103

[5422]-129

S. Y. B. Sc.

ENVIRONMENTAL SCIENCE

**EVS - 202 : Natural Resources Energy & Their Management
(2013 Pattern) (Semester - I) (Paper - II)**

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

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

Q1) Answer the following 1-2 lines.

[10]

- a) What do you meant by energy plantation?
- b) Sketch & Lable diagram of solar cell.
- c) Enlist any two causes of soil erosion.
- d) Give the name of person who known as father of Green Revolution of India.
- e) Enlist two national parks present in different states of India.
- f) What do you meant by perpetual Resources?
- g) Define : Resources.
- h) Enlist any two problems associated with modern Agriculture.
- i) Give two examples of polluting & non polluting energy Resources.
- j) What do you meant by wave energy?

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

[10]

- a) Rain water harvesting
- b) Sustainable Agriculture
- c) Importance & scope of Natural Resource.

P.T.O.

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

- a) Write a note on Green Revolution in India.
- b) Explain in detail different methods used in water conservation.
- c) Describe in detail wave energy. Enlist advantages & Disadvantages of wave energy.

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

- a) Discuss potential of Protected areas. Explain In-situ conservation method with suitable example.
- b) Define food resources. Explain in detail problems associated with modern Agricultural practices.



Total No. of Questions : 4]

SEAT No. :

[Total No. of Pages : 3

P104

[5422]-130

S.Y. B.Sc.

ENGLISH (Optional)

Literary Vistas

(2013 Pattern) (Semester - 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 any one of the following in about 100 words each : **[5]**

- i) What interesting information about the stars do you get from the lesson 'The Stars, the Planets and the Stars'?
- ii) What is the scientific point of view? How does it help us when applied to the events of daily life?

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

- i) How is science ethically neutral?
- ii) What are the problems that children who are 'at the mercy of five to six hours of TV a day' face, when they move into the real world?

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

- i) How does H.W. Longfellow compare our life to 'A Psalm of Life'?
- ii) Do you agree with the poet 'Life changes for a girl, once she starts wearing Purdah'? Give reasons.

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

- i) How does the poem 'A Psalm of Life' depicts the narrator's perspectives on the value of life and virtues we should incorporate to live everyday meaningful?
- ii) Analyse the symbolism in the poem, 'Purdah (I)' paying attention to the following words : corpse, walls, clod of earth and roots.

P.T.O.

Q3) Attempt any five of the following :

[10]

- a) Complete the following sentences with an appropriate word chosen from those in brackets.
- i) The director's decision to resign was _____ for the institution. (momentary/momentous)
- ii) I _____ if I can leave the office early tomorrow. (suspect / doubt).
- b) Match the words that mean the same.
- | A | B |
|----------------|---------------|
| i) yearly | a) useless |
| ii) lucid | b) annually |
| iii) mandatory | c) clear |
| iv) futile | d) compulsory |
- c) Choose the right combination of the words.
- i) hardly nothing / practically nothing.
- ii) renew a contract / resign a contract.
- d) Pick out the word that is the closest antonym of the underlined word.
- i) ambiguity : clarity, guilt, liveliness
- ii) dormant : forgotten, lament, active
- e) Differentiate between the following pairs of words.
- i) fair, fare.
- ii) beside, besides.
- f) Add prefixes or suffixes to the words in brackets and rewrite the sentences.
- i) No, that answer is _____. (correct)
- ii) I have a _____ card. (paid).

Q4) Attempt any ten of the following :

[10]

- a) Computers _____ (store) large amount of data.
(Use the correct form of the verb given in the bracket)
- b) The doctor is busy now, but he _____ (see) you after an hour.
(Use the correct form of the verb given in the bracket)
- c) He had every qualification for the job except experience.
(Change into a compound sentence)
- d) He had problems but he completed the assignment in time.
(Change into a complex sentence)
- e) Rajesh finished his work in the office and went home.
(Change into a simple sentence)
- f) What an exciting trip we had!
(Change into declarative sentence)
- g) The flower is very beautiful.
(Change into an exclamatory sentence)
- h) It is too hot to go out.
(Remove too and rewrite the sentence)
- i) The film division is making a documentary.
(Change into passive voice)
- j) The Moon can be seen through the clouds.
(Change into Negative sentence)
- k) Sanket cycles to college every day.
(Change into an interrogative sentence)
- l) Kamal said, "I'm returning to Pune next Saturday".
(Change into direct speech).



Total No. of Questions : 3]

SEAT No. :

P105

[5422]-131

[Total No. of Pages : 1

S.Y. B.Sc.

मराठी (MARATHI)

पाठ्यपुस्तक : “विज्ञानसृष्टी” (मराठी विज्ञान साहित्य)

(2013 पॅटर्न) (Semester - I)

वेळ : 2 तास/

[एकूण गुण : 40

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

प्र.1) खालीलपैकी कोणत्याही एका विषयावर 400 शब्दांत निबंध लिहा.

[10]

- अ) स्वच्छ भारत-स्वस्थ भारत
ब) कौशल्य विकास व आजची शिक्षणपद्धती
क) विज्ञानातील गमती-जमती... (ललित)

प्र.2) खालीलपैकी एका प्रश्नाचे उत्तर 300 शब्दांपर्यंत लिहा.

[15]

‘पहाड’ या विज्ञानकथेचा आशय सविस्तर उलगडून दाखवा.
किंवा

‘वैज्ञानिक दृष्टिकोन’ या पाठातून डॉ. नरेंद्र दाभोळकर यांनी वैज्ञानिक दृष्टिकोनाचे महत्त्व कसे पटवून दिले आहे? ते साधार लिहा.

प्र.3) टिपा लिहा. (कोणत्याही तीन)

[15]

- अ) विज्ञान साहित्याची वैशिष्ट्ये.
ब) ‘अतिरेकी’ कथेतील ‘अतिरेक्या’चे व्यक्तिचित्र लिहा.
क) भारतरत्न सी. एन. आर. राव यांचे संस्थात्मक कार्य.
ड) भारतातील पर्यावरण कार्यक्रम.
इ) अणुशक्ती व उद्योगातील संधी.
फ) भारताची मंगळ उपग्रहावरील मोहिम.



Total No. of Questions : 3]

SEAT No. :

P106

[5422]-132

[Total No. of Pages : 2

S.Y. B.Sc.

हिंदी (Hindi)

(2013 Pattern) (नया पाठ्यक्रम) (सामान्य) (General) (Semester- I)

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

समय : 2 घंटे]

/पूर्णांक : 40

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

प्र.1) अ) निम्नलिखित में से किन्हीं छह वाक्यों को शुद्ध करके फिर से लिखिए। [6]

- i) मैंने ग्रहकार्य नहीं किया।
- ii) गाय का ताकतवर दूध होता है।
- iii) मुझे एक कप चाय होना।
- iv) गाँव में किसान लोग मेहनत करता हैं।
- v) आप यहाँ मत बैठो।
- vi) विहान कब आया।
- vii) बच्चों से गुस्सा करना व्यर्थ है।
- viii) मुझे हिंदी में बीस अंक मिला।

आ) निम्नलिखित अंग्रेजी अनुच्छेद का हिंदी में अनुवाद कीजिए। [6]

Poetry is the language of the imagination and the passions. It relates to whatever gives immediate pleasure or pain to the human mind. It comes home to the bosoms and businesses of men; for nothing but what comes home to them in the most general and intelligible shape can be subject for poetry. Poetry is the universal language which the heart holds with nature and itself he who has a contempt for poetry can not have much respect for himself, or for anything else. Wherever there is a sense of beauty or power, to harmony as in the motion of a wave of the sea, in the growth of a flower, there is poetry in its birth.

P.T.O.

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

क) “एक ऑपरेशन में यहाँ बीस हजार से पचास हजार रूपए का खर्च आता है।”

अथवा

“दैनिक जीवन में अपरिहार्य साधारण आवाजों से अधिक उँची आवाजें ‘शोर’ कहलाती हैं।”

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

ख) “मेरी वीणा का मधुमय स्वर

विश्व सुनेगा कान लगाकर,

दूर गए पर मेरे उर की धड़कन को सुन पानेवाले।”

अथवा

“उच्च मनुजता को ठुकराने से तो वह डरता है

किंतु, उच्च गुण के कारण जो रण में हार गए हैं,

उन पराजितों की किस्मत पर रोता है इतिहास,

पर, अपाहिजों का कलंक वह क्षमा नहीं करता है।”

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

i) संस्कृति का वर्णन ‘दिनकर’ ने कैसे किया है?

ii) श्मशान कबीर का दोहा सुनकर पहाड़ी से कौनसी बात करता है?

iii) लेखक त्यागीजी ने रचनात्मक कार्य का वर्णन कैसे किया है?

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

i) यशोधरा की व्यथा को गुप्त जी ने किस प्रकार अभिव्यक्त किया है?

ii) ‘तोड़ती पत्थर’ कविता के उद्देश्य को लिखिए।

iii) जीवन में ‘सुख-दुख’ के महत्व को पंत जी ने कैसे स्पष्ट किया है?



Total No. of Questions : 4]

SEAT No. :

P107

[Total No. of Pages : 2

[5422]-133

S.Y. B.Sc.

SANSKRIT

Geervanabharati

गीर्वाणभारती

(2013 Pattern) (Semester-I)

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

- 1) *All questions are compulsory.*
सर्व प्रश्न अनिवार्य आहेत.
- 2) *Figures to the right indicate full marks.*
उजवीकडील अंक पूर्ण गुण दर्शवितात.

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

[16]

पुढील प्रश्नांची 2 ते 4 ओळीत उत्तरे लिहा.

- a) What did sukanya say to Chyavana?
च्यवनास सुकन्या काय म्हणाली ?
- b) State the any four names of Upanishad?
कोणत्याही चार उपनिषदांची नावे लिहा.
- c) Which are the चतुष्कला in अनन्तवान् ?
अनन्तवान् या पादाच्या चतुष्कला कोणत्या ?
- d) Explain the meaning of - वाक्याचा अर्थ स्पष्ट करा -
ययातेरिव शर्मिष्ठा भर्तुबहुमता भव।
- e) Explain the meaning of - विनयात् संसाधयेत् कार्यम्।
वाक्याचा अर्थ स्पष्ट करा - विनयात् संसाधयेत् कार्यम्।
- f) Write a meaning of - छायाग्राहिसत्त्व.
छायाग्राहिसत्त्व या शब्दाचा अर्थ सांगा.
- g) What is a meaning of अर्चनभक्ती ?
अर्चनभक्ती या शब्दाचा अर्थ काय होतो ?
- h) What is the reason of King Parikshit's death?
कोणत्या कारणाने परीक्षितराजा मरण पावला ?

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.

- सुकन्या
- चतुष्पाद
- उपनिषद्

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

पुढीलपैकी कोणत्याही दोहोंवर 8-10 ओळीत संक्षिप्त टीपा लिहा.

- Explain स्पष्ट करा – क्वापि न गच्छेदनाहूतः।
- सिंहिका
- Explain स्पष्ट करा – यद्यत्कर्म करोमि तत्तदखिलं शंभो तवाराधनम्।

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

पुढीलपैकी कोणत्याही एका प्रश्नाचे 16-20 ओळीत उत्तर लिहा.

- Critically appreciate 'सेयं याति शकुन्तला पतिगृहम्'
'सेयं याति शकुन्तला पतिगृहम्' या पाठाचे विवेचक रसग्रहण करा.
- Explain the importance of शिवमानसपूजा
शिवमानसपूजेचे महत्त्व स्पष्ट करा.



Total No. of Questions :4

SEAT No. :

P-108

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[5422] - 134

S.Y.B.Sc.

Arabic Functional
(2013 Pattern) (Semester - I)

Time : 2 Hours]

[Min. Marks : 40

1. Define with examples any two of the following Grammar (10)

(١) المبتدا والخبر

(٢) الضمائم

(٣) حُرُوفُ الشَّمْسِيِّ

(٤) الفعل الماضي

2. Translate into English any Five of the following sentences : (10)

(١) رَئِيسُ الْقِسْمِ جَالِسٌ فِي بَيْتِهِ

(٢) هُوَذَا هَبَّ الْأَبِيْتَهُ صَدِيقَهُ -

(٣) عَلِيٌّ رَاجِعٌ مَعَ فَاطِمَةَ مِنَ السُّوقِ -

(٤) هِيَ مَشْغُولَةٌ فِي مَكْتَبِهَا.

(٥) تَلْفِزِيُونٌ فَرِيدَةٌ فِي عَرَفَتِهَا.

(٦) أَلْبِنْتُ جَالِسَةً عَلَى الْكُرْسِيِّ.

(٧) مَكْتَبُهُ بَعِيدٌ مِنْ بَيْتِهِ.

(٨) عَلَى الطَّاوَلَةِ جَرِيدَةٌ.

P.T.O.

3. Translate into Arabic any five of the following Sentences: (10)

1. This bus is Coming from the College
2. That Chair is Comfortable.
3. My brother is going to the School.
4. On the window there is a Curtain.
5. The new teacher is a tall man.
6. The garden of University is beautiful.
7. No, his College is Closed.
8. That bus is going to University.

4. Write the terminology in Arabic any ten of the following: (10)

- (1) Radiation (2) Astrology.
- (3) Mercury (4) Degree.
- (5) Heat (6) Orbit. (7) Liquid.
- (8) Solid (9) Voltage.
- (10) Motion (11) Soft (12) Atom.
- (13) AXIS (14) Science.
- (15) Planet (16) Pole.



Total No. of Questions : 4]

SEAT No. :

P-109

[Total No. of Pages :2

[5422] - 135

S.Y.B.Sc.

(UR-G2): Urdu General
(Paper-II) (New Pattern) (Semester - I)

Time : 2 Hours]

[Min. Marks : 40

- ہدایات : (۱) تمام سوالات لازمی ہیں۔
(۲) بائیں جانب درج نمبرات مارکس ہیں۔
- 1- علامہ اقبال کی نظموں کا سرسری جائزہ لیجیے۔ (10)
- یا
- علامہ اقبال کی حیات و شخصیت پر نوٹ لکھیے۔
- 2- بانگ درا کی خصوصیات بیان کیجیے۔ (10)
- یا
- صنف نظم کے آغاز و ارتقاء پر روشنی ڈالیے۔
- 3- کسی ایک نظم کا مرکزی خیال بیان کرتے ہوئے تشریح کیجیے۔ (10)
- ۱- پرندے کی فریاد ۲- نیا سوال ۳- صبح کا ستارہ
- 4- مندرجہ ذیل اشعار میں سے کوئی پانچ اشعار کی تشریح بحوالہء متین کیجیے۔ (10)
- ۱- ہائے کیا فرطِ طرب میں جھومتا جاتا ہے ابر
فیل بے زنجیر کی صورت اڑا جاتا ہے ابر
- ۲- انجمن ہے ایک میری بھی جہاں رہتا ہوں میں
بزم میں اپنی اگر لیکتا ہے تو، تنہا ہوں میں
- ۳- جب سے چمن چھٹا ہے یہ حال ہو گیا ہے
دل غم کو کھار ہا ہے غم دل کو کھار ہا ہے
- ۴- نہ یہ خدمت، نہ یہ عزت، نہ یہ رفعت اچھی
اس گھڑی بھر کے چمکنے سے تو ظلمت اچھی

P.T.O.

- ۵۔ شکلی بھی شانتی بھی بھکتوں کے گیت میں ہے
دھرتی کے باسیوں کی مکتی پریت میں ہے
- ۶۔ جو مری ہستی کا مقصد ہے مجھے معلوم ہے
یہ چمک وہ ہے، جبیں جس سے تری محروم ہے!
- ۷۔ اے ہمالہ! اے فصیلِ کشورِ ہندوستان!
چومتا ہے تیری پیشانی کو جھک کر آسماں



Total No. of Questions : 4]

SEAT No. :

[Total No. of Pages : 2

P110

[5422] - 136

S.Y.B.Sc. (Vocational)

INDUSTRIAL CHEMISTRY

VOC- 211: Utilities Unit Operations & Process Instrumentation

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

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

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

Q1) Answer the following:

[16]

- a) Convert -3°C into absolute temperature.
- b) Convert 15 psi into torr.
- c) Define hardness of water.
- d) What is extractive distillation?
- e) Describe in brief primary nucleation.
- f) Write the expression for Reynold number.
- g) What is the principle of an alphanatron pressure gauge?
- h) What is drying?

Q2) Attempt any two of the following:

[8]

- a) Write a short note on venturi tubes.
- b) Write four applications of steam in industry.
- c) Describe the role of thermo couples in temperature measurements.

P.T.O.

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

- a) Describe in brief different types of boilers.
- b) Explain the principle involved in fractional distillation.
- c) Write a short note on crystallization.

Q4) Describe the methods used for removal of hardness from water. [8]

OR

Sketch and explain various types of vacuum pressure devices.

EEE

Total No. of Questions : 4]

SEAT No. :

[Total No. of Pages : 2

P111

[5422] - 137

S.Y.B.Sc.

BIOTECHNOLOGY - I (Vocational)

VOC Biotech - 211: Cell & Molecular Biology and Microbial Genetics

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

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

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

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

[10]

- a) Define paracrine signaling.
- b) What is passive transport?
- c) What is collagen protein?
- d) State the role of hemidesmosome.
- e) Enlist any two examples of cell signalling pathways.
- f) How Hfr strain is formed during conjugation.
- g) Define: Base excision repair.
- h) What is replication fork?
- i) State the role of histone protein in nucleosome.
- j) What is generalised transduction?

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

[10]

- a) Transduction.
- b) Post translational modification.
- c) Apoptosis.

P.T.O.

Q3) Answer any two of the following:

[10]

- a) Describe LINES and SINES with suitable examples.
- b) Explain structure and function of golgi complex.
- c) What is gene? Explain eukaryotic gene structure.

Q4) Compare and contrast prokaryotic and eukaryotic transcription process. Add a note on transcription inhibitors. **[10]**

OR

Explain in detail prokaryotic transcription process.

EEE

Total No. of Questions : 4]

SEAT No. :

[Total No. of Pages : 2

P112

[5422] - 138

S.Y. B.Sc. (Vocational)

PHOTOGRAPHY AND AUDIO - VISUAL PRODUCTION – I

Still Photography, Processing & Printing

(2013 Pattern) (Semester - I)

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 indicates full marks.*

Q1) Answer the following in short:

[16]

- a) Mention the important attributes of any colour.
- b) Which colour of light is transmitted and absorbed by a sky light filter?
- c) What is the purpose of a camera lens?
- d) What is the 'hyper focal distance'? Which factors affect it?
- e) Discuss the importance of the 'histogram' in digital photography.
- f) What is a 'normal' lens?
- g) Define the guide number of a flash light.
- h) What is a fast lens?

Q2) Attempt ANY TWO of the following:

[8]

- a) How is a polarizing filter useful in photography?
- b) Discuss what is 'unwanted light' in photography. Give suitable examples.
- c) What is a macro lens? How is it useful in photography?

P.T.O.

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

- a) Metering patterns of a TTL exposure meter.
- b) Use of polarizing filter in photography.
- c) Documentary photography.

Q4) Answer ANY ONE of the following: **[8]**

- a) Give suitable examples and discuss how light is important in photography.
- b) Draw a suitable diagram and discuss the construction and working of a flash light.

EEE

Total No. of Questions : 4]

SEAT No. :

P905

[Total No. of Pages : 2

[5422]-139

S.Y. B.Sc. (Vocational)

ELECTRONIC EQUIPMENT MAINTENANCE

**EEM : 211 - Troubleshooting Electronic Equipment - A
(Semester - I) (Paper - I)**

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

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

Q1) Answer the following :

- a) What is wiring diagram? [1]
- b) What do you mean by re-assembly? [1]
- c) State the difference between inductor & choke. [1]
- d) What is VOM? Where it is used? [1]
- e) State different types of printed circuit boards. [2]
- f) List the applications of capacitors. [2]
- g) Give common failures in semiconductor devices. [2]
- h) List different audiofile formats. [2]

Q2) Answer any Two :

- a) Discuss different causes of equipment failure. [4]
- b) Describe the steps involved in troubleshooting process. [4]
- c) Mention common failures in resistors & their causes. [4]

Q3) Answer any Two :

- a) What is working life? Discuss in appropriate conditions during working life. [4]
- b) Write a note on failures in capacitors. [4]
- c) Explain the test procedure of special diode. [4]

P.T.O.

Q4) Attempt the following.

- a) Explain in brief the contents of service/maintenance manual. [6]
- b) Discuss various test & measuring tools. [6]

OR

Q4) Attempt the following.

- a) Explain in detail types of failure in bipolar junction transistor. Discuss the testing procedure of bipolar transistor. [6]
- b) Discuss the fault diagnosis in Op-AMP circuits. [6]



Total No. of Questions : 4]

SEAT No. :

[Total No. of Pages : 2

P113

[5422] - 140

S.Y.B.Sc. (Vocational)

COMPUTER HARDWARE & NETWORK ADMINISTRATION

Microprocessor & Interfacing Techniques

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

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

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

Q1) a) Attempt the following: [4×1=4]

- i) List various Non-Intel processors.
- ii) List different types of key switches?
- iii) Define Accuracy.
- iv) What do you mean by Quad core processor?

b) Attempt the following: [4×2=8]

- i) What is primary memory? State its functions.
- ii) What is sensor? List any two temperature sensors?
- iii) What is the size of address bus and data bus for 8086 processor?
- iv) What is USB? State any two advantages of USB.

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

- a) What is function of BUS? Explain features of PCI bus.
- b) What is ADC? Explain working of any one type of ADC?
- c) What is need of cache? Explain cache memory hierarchy.

P.T.O.

Q3) Attempt any two of the following:

[2×4=8]

- a) What is a Microprocessor? Explain features of 8086 processor.
- b) What is interrupt? Explain software interrupts in brief.
- c) What is function of RAM? State differences between SRAM and DRAM.

Q4) Attempt any two of the following:

[2×6=12]

- a) Explain features Pentium processor and i3 processor.
- b) What is DAC? State different types of DAC. Explain working of any one type of DAC.
- c) What is function of DMA? Explain DMA Controller operation with a neat diagram.

EEE

Total No. of Questions : 4]

SEAT No. :

P906

[Total No. of Pages : 2

[5422]-141

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

SEED TECHNOLOGY (Vocational) (Paper - I)

Hybrid Seed Production

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 labeled diagrams wherever necessary.*

Q1) Attempt the following :

[10 × 1 = 10]

- a) What is a Variety?
- b) Define emasculation.
- c) What is the isolation distance required for cotton hybrid seed Production.
- d) What is self incompatibility?
- e) What is stigma receptivity?
- f) Give the types of apomixis.
- g) What is isolation?
- h) Define Roughing.
- i) What is allogamy?
- j) Define genetic male sterility.

Q2) Attempt any two of the following :

[2 × 5 = 10]

- a) Discuss on Pollen Storage.
- b) Describe in detail Genetic basis of heterosis.
- c) Comment on compact area approaches.

P.T.O.

Q3) Write notes on (Any two) :

[2 × 5 = 10]

- a) Hand emasculation.
- b) Homomorphic self incompatibility.
- c) Genetic male sterility.

Q4) Explain in detail the procedure for hybrid seed production in zea mays.

[1×10=10]

OR

Describe in detail, the procedure for hybrid seed production in Jowar with respect to land requirement, isolation, planting ratio, cultural practices, plant protection, roughing & harvesting.



Total No. of Questions : 4]

SEAT No. :

P114

[Total No. of Pages : 2

[5422] - 142

S.Y.B.Sc. (Vocational)

INDUSTRIAL MICROBIOLOGY

VOC-IND-MIC-211: Bioreactors - Designs and Operation

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

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

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

[10]

- a) What is sparger?
- b) Give examples of two fed-batch fermentations.
- c) How is overall Del factor calculated?
- d) What is a plug-flow reactor?
- e) State two disadvantages of batch sterilization.
- f) AISI 304 stainless steel used for fermenters contains 18% chromium and 8% nickel. What is the role of chromium and nickel?
- g) How do you sterilize vitamins?
- h) Enlist two types of impellers.
- i) What are offline sensors?
- j) Enlist two methods of estimation of biomass.

Q2) Attempt any two of the following:

[10]

- a) Draw a neat labelled diagram of fluidized bed reactor.
- b) Describe in detail pH sensors used in biofermenters.
- c) Discuss advantages of Stirred tank reactors.

P.T.O.

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

[10]

- a) KLa of a fermentor.
- b) Temperature control in fermenter.
- c) Antifoam agents.

Q4) Answer any one of the following:

[10]

- a) Write in details about methods of sterilization of fermenter vessel, medium and air for a fermentation process.
- b) Describe in details time course of fermentation process with suitable example.

EEE

Total No. of Questions : 4]

SEAT No. :

[Total No. of Pages : 2

P115

[5422] - 143

S.Y.B.Sc. (Vocational)

INDUSTRIAL CHEMISTRY

VOC- 212: Inorganic Process Industries

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

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

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

Q1) Answer the following:

[16]

- a) What is white portland cement?
- b) How are enamels prepared?
- c) What do you understand by cullet?
- d) Write two uses of refractories.
- e) What is dry corrosion?
- f) Name two oxides used for making colored glass.
- g) Define whiskers.
- h) Name two methods for prevention of corrosion.

Q2) Answer any two of the following:

[8]

- a) Discuss the properties of refractory materials.
- b) Explain the properties of special cement.
- c) Write a short note on underground corrosion.

P.T.O.

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

- a) Describe the wet process of manufacture of portland cement.
- b) What is ferromagnetic material? What is the role of this material in refractories?
- c) Write a note on Annealing of glass.

Q4) Explain the various steps involved in manufacture of refractories. [8]

OR

Describe in detail

- a) Ferroelectric ceramics and
- b) Ceramic superconductors.

EEE

Total No. of Questions : 4]

SEAT No. :

P116

[5422]-144

[Total No. of Pages : 2

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

**VOC – Biotech - 212 : Recombinant DNA Technology
(2013 Pattern) (Semester-I) (Paper - II)**

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

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

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

[10]

- a) What are bacteriophages?
- b) Give two examples of DNA modifying enzymes.
- c) What is r-DNA technology?
- d) What is Qri-site?
- e) Define shuttle vectors.
- f) Name the special type of membrane used in Northern blotting.
- g) Give the function of ligase enzyme in RDT.
- h) What is copy number of plasmids?
- i) What is transformation?
- j) Name the source of Taq polymerase enzyme.

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

[10]

- a) PCR
- b) Western blotting
- c) Enlist four applications of r-DNA technology and explain any one in detail.

P.T.O.

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

- a) Describe the Maxam-Gilbert method of DNA sequencing.
- b) Explain proteomics in detail.
- c) Give classification of restriction endonucleases with suitable examples.

Q4) What is gene cloning? Explain in detail the steps in gene cloning method.[10]

OR

What are plasmids? Describe any two plasmid vectors in detail.



Total No. of Questions : 4]

SEAT No. :

P117

[5422]-145

[Total No. of Pages : 2

S.Y. B.Sc.

PHOTOGRAPHY AND AUDIO-VISUAL PRODUCTION

Fundamentals of Acoustics and Sound for Media

(2013 Pattern) (Semester - I) (Vocational)

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 ALL of the following :

- a) Define : Decibel. [2]
- b) Explain in brief any two characteristics of a microphone. [2]
- c) Find the wavelength of sound of 1000 Hz presuming its velocity to be 344 m/s. [2]
- d) Calculate the reverberation time for an auditorium of 1000 cubic meters having total absorption equal to 230 Sabine. [2]
- e) Calculate power gain in dB if input power of 200 mW gives output power of 2 W. [2]

Q2) Attempt Any Two of the following :

- a) Using neat labelled diagram, explain the functioning of bass reflex enclosure with port using suitable circuit. [5]
- b) Explain the necessity of cross-over networks. Design a crossover network to give 12 dB per octave attenuation for tweeter and woofer for critical frequency of 1 kHz. Loudspeaker resistance is 16 Ω . [5]
- c) What are the characteristics of a good loudspeaker? Why efficiency of indirect radiating loudspeaker is higher than direct radiating type? [5]

P.T.O.

Q3) Attempt Any Two of the following :

- a) Calculate the reverberation time for a hall whose length, width and height are 50 m, 30 m and 5 m, respectively and the average absorption coefficient is 0.161. [5]
- b) With the help of a neat sketch, explain the principle of working of a ribbon microphone. Why is it known as velocity microphone? [5]
- c) Write a short note on the characteristics of human ear. [5]

Q4) Attempt Any Two of the following :

- a) Draw a neat labeled block diagram to explain the construction and working of a magnetic sound recording system. [5]
- b) With the help of a neat sketch, explain the functioning of a horn type loudspeaker. Explain why it is called an indirect radiating type loudspeaker. [5]
- c) Sound intensity at 1 meter from a loudspeaker is 400 mW/m^2 . The audio power fed to the loudspeaker is 10 W. Calculate the efficiency of the loudspeaker. [5]



Total No. of Questions : 4]

SEAT No. :

P907

[Total No. of Pages : 2

[5422]-146

S.Y. B.Sc. (Vocational) (Semester - I)
ELECTRONIC EQUIPMENT MAINTENANCE (EEM)
Audio, Video and Office Equipment (Paper - II)

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

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

Q1) Answer the following.

- a) State the advantages of PA system. [1]
- b) What is the range in typical AM receiver? [1]
- c) What is ghost image? [1]
- d) List different receiver ICS. [1]
- e) State the difference between SDTV and HDTV. [2]
- f) List the applications of TV. [2]
- g) State the function of vertical blanking pulse. [2]
- h) What type of speakers are used in home theater system? [2]

Q2) Answer any Two.

- a) What is MP3? State its advantages. Give the procedure for downloading songs in MP3 format. [4]
- b) Explain the typical automotive infotainment system. [4]
- c) Explain the receiver characteristics and alignment of AM receiver. [4]

Q3) Answer any two.

- a) What is the function of PA system? State its requirements. [4]
- b) Explain sound reproduction from the CD. [4]
- c) Explain HDTV standard in brief. [4]

P.T.O.

Q4) a) Explain in detail CCTV system. How does it differ from normal TV?
What are its applications? [6]

b) Describe the construction of VCD player with the help of neat diagram. [6]

OR

a) What is ACD player? Explain principle of recording ACD. [6]

b) Explain the principle of recording of electrical signal on magnetic tape. [6]



Total No. of Questions : 4]

SEAT No. :

P118

[5422]-147

[Total No. of Pages : 2

S.Y. B.Sc. (Vocational)

COMPUTER HARDWARE & NETWORK ADMINISTRATION

Computer System Management

(2013 Pattern) (Paper - II) (Semester - 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 SMPS?
- ii) What are power line problems?
- iii) List various components on mother board.
- iv) What is noise?

b) Attempt the following :

[4 × 2 = 8]

- i) What is device driver?
- ii) What is CDROM? List any two problems related to CDROM.
- iii) What is function of RAM and ROM?
- iv) State any two motherboard related problems.

Q2) Attempt Any Two of the following :

[2 × 4 = 8]

- a) Write a short note on software preventive maintenance.
- b) In what different ways can a printer malfunction? How will you overcome them?
- c) Write a short note on disk drive problems.

P.T.O.

Q3) Attempt Any Two of the following :

[2 × 4 = 8]

- a) Explain keyboard and mouse problems and the measures for their troubleshooting.
- b) Write a short note on repair generated failures.
- c) Explain backup and recovery procedures.

Q4) Attempt Any Two of the following :

[2 × 6 = 12]

- a) Explain the effect of heat, dust and cold, as contributors to system failures?
- b) List various electronic equipments used in troubleshooting. State and explain general rules for troubleshooting of computer.
- c) List common problems in modern PC. Explain in brief about problems that may arise while using serial and parallel port.



Total No. of Questions : 4]

SEAT No. :

P908

[Total No. of Pages : 2

[5422]-148

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

SEED TECHNOLOGY

Seed Testing (Vocational) (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 labeled diagrams wherever necessary.*

Q1) Attempt the following :

[10 × 1 = 10]

- a) What is seed Testing?
- b) Write the minimum moisture content required for cereals?
- c) What is physical purity?
- d) Define seed vigour?
- e) Define guard samples.
- f) Write an important role of International seed Testing Association.
- g) What type of equipment is used to test physical purity?
- h) Write any two Precautions to be taken at the time of seed registration.
- i) Define seed germination.
- j) Define seed sampling.

Q2) Attempt any two of the Following :

[2 × 5 = 10]

- a) Give the procedure of seed sampling.
- b) Discuss on physical Purity analysis.
- c) Comment on seed vigour testing.

P.T.O.

Q3) Write notes on (Any two) :

[2 × 5 = 10]

- a) Staffing in relation to seed Testing Laboratory.
- b) Role of International seed Testing Association.
- c) Air oven method.

Q4) Define seed germination? Discuss in detail any two methods used for testing seed germination. **[10]**

OR

Give an account of precautions and procedure for registration in detail.



Total No. of Questions : 4]

SEAT No. :

P119

[5422]-149

[Total No. of Pages : 2

S.Y. B.Sc. (Vocational)

INDUSTRIAL MICROBIOLOGY - II

VOC-IND-MIC-212 : Screening and Process Optimization

(2013 Pattern) (Paper - II) (Semester - 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 labeled diagrams wherever necessary.*
- 5) *Use of scientific calculators is allowed.*

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

[10]

- a) Define 'Revertant mutant'
- b) What is lyophilization?
- c) What is Scale up?
- d) Define Primary screening.
- e) What is cryopreservation?
- f) Enlist any two Carbon sources used in fermentation industry.
- g) How to isolate Auxotrophs?
- h) Name any two industrially important fungi.
- i) Enlist any two antifoam agents used in fermentation process.
- j) Enlist any two Inducers used in fermentation process.

Q2) Attempt Any Two of the following :

[10]

- a) Explain importance of growth factors in industrial fermentation media with appropriate examples.
- b) Draw different feedback repression pathways used to control production of primary metabolites in bacterial cell.
- c) Explain Genotype based targeted screening.

P.T.O.

Q3) Write a short note on Any Two of the following : [10]

- a) Write a note on 'Scale up Window'.
- b) With the help of an appropriate example draw a flowchart for the process of inoculum built up.
- c) Write a note secondary screening technique.

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

- a) Explain any two techniques of Strain Improvement and state applications of strain improvement.
- b) Explain how Plackett Burman design can be used for the optimization on parameters of large scale fermentation process.



Total No. of Questions : 4]

SEAT No. :

[Total No. of Pages : 2

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[5422] - 150

S.Y.B.Sc.

NANOSCIENCE - I

NS- 211: Physical Techniques for Synthesis of Nanomaterials

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

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) Attempt all of the following:

- a) What is top down process? [1]
- b) What is epitaxy growth? [1]
- c) What do you mean by plasma? [1]
- d) Define sputtering. [1]
- e) How filament material tested for evaporation method. [1]
- f) What is meant by exfoliation. [1]
- g) List all characterization technique which determine size & morphological feature of nanoparticles. [1]
- h) List all biological entities that can synthesize nanoparticle. [1]
- i) Write advantages of molecular beam epitaxy. [1]
- j) Write all allotropes of carbon. [1]

Q2) Attempt any two of the following:

- a) Explain key properties of grinding media for ball milling method. [5]
- b) Explain with neat labelled diagram electric arc discharge method. [5]
- c) Explain with neat labelled diagram physical vapour deposition technique for growing nano-structure. [5]

P.T.O.

Q3) Attempt any two of the following:

- a) Explain properties of Graphene. [5]
- b) Explain synthesis of nanoparticles using bacteria. [5]
- c) Give the advantages of green synthesis over other synthesis technique.[5]

Q4) a) Attempt (i) or (ii) of the following:

- i)
 - 1) Give the application of nanoparticles. [4]
 - 2) Explain with neat labelled diagram ultrasonic exfoliation. [4]
 - ii)
 - 1) Give the factor affecting biological synthesis of metal nanomaterial. [4]
 - 2) Explain synthesis of palladium & platinum nanoparticles using plant extract. [4]
- b) Give the advantages & disadvantages of any one of the following.
- i) Ball milling. [2]
 - ii) Mechanical exfoliation. [2]

EEE

Total No. of Questions : 4]

SEAT No. :

[Total No. of Pages : 2

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[5422]-151

S.Y. B.Sc.

NANOSCIENCE - II

**NS - 212 : Properties of Nanomaterials
(Physical, Chemical, Optical and Magnetic)
(2013 Pattern) (Paper - II) (Semester - I)**

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

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

Q1) Attempt all of the following :

- a) Define exciton. [1]
- b) What is mean by hydrophilicity? [1]
- c) What is Neel relaxation time? [1]
- d) Define strength of materials. [1]
- e) What is the quantum size effect? [1]
- f) What is mean by immunohisto chemistry? [1]
- g) Define antiferromagnetism. [1]
- h) Draw a neat labelled diagram of SEM. [1]
- i) Define histology. [1]
- j) What is the value of magnetic susceptibility for ferromagnetic substance? [1]

Q2) Attempt Any Two of the following :

- a) What is electroluminescence? Explain in brief. [5]
- b) Explain blue shift and red shift in semiconducting nanomaterials. [5]
- c) Explain ferromagnetism indetail. [5]

P.T.O.

Q3) Attempt Any Two of the following :

- a) What is superparamagnetic state? Explain blocking temperature. [5]
- b) Explain quantum mechanics of GMR. [5]
- c) Explain Redox cycling in brief. [5]

Q4) a) Attempt (i) OR (ii) of the following :

- i)
 - 1) With block diagram explain the experimental set up of spectrofluorometer. [4]
 - 2) Write a note on Gastrointestinal tract. [4]
 - ii)
 - 1) With neat labelled diagram explain X-ray fluorescence spectroscopic method. [4]
 - 2) Explain surface plasmon resonance. [4]
- b) Attempt Any One of the following :
- i) What is mean by domain? [2]
 - ii) Define histopathology. [2]

