

Total No. of Questions : 4]

SEAT No. :

**P309**

[Total No. of Pages : 2

[5522]-101

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

**MATHEMATICS**

**MT-211: Multivariable Calculus-I**

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

*Time : 2 Hours]*

*[Max. Marks :40*

*Instructions to the candidates:*

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

**Q1)** Attempt any FIVE of the following.

**[10]**

- a) Find an equation of the level curve of  $f(x, y) = \sqrt{x^2 - 1}$  that passes through the point (1,0).
- b) Find  $\lim_{(x,y) \rightarrow (2,0)} \frac{\sqrt{2x-y-2}}{2x-y-4}$ ,  $2x-y \neq 4$
- c) Define the tangent plane and normal line at the point (a,b,c).
- d) Find the directions in which  $f(x, y) = x^2 + xy + y^2$  increase most rapidly at point (-1,1).
- e) State strong form of Fubini's theorem.
- f) Find the derivative of  $f(x, y) = 2x^2 + y^2$  at the point p(-1,1) in the direction of  $\bar{u} = 3\bar{i} - 4\bar{j}$ .
- g) Find stationary point of  $f(x, y) = x^2 - 4xy + y^2 + 6y + 2$ .

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

**[10]**

- a) If  $w = f(u, v)$  is a differentiable function of two variables u and v,  $u = \phi(x, y)$ ,  $v = \psi(x, y)$  are differentiable functions of x and y then prove that the composite function  $w = f(\phi(x, y), \psi(x, y))$  is also differentiable and

$$\frac{\partial w}{\partial x} = \frac{\partial w}{\partial u} \cdot \frac{\partial u}{\partial x} + \frac{\partial w}{\partial v} \cdot \frac{\partial v}{\partial x}$$

**P.T.O.**

b) Define simultaneous limit of function of two variables and show that

$f(x, y) = \frac{x^4}{x^4 + y^2}$  has no limit as  $(x, y) \rightarrow (0, 0)$ , by considering different paths.

c) If  $u = (x^2 + y^2 + z^2)^{\frac{1}{2}}$ , show that

$$\left(\frac{\partial u}{\partial x}\right)^2 + \left(\frac{\partial u}{\partial y}\right)^2 + \left(\frac{\partial u}{\partial z}\right)^2 = u^4$$

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

- a) Explain Lagrange's method of undetermined multiplier.
- b) If  $f(x, y) = xy^2$ , then find approximate value of  $f(2.01, 3.02)$ , using differentials.
- c) Expand  $f(x, y) = x^2 + 3y - 2$  in powers of  $(x-1)$  and  $(y-2)$ .

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

- a)
  - i) By changing the order of integration evaluate  $\int_0^{\infty} \int_x^{\infty} \frac{e^{-y}}{y} dy dx$ .
  - ii) Evaluate  $\int_0^1 \int_0^{1-x} \int_0^{x+y} e^z dx dy dz$ .
- b)
  - i) Find the volume of the sphere of radius  $a$ , using the spherical polar co-ordinates.
  - ii) Evaluate  $\iint_D (y^2 + x) dx dy$ , where  $D$  is bounded by the parabolas  $y = x^2$  and  $x = y^2$



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SEAT No. :

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

**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) State principle of duality. Write dual of  $(P \wedge F) \wedge T$ .
- b) What is the truth value of  $p \rightarrow (q \leftrightarrow p)$  if  $p$  and  $q$  has truth values T and F respectively?
- c) Prove that  $\sim (p \wedge q) \equiv (\sim p) \vee (\sim q)$ .
- d) Find the number of ways that a party of seven persons can arrange themselves in a row of seven chairs.
- e) Define tautology; Give one example.
- f) Find the number of permutations of the letters in the word 'DADDY'?
- g) Write Inclusion-Exclusion principle for three sets.

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

- a) Show that  $[p \rightarrow (q \wedge r)] \equiv (p \rightarrow q) \wedge (p \rightarrow r)$ .
- b) If a collection of objects consists of  $n_1$  identical objects of type 1,  $n_2$  identical objects of type 2, .....  $n_k$  identical objects of type k where  $n_1 + n_2 + \dots + n_k = n$  then prove that the total number of arrangements of these  $n$  objects is  $\frac{n!}{n_1! \times n_2! \times \dots \times n_k!}$ .
- c) How many ways are there to select 12 balls from 20 red, 22 blue and 24 green balls, so that at least 6 blue balls are selected?

**P.T.O.**

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

**[10]**

- a) Test the validity of the following argument using laws of logic.

I like meeting people. I like travelling also. If I like meeting people and travelling then I am considered to be a nice person. Hence I am a nice person.

- b) Given 20 points, no three of which are collinear. Find

i) How many straight lines they will determine?

ii) How many triangles they will determine?

- c) Prove that if  $3n + 2$  is even then  $n$  is even integer by using proof by contrapositive.

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

**[10]**

- a) i) Prove that  ${}^n C_r + {}^n C_{r-1} = {}^{n+1} C_r$ .

ii) Translate into symbolic form

1) All Juniors are clever.

2) Square of every non zero integer is greater than or equal to zero.

- b) i) Find the number of positive integers less than 30 which are relatively prime with 30 using Inclusion - Exclusion principle.

ii) How many solutions do the equation  $x_1 + x_2 + x_3 = 11$  have, where  $x_1, x_2, x_3$  are integers?

*EEE*

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**[5522]-102**

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

**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  $L\{\sin^2 kt\}$ .
- b) Find  $L\{t^2 e^{3t}\}$ .
- c) Find  $\sqrt{\frac{7}{2}}$ .
- d) Define Unit Step Function.
- e) Find  $L^{-1}\left\{\frac{1}{s^2 + 2s + 5}\right\}$ .
- f) Solve the differential equation  $y'' + y = 0$ , with  $y(0) = 1$ ,  $y'(0) = 0$  by using Laplace Transform.
- g) Define Inverse Laplace Transform.

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

**[10]**

- a) If  $L\{f(t)\} = \phi(s)$  then prove that  $L\{t^n f(t)\} = (-1)^n \frac{d^n}{ds^n} \{\phi(s)\}$ , where  $n$  is positive integer.
- b) Find  $L\{t \sin^3 2t\}$ .
- c) Evaluate  $\int_0^{\infty} \frac{e^{-4t} - e^{-2t}}{t} dt$ .

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

**[10]**

a) If  $L^{-1}\{\phi(s)\} = f(t)$ , then prove that  $L^{-1}\{\phi^n(s)\} = (-1)^n t^n f(t)$ .

b) Show that  $L^{-1}\left\{\frac{1}{\sqrt{s+a}}\right\} = \frac{e^{at}}{\sqrt{\pi t}}$ .

c) Solve  $y'''(t) + y''(t) = e^t + t + 1$ , where  $y(0) = y'(0) = y''(0) = 0$ .

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

**[10]**

a) State and prove convolution theorem and hence find  $L^{-1}\left\{\frac{1}{s(s^2+1)}\right\}$ .

b) Define Fourier series. Find the Fourier series for the function,  $f(x) = |x|$ , for all  $x \in [-\pi, \pi]$ .

*EEE*

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[Total No. of Pages : 2

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**[5522]-103**

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

**PHYSICS**

**PH - 211 : Mathematical Methods in Physics  
(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  $a - ib = \sqrt{x + iy}$  determine  $x$  and  $y$ .
- b) Define vector field with examples.
- c) Write necessary condition for exact differential.
- d) Define coplanar vectors.
- e) Determine the modulus of  $z = 2 + 5i$ .
- f) Prove that  $\vec{V} = 3y^4z^2\hat{i} + 4x^3z^2\hat{j} - 3x^2y^2\hat{k}$  is a solenoidal vector.
- g) Explain the term linearity.
- h) If  $z = 3 + 2i$ , find complex conjugate of  $z$  and product  $z\bar{z}$ .
- i) Decide degree and order of following differential equation  
$$\frac{d^2y}{dx^2} + 2\frac{dy}{dx} + y = 0.$$
- j) Find the value of 'p' which makes vector  $\vec{A} = p\hat{i} + 3\hat{j} - \hat{k}$ ,  $\vec{B} = 2\hat{i} + 3\hat{j} - 4\hat{k}$ . are perpendicular.

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

**[10]**

- a) Obtain the quadratic equation in  $Z$ , if its roots are  $(3 \pm 4i)$ .
- b) Poiseuillis formula for the flow of a viscous liquid through a capillary tube is given by  $V = \frac{\pi pr^4}{8\eta l}$ .

**P.T.O.**

Where symbols have their usual meaning, if the errors in the measurement of p, r, l are 1%, 1.5% and 2% respectively. Find the maximum possible relative and percentage error in the measurement of V.

- c) Show that  $\vec{F} = \cos y \hat{i} - x \sin y \hat{j} - \cos z \hat{k}$  is conservative field.

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

- a) Using the method of differential equation. Find the approximate value of  $[(6.01)^2 + (8.01)^2]^{y^2}$
- b) Show that the vector field represented by  $\vec{F} = (z^2 + 2x + 3y)\hat{i} + (3x + 2y + z)\hat{j} + (y + 2zx)\hat{k}$  is irrotational but not solenoidal.
- c) Show the the point  $x = 0$  is regular singular point of Bessel differential equation.  $x^2 y'' + xy' + (x^2 - n^2)y = 0$ .

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

- a) i) Show that  $\vec{\nabla} \cdot \vec{\nabla} \phi = \nabla^2 \phi$ . [4]
- ii) Determine the value of  $(1 + i)^8$ . [4]
- b) i) Find the angle between  $\vec{A} = 2\hat{i} + 2\hat{j} - \hat{k}$  and  $\vec{B} = 6\hat{i} - 3\hat{j} + 2\hat{k}$ . [4]
- ii) Find the slope of the tangent to the curve  $x^3 + 3xy^2 - y^3 = 0$  at  $x = -2$ , and  $y = 1$ . [4]

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

- a) Prove that the vectors  $\vec{A} = \hat{i} + 3\hat{j} + \hat{k}$   $\vec{B} = 3\hat{i} + 9\hat{j} + 3\hat{k}$  are parallel to each other. [2]
- b) Find the sum and difference of complex number  $z_1 = 3 - 2i$ ,  $z_2 = 4 + 3i$ . [2]





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**[5522] - 104**

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

**PHYSICS**

**PH - 212 (B) : Instrumentation**

**(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 diagrams wherever necessary.*
- 4) *Use of log tables and calculator is allowed.*

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

**[10]**

- a) Define input bias current.
- b) What is linearity?
- c) Define atmospheric pressure.
- d) State any one type of analog recorder.
- e) Define dead zone.
- f) What do you mean by cantilever beam?
- g) Which principle is used in platinum resistance thermometer?
- h) Draw circuit diagram of buffer amplifier using OPAMP.
- i) What is Piezo-electric transducer?
- j) Which principle is used in platinum resistance thermometer?

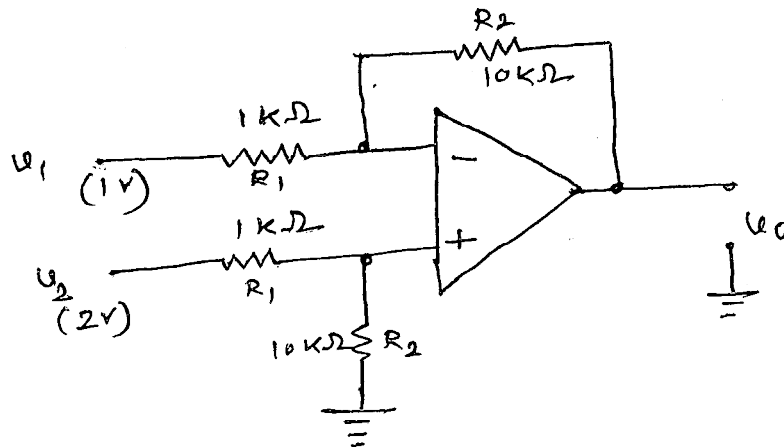
***P.T.O.***

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

- Write a note on thermal element as a first order system of measurement. [5]
- What do you mean by variable inductance type transducer? Explain how displacement is measured with change in number of turns in inductive transducer. [5]
- Explain with circuit diagram, OPAMP as differentiate. [5]

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

- A capacitive transducer uses two quartz diaphragms of area  $600 \text{ mm}^2$  separated by a distance  $3 \text{ mm}$ . A pressure of  $1000 \text{ KN/m}^2$  when applied to top diaphragm produces a deflection of  $0.5 \text{ mm}$ . The capacitance is  $370 \text{ PF}$  when no pressure is applied to the diaphragms. Find the value of capacitance after application of pressure of  $1000 \text{ KN/m}^2$ . [5]
- What will be the outputs for the following circuit? Also mention the configuration of the circuit. [5]



- When a pressure is applied for a membrane type diaphragm of radius  $5 \text{ cm}$  and thickness  $0.15 \text{ cm}$  shows maximum deflection at centre  $0.05 \text{ cm}$ . Find pressure acting on it.

(Given : Young's modulus =  $12 \times 10^{11} \text{ N/m}^2$ ) [5]

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

- a) i) Write a short note on U-tube manometer as second order system of measurements. **[4]**
- ii) Describe with neat diagram, X - Y recorder. **[4]**
- b) i) Explain concept of virtual ground in OPAMP. **[4]**
- ii) Explain load cell with suitable diagram. **[4]**

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

- a) Draw the circuit diagram of instrumentation amplifier using three OPAMP and state the expression for the output voltage. **[2]**
- b) A manufacturer calibrates a temperature gauge of 100°C range with  $\pm 0.5^\circ\text{C}$ . If it is used for temperature measurement of 50°C, what will be the probable minimum and maximum value at temperature shown by gauge? **[2]**



Total No. of Questions :4]

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**[5522] - 104**

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

**PHYSICS**

**PH - 212 (A1) : Electronics - I**

**(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 diagram wherever necessary.*
- 4) Use of log tables and calculator is allowed.*

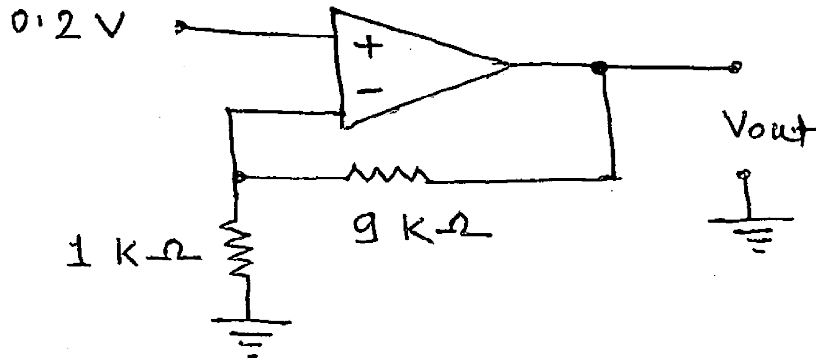
**Q1)** Attempt all of the following.

**[10]**

- a) State maximum power transfer theorem.
- b) State Thevenin's theorem.
- c) Define current amplification factor  $\beta$ .
- d) Draw symbol of OP-AMP.
- e) Draw symbol of UJT.
- f) Convert  $(5A)_{16}$  into equivalent binary number.
- g) Which gates are called as universal gates?
- h) Define CMRR.
- i) What is Barkhausen criterion of oscillation?
- j) What is regulated power supply?

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

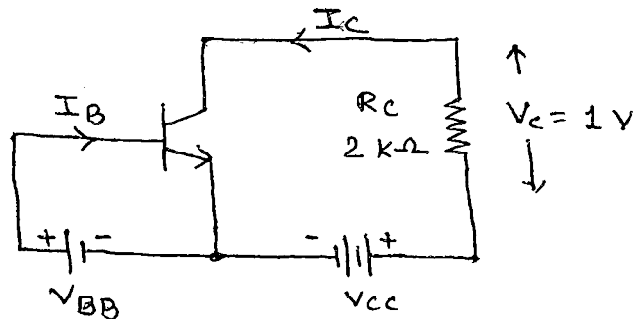
- Explain with circuit diagram output characteristics of a transistor in CE configuration. [5]
- What is the output of the following circuit? [5]



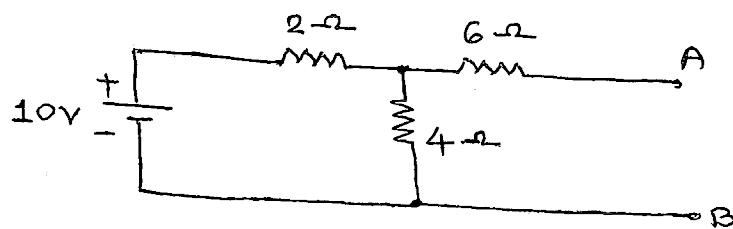
- Show that gain of an amplifier with feedback is  $A' = \frac{A}{1 - \beta A}$ . [5]

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

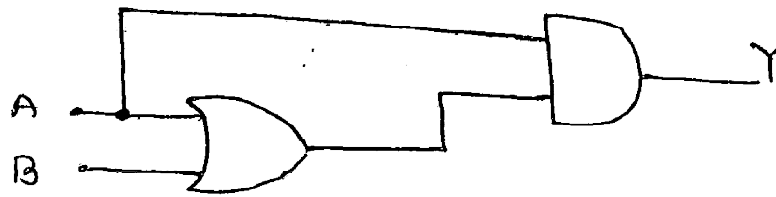
- For a transistor shown in a given circuit, the voltage drop across  $2\text{ k}\Omega$  collector resistance is  $1\text{ V}$ . If  $\beta = 50$ , find the base current. [5]



- Using Norton's theorem, Nortonize the following circuit. [5]



- c) Find the Boolean expression and give truth table for the following logic circuit. [5]



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

- a) i) Describe d.c. load line using common emitter amplifier circuit. [4]  
ii) Describe the action of capacitor filter circuit. [4]  
b) i) State and prove De-Morgan's theorems with their truth tables. [4]  
ii) Explain the concept of virtual ground in OP-AMP. [4]

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

- a) Draw Pin diagram of IC741. [2]  
b) Convert following binary numbers into equivalent decimal numbers.  
10011, 10101 [2]



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SEAT No. :

[Total No. of Pages : 3

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**[5522]-105**

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

**CHEMISTRY**

**CH-211: Physical and Analytical Chemistry**

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

*Time : 2 Hours]*

*[Max. Marks :40*

*Instructions to the candidates:*

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

**SECTION-I**

**(Physical Chemistry)**

**Q1)** Answer the following:

**[5]**

- a) What is mean by infinite reading?
- b) Write the rate law equation for the reaction  $2A + H_2 B \rightarrow \text{product}$ .
- c) Define Lambert's law.
- d) What is mean by photosensitization reaction?
- e) State Nernst distribution law.

**Q2)** a) Attempt ANY TWO of the following:

**[6]**

- i) Distinguish between order and molecularity of the reaction.
- ii) Derive the expression for rate constant for second order reaction with equal initial concentration.
- iii) What is photo catalysis? Explain with suitable example.

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

- b) Attempt ANY TWO of the following: [4]
- Explain any two properties of physical methods to determine rate of chemical reaction.
  - Explain the term 'Chemiluminescence'.
  - Write in short about 'Fluorescence'.

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

- The rate constant for the first order reaction is  $4.5 \times 10^{-2} \text{ min}^{-1}$ . Calculate the time required to complete 70% of reaction.
- For a given photochemical reaction,  $2.22 \times 10^{18}$  photons are absorbed per second. After 900 seconds,  $5.55 \times 10^{-5}$  moles of product is formed. Calculate the quantum yield of the reaction. (Given  $N = 6.023 \times 10^{23}$  molecules.)
- Calculate the amount of solute extracted from 600 ml of an aqueous solution containing 10 gm of solute on extracting with 100 ml each of ether in two lots. (Given: partition coefficient of solute in water to ether is 2)

## SECTION-II

### (Analytical Chemistry)

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

- Define the term 'Qualitative Analysis'.
- Define 'Precision'.
- Which is the group reagent for III B group in qualitative analysis?
- Why is  $\text{NH}_4\text{Cl}$  added before  $\text{NH}_4\text{OH}$  in inorganic qualitative analysis?
- Find the proper number of significant figures in 0.0069 gm and 12.09 gm.



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

- i) What is common ion effect? Explain one application of it in inorganic qualitative analysis.
- ii) How is aldehyde detected? Give its characteristic tests.
- iii) Explain the Kjeldahl's method of estimation in an organic compound.

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

- i) Discuss the effect of dil. HCl in presence of H<sub>2</sub>S in inorganic qualitative analysis.
- ii) Explain the terms
  - 1) Absolute error
  - 2) Relative error
- iii) What is yellow ammonium sulphide? Discuss use of yellow ammonium sulphide in inorganic qualitative analysis.

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

- a) Following weights were obtained by a person on repeating the same experiment four times: 15.3, 17.6, 16.8 and 15.9 gm. Calculate the mean deviation and standard deviation.
- b) The solubility product of AgCl is  $1.2 \times 10^{-10}$ . What is the solubility of AgCl in water if 25 ml 0.1M AgNO<sub>3</sub> are added to 20ml 0.1 m NaCl solution.
- c) An organic compound on analysis gave 68.84% carbon and 4.92% hydrogen. Find its empirical formula.

*EEE*

Total No. of Questions : 6]

SEAT No. :

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[Total No. of Pages : 3

[5522]-106

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

**CHEMISTRY**

**CH - 212 : Organic and Inorganic Chemistry**

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

*Time : 2 Hours]*

*[Max. Marks :40*

*Instructions to the candidates:*

- 1) *Answers to the two sections should be written in same answer book.*
- 2) *All questions are compulsory.*
- 3) *Figures to the right side indicate full marks.*

**SECTION - I**

**(Organic Chemistry)**

**Q1)** Answer the following.

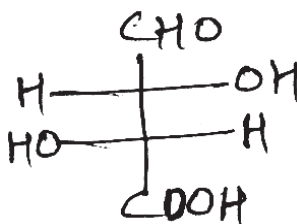
**[5]**

- a) Define enantiomerism.
- b) t-butyl cyclohexane exists in equatorial form. Explain.
- c) Benzyl chloride does not undergo elimination reaction. Why?
- d) Define free radical.
- e) Define nucleophile with suitable example.

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

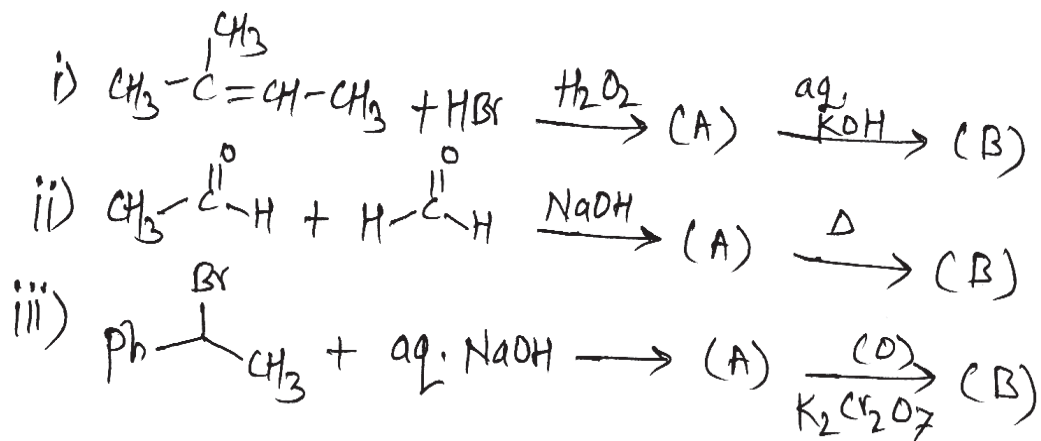
**[6]**

- i) Define threo isomer. Assign R/s configuration for



**P.T.O.**

- ii) Draw all possible conformations of 1, 3 dimethyl cyclohexane and comment on their stability.
- iii) Explain addition of HBr to 1-butene in presence of  $H_2O_2$  with mechanism.
- b) Assign (A) and (B) of the following reactions (Any Two) [4]



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

- a) Axial methyl cyclohexane is unstable than equatorial methyl cyclohexane. Explain.
- b) Explain limitations of Bayer's strain theory with suitable example.
- c) Discuss stereochemistry of  $SN^2$  reaction with suitable example.

**SECTION - II**  
**(Inorganic Chemistry)**

Q4) Answer the following. [5]

- a) What is ore?
- b) What is metal cladding?
- c) What is cryolite?
- d) Give the composition of wrought iron.
- e) Name the metal used for tinning.

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

- i) What is passivity? What is electrochemical passivity? What are its applications?
- ii) Explain in brief acid Bessemer process?
- iii) Give physico–chemical principles of aluminium extraction.

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

- i) Explain the effect of impurity on corrosion.
- ii) Explain the refining of metals by
  - 1) Poling
  - 2) Electrolytic refining.
- iii) What are different commercial forms of iron?

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

- a) What is blast furnace? Explain it's working.
- b) Define the term electroplating. Explain galvanising process.
- c) Distinguish between roasting and calcination.



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SEAT No. :

**P 315**

**[5522]-107**

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

**BOTANY**

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

*Time : 2 Hours]*

*[Max. Marks : 40*

*Instructions to the candidates:*

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

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

**[10]**

- a) What is phylogenetic system of classification?
- b) Give any two adaptations of xerophytes.
- c) Define ecology.
- d) Define food chain.
- e) Give botanical name of any one plant of family Euphorbiaceae having economic importance.
- f) Define monograph.
- g) Write the type of fruit of family Asclepiadaceae.
- h) Give two examples of source of data from morphology.
- i) Write two advantages of e-herbarium.
- j) What is generic name?

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

**[10]**

- a) Give merits and limitations of Carl Linnaeus System of classification.
- b) Explain embryology as a source of data for systematics.
- c) Give advantages of Binomial nomenclature.

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

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

**[10]**

- a) Flora
- b) Objectives of taxonomy
- c) Pyramid of Biomass.

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

OR

What are hydrophytes? Give external and internal adaptations in stem and leaf of hydrophytes. **[10]**



Total No. of Questions :4]

SEAT No. :

**P 316**

**[5522]-108**

[Total No. of Pages : 2

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

**BOTANY**

**BO -212 : Plant Physiology**

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

**Q1)** Answer the following.

**[10]**

- a) What is active absorption of water?
- b) Define imbibition.
- c) Enlist various types of transpiration.
- d) Who proposed transpiration pull theory?
- e) Define photoperiodism.
- f) What are antitranspirants?
- g) Give any two names of eminent plant physiologists in India.
- h) Enlist any two methods of breaking seed dormancy.
- i) What is denitrification?
- j) Define grand period of growth.

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

**[10]**

- a) Describe the role of water in plants.
- b) Explain the different types of seed dormancy.
- c) Describe practical applications of cytokinins.

**P.T.O.**

**Q3)** Write notes on (Any two)

**[10]**

- a) Guttation
- b) Vernalization
- c) Factors affecting ascent of sap.

**Q4)** Define osmosis. Write its mechanism and add a note on its significance in plants. **[10]**

OR

What is nitrogen fixation? Explain in detail symbiotic nitrogen fixation.





Total No. of Questions :4]

SEAT No :

[Total No. of Pages : 2

**P317**

**[5522]-109**

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

**ZOOLOGY**

**ZY-211: Animal Systematics and Diversity-III**

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

**Q1)** Attempt the following:

**[10]**

- a) Write any two distinguishing characters of class cephalopoda
- b) Give any two examples of class pelecypoda.
- c) What is ametabolous development?
- d) What is mimicly in insects?
- e) What is torsion in mollusca?
- f) Write any two distinguishing characters of class Gastropoda.
- g) What is sinistral shell?
- h) What is the function of pedicellariae in starfish?
- i) What is the function of gonads in starfish?
- j) Write any two examples of class Insecta.

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

**[10]**

- a) Autotomy and regeneration in starfish
- b) Distinguishing characters of class crustacea
- c) Glochidium larva in mollusca

**P.T.O.**

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

- a) Sketch and label water vascular system in starfish
- b) Doliolaria larva in Echinodermata
- c) Economic importance of Honey bee

**Q4)** Write in detail about habit, habitat and external characters of starfish. **[10]**

OR

Write general characters of Echinodermata and distinguishing characters of class Echinoidea.

& & &

Total No. of Questions : 4]

SEAT No. :

[Total No. of Pages : 2

**P318**

**[5522]-110**

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

**ZOOLOGY**

**APPLIED ZOOLOGY – I**

**ZY - 212 : Fisheries and Agricultural Pests and their Control  
(Paper – II) (2013 Pattern) (Semester - I) (Revised)**

*Time : 2 Hours]*

*[Max. Marks :40*

*Instructions to the candidates:*

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

**Q1)** Attempt the following.

**[10]**

- a) What is Inland fishery?
- b) Mention the names of any two household pests.
- c) What is the long form of IPM.
- d) What is cultural Pest control?
- e) Define Craft.
- f) What is induced breeding?
- g) Mention any two hazards of pesticide on humans.
- h) Write the name of equipments used for Lobster harvesting.
- i) What is stocking Pond?
- j) Write the damages caused by Red cotton bug.

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

**Q2) Write short notes on Any Two. [10]**

- a) Freezing and drying techniques in fish preservation.
- b) Rampani Net.
- c) Rats and Crab's as non-insects Pests.

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

- a) Describe Machwa boat.
- b) Sketch and label – Rotary duster.
- c) Describe in brief – Chemical control.

**Q4) Describe marks of identification, nature of damage and control measures of Red cotton bug and Jowar Stem borer. [10]**

OR

Describe habits, habitat and culture methods of Catla and Rohu.



Total No. of Questions : 4]

SEAT No. :

[Total No. of Pages : 2

**P319**

**[5522]-111**  
**S.Y. B.Sc. (Regular)**  
**GEOLOGY**  
**GL-211 : Mineralogy**  
**(Semester-I) (2013 Pattern) (Paper-I)**

*Time : 2 Hours]*

*[Max. Marks :40*

*Instructions to the candidates:*

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

**Q1)** Answer the following.

**[10]**

- a) Define hemihedral form with examples.
- b) What is extraordinary ray of light?
- c) Name minerals from hexagonal system.
- d) Define specific gravity.
- e) What is parallel overgrowth in crystals?
- f) Enlist varieties of garnet.
- g) Define twin plane.
- h) Enlist varieties of corundum.
- i) Define etch figures.
- j) What is phenomenon of extinction?

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

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

- a) Twinning in crystals.
- b) Garnet as gemstone.
- c) Optical properties and paragenesis of silica group of minerals.

**Q3) Answer the following (Any Two). [10]**

- a) Give physical and optical properties of amphiboles.
- b) What are external imperfections in crystals?
- c) What are the attributes of gemstones?

**Q4) Give the classification of minerals based on chemical composition and silicate structure. [10]**

OR

Describe the mineral composition, physical and optical properties and paragenesis of feldspathoid group of minerals.



Total No. of Questions : 4]

SEAT No. :

[Total No. of Pages : 2

**P320**

**[5522] - 112**

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

**GEOLOGY**

**GL: 212- Structural Geology**

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

**Q1)** Answer the following questions in 2/3 lines.

**[10]**

- a) Define axial plane
- b) Define Horst and Graben
- c) Define synclorium fold
- d) Define fault zones
- e) Define plunging kold
- f) Define dip slip
- g) Define dome and basin
- h) Define absolute movements along fault
- i) Mention the name of kold, which can be recognise by direct observation.
- j) Define the term Throw & Heave

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

**Q2) Write notes on (Any Two) [10]**

- a) Separations
- b) Outliers and inliers
- c) Brunton compass and its uses

**Q3) Write notes on (Any two) [10]**

- a) Non Unconformity and angular unconformity
- b) Effects of faulting on disrupted strata
- c) Define structural Geology and its relation with other branches of geology.

**Q4) Define fold. Describe the following folds anticline, syncline, chevron, box and fan fold. [10]**

OR

Define joints. Describe the Geometrical classification of joints with examples. [10]





Total No. of Questions : 4]

SEAT No. :

**P321**

[Total No. of Pages : 3

**[5522]-113**

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

**STATISTICS**

**ST - 211 : Discrete Probability Distributions,**

**Time series and R-Software**

**(Paper -I) (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.*
- 3) Use of calculator and statistical tables is allowed.*
- 4) Symbols and abbreviations have their usual meaning.*

**Q1)** Attempt each of the following.

- A) Choose the correct alternative in each of the following: **[1 each]**
- a) If  $X \rightarrow NB(3, 0.8)$ , then first cumulant is equal to
- |           |        |
|-----------|--------|
| i) 0.75   | ii) 12 |
| iii) 0.94 | iv) 60 |
- b) Suppose  $X = (X_1, X_2, X_3) \rightarrow MD(4, 0.5, 0.25, 0.25)$  then  $E(X_1, X_2)$  is
- |          |            |
|----------|------------|
| i) -1.5  | ii) 0.667  |
| iii) 1.5 | iv) -0.667 |
- c) In time series analysis, method of simple averages is used to compute
- |                          |                          |
|--------------------------|--------------------------|
| i) Trend                 | ii) Seasonal indices     |
| iii) Cyclical variations | iv) irregular variations |

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

- B) State whether each of the following statements is True or False: **[1 each]**
- Moving averages can give estimate of trend for future.
  - Sea () function is used to generate a vector of elements in sequence.
  - Negative binomial distribution is always positively skewed.
- C) State four phases of business cycle. **[1]**
- D) State R name of binomial and poisson distributions. **[1]**
- E) Give any one real life situation where negative binomial distribution is applicable. **[1]**
- F) Define truncated poisson distribution, truncated at zero. **[1]**

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

- If  $(X_1, X_2, X_3)$  is a trinomial random variable (r. v.) with  $(n, p_1, p_2, p_3)$  as parameters then obtain conditional distribution of  $X_1$  given  $X_2 = x_2$ .
- State components of the time series and explain any one of them.
- At a traffic checkpoint 20% of vehicles are found to be out of state. What is the probability that on a particular day 10<sup>th</sup> vehicle will be found to be 3<sup>rd</sup> vehicle which is out of state?

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

- If  $X_T$  is a binomial r. v. with  $n = 5$  and  $p = 0.4$ , truncated at zero.  
Find i)  $P [X_T = 4]$   
ii)  $P [X_T \leq 2]$
- Describe ratio to moving average method for estimation of seasonal indices in time series.

c) Give the output of the following:

- i) `> x = 2 : 5`  
`> n = length (x)`  
`> n`
- ii) `> x = c (1, 5, 1, 2, 3, 7, 1, 2)`  
`> unique (x)`
- iii) `> x = c (1, 4, 4, 6, 4, 7)`  
`> range (x)`
- iv) `> x = c (140, 138, 164, 198)`  
`> x [c (1, 3)]`
- v) `> x = rep (6, 4)`  
`> x`

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

- a) i) For the following time series fit exponential smoothing with damping factor 0.9 ( $= 1 - \alpha$ ). [5]

t:	1	2	3	4	5	6	7	8	9	10
$Y_t$ :	31	37	39	41	41	39	33	29	27	29

- ii) If  $(X_1, X_2, X_3) \rightarrow MD (n, p_1, p_2, p_3)$ , show that the multiple correlation coefficient  $R_{1,23} = 1$ . [5]

- b) i) Write a note on double exponential smoothing. [4]

- ii) If  $X = (X_1, X_2, X_3) \rightarrow MD (6, 0.4, 0.2, 0.4)$ ,

Find: 1)  $P [X_1 = 2, X_2 = 2, X_3 = 2]$

2)  $P [X_1 + X_2 = 3]$  [4]

- iii) If  $X_T$  is a poisson r. v. with  $\lambda = 2$  truncated at zero then find  $E (X_T)$  and  $\text{var} (X_T)$  [2]



Total No. of Questions : 4]

SEAT No. :

**P322**

[Total No. of Pages : 4

**[5522]-114**

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

**STATISTICS**

**ST - 212 : Continuous Probability Distributions - I**

**(Paper -II) (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.*
- 3) *Use of calculator and statistical table is allowed.*
- 4) *Symbols and abbreviations have their usual meaning.*

**Q1)** Attempt each of the following.

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

a) If  $F(x)$  is distribution function and  $x_2 < x_1$  then

i)  $F(x_2) < F(x_1)$

ii)  $F(x_2) \leq F(x_1)$

iii)  $F(x_2) > F(x_1)$

iv)  $F(x_2) \geq F(x_1)$

b) A continuous random variable (r. v.)  $(x, y)$  has joint p. d. f.  $f(x, y)$ . If  $x$  and  $y$  are independent then  $f(y/x = x)$  is

i)  $f(x)$

ii)  $f(y)$

iii)  $f(x) f(y)$

iv)  $\frac{f(y)}{f(x)}$

c) If  $x \rightarrow U[-1, 1]$  then  $E(x)$  is

i) 1

ii) 2

iii) 0

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

**P.T.O.**

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

i) If  $x \rightarrow N(1, 1)$  then  $\mu_3$  is 0.

ii) If  $x$  is continuous r. v. with probability density function (p. d. f.)  $f(x)$  then moment generating function (m. g. f.) of  $x + a$  is :  
 $M_{x+a}(t) = M_x(a + t)$ .

iii) Exponential distribution is symmetric.

c) State mean and variance of  $\mathcal{G}(\alpha, \lambda)$ . [1]

d) Suppose  $x$  is continuous r. v. with p. d. f.

$$f(x) = K(1 - x); 0 < x < 1$$
$$= 0 \quad ; \text{otherwise}$$

Find the value of  $K_0$ . [1]

e) Define joint probability distribution function of a continuous bivariate r. v. [1]

f) If  $x \rightarrow U[a, b]$  then find median of  $x$ . [1]

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

a) The joint p. d. f. of r. v.  $(x, y)$  is

$$f(x, y) = 4x(1-y); 0 < x, y < 1$$
$$= 0 \quad ; \text{otherwise}$$

i) Find marginal p. d. f. of  $X$  and  $Y$ .

ii) Find conditional p. d. f. of  $Y$  given  $X = x$ .

b) A r. v.  $x$  has p. d. f.

$$f(x) = 3(1-x)^2; 0 < x < 1$$
$$= 0 \quad ; \text{otherwise}$$

Find i)  $E(x)$ .

ii) p. d. f. of  $\frac{X}{1-X}$

c) State and prove additive property of two independent normal variates.

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

**[5 each]**

a) Suppose  $x$  is a r. v. with distribution function.

$$F(x) = 0 \quad x < 2$$
$$= \frac{x-2}{4} \quad 2 \leq x \leq 6$$
$$= 1 \quad x > 6$$

If  $A = \{x \mid 1 < x < 4\}$ ,  $B = \{x \mid 2 < x < 5\}$

then find  $P(A \cup B)$ ,  $P(A \cap B^c)$ .

b) If  $X$  is a r. v. with m. g. f.

$$M_X(t) = e^{2t+2t^2} \text{ then}$$

i) Identify distribution of r. v.  $X$

ii) Find  $P[2 < X < 4]$ .

c) State and prove lack of memory property of exponential distribution and interpret it.

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

a) i) Suppose  $X, Y$  are independent r. v.'s.

with p. d. f. 's as

$$\begin{aligned} f(x) &= 3e^{-3x} && ; x > 0 \\ &= 0 && ; \text{otherwise} \end{aligned}$$

$$\begin{aligned} f(y) &= 3e^{-3y} && ; y > 0 \\ &= 0 && ; \text{otherwise} \end{aligned}$$

Find probability distributions of  $X + Y$  and  $\frac{X}{Y}$ . [7]

ii) State any three properties of distribution function. [3]

b) i) Check whether  $X, Y$  are independent r. v. if the joint p. d. f. is

$$\begin{aligned} f(x, y) &= 4xy && ; 0 < x, y < 1 \\ &= 0 && ; \text{otherwise} \end{aligned}$$

Also find  $E(X + Y)$  and  $E(XY)$ . [4]

ii) Explain the methods for obtaining central moments by using cumulant generating function. [4]

iii) State central limit theorem for independent and identically distributed r. v. 's with finite variance. [2]



Total No. of Questions : 4]

SEAT No. :

[Total No. of Pages : 2

**P323**

**[5522]-115**

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

**GEOGRAPHY**

**Gg-211: Geography of Resources - 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) Draw neat diagrams and sketches wherever necessary.*
- 4) use of map stencils are allowed.*

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

- a) Definition of resource.
- b) What are the components of natural resources?
- c) What is meant by biotic resource?
- d) Give any two examples of abiotic renewable resources.
- e) Write any two direct uses of forest.
- f) Name any four plant species of temperate forest.
- g) Give any four causes of deforestation.
- h) Write any two uses of water in industries.
- i) Name the various sources of water.
- j) Give any two methods of water conservation in domestic sector.
- k) Write any two importance of land resource.
- l) Give any two causes of land degradation.
- m) Write any two methods of land conservation.

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



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

- a) Importance of study of resources.
- b) Importance of renewable resources.
- c) Water as a resource.
- d) Remedial measures to conserve forest resource.

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

- a) Describe the components of resources.
- b) Describe environmental significance of forest.
- c) What are the different methods of water conservation.
- d) Explain the importance of land resource.

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

- a) Explain the importance of biotic and abiotic renewable resources.
- b) Explain the causes and effects of land degradation.

*EEE*

Total No. of Questions : 4]

SEAT No. :

[Total No. of Pages : 2

**P324**

**[5522]-116**

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

**GEOGRAPHY**

**Gg-212: Watershed Management-I  
(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 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) Define watershed.
- b) Write any two benefits of watershed management.
- c) What is delineation?
- d) Define runoff characteristics of watershed.
- e) What do you mean by stream order?
- f) Write any two forms of precipitation.
- g) Write any two names of factors affecting evaporation.
- h) What is soil?
- i) Write the names of any two factors affecting erosion by water.
- j) What is wind erosion?
- k) What is land capability classification?
- l) Write two names of internal factors determining land capability.
- m) Write any two objectives of land capability classification.

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

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

- a) Objectives of watershed management.
- b) Geomorphological characteristics of watershed.
- c) Control measures of water erosion.
- d) Criteria for land capability classification.

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

- a) Describe relief aspect of drainage basin.
- b) Explain the ecological characteristics of river.
- c) Explain universal soil loss equation.
- d) Explain the methods for land capability classification.

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

- a) What is watershed management? Explain the need of watershed management.
- b) Define hydrological cycle. Explain it with suitable diagram.



Total No. of Questions : 4]

SEAT No. :

[Total No. of Pages : 2

**P325**

**[5522]-117**

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

**MICROBIOLOGY**

**MB - 211 : Bacterial systematics and physiology  
(2013 Pattern) (Paper -I) (Semester - I) (Theory)**

*Time : 2 Hours]*

*[Max. Marks :40*

*Instructions to the candidates:*

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

**Q1)** Attempt the following.

**[10]**

- a) Define Dendrogram.
- b)  $T_m$  is calculated for determination of G + C content (T/F).
- c) Enlist two coenzymes of pyruvate dehydrogenase complex.
- d) Draw structure of glucose 6 phosphate.
- e) Net gain of ATP in EMP is \_\_\_\_\_.
- f) Define coenzyme.
- g) Lactic acid is end product of heterofermentative pathway. (T/F)
- h) Enlist two amino acids present at active site of an enzyme.
- i) Draw structure of dihydroxy acetone phosphate.
- j) Radioisotopes are used in \_\_\_\_\_.
  - i) Numerical taxonomy
  - ii) Chemotaxonomy
  - iii) DNA hybridization.
  - iv) Determination of G + C content.

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

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

- a) Describe the steps of Numerical taxonomy for bacterial classification.
- b) Describe glyoxylate pathway with structure.
- c) Describe transferase class of enzymes with two examples.

**Q3)** Write short notes on (Any Two) **[10]**

- a) Autoradiography.
- b) Chemiosmotic hypothesis.
- c) Effect of temperature on enzyme activity.

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

- a) Describe TCA cycle with structure and enzymes involved in it.
- b) Describe “Lock and Key” and “Induced fit” models for enzyme catalysis.



Total No. of Questions : 4]

SEAT No. :

**P326**

[Total No. of Pages : 2

**[5522]-118**

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

**MICROBIOLOGY**

**MB - 212 : Industrial and Soil Microbiology**

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

*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) What is primary screening?
- b) Define Rhizosphere.
- c) Which of the following is used in temperature monitoring of fermentation process.
  - i) Thermistor
  - ii) Thermocouple
  - iii) Thermometer
  - iv) All the above
- d) \_\_\_\_\_ is a nitrogen biofertilizer.
  - i) Azotobacter spp
  - ii) E. Coli
  - iii) Staphylococcus spp
  - iv) Bacillus Subtilis
- e) Ethanol production involves two microbial strains. [T/F]
- f) Red soil is a fertile soil.[T/F]
- g) Write any two enzymes involved in cellulose degradation.
- h) Enlist any two microorganisms involved in humus formation.
- i) Write any two examples of precursors used fermentation process.
- j) Give the significance of compost.

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

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

- a) Explain the process of Inoculum development.
- b) What is contamination? Explain the sources and its consequences on fermentation process.
- c) Write a short note on symbiosis.

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

- a) Describe the various nitrogen sources used in fermentation process.
- b) Diagrammatically represent carbon-cycle and add a note on its significance.
- c) Explain the composition of soil.

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

- a) Diagrammatically represent CSTR. Explain construction and its working.
- b) Describe the production of the fungal biocontrol agent with respect to—
  - i) Micro organisms used.
  - ii) Flow sheet for production.
  - iii) Fermentation process.
  - iv) Formulation.



Total No. of Questions : 4]

SEAT No. :

[Total No. of Pages : 2

**P327**

**[5522]-119**

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

**PSYCHOLOGY**

**Psychology of Adjustment**

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

*Time : 2 Hours]*

*[Max. Marks :40*

*Instructions to the candidates:*

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

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

**[16]**

- a) Define the Job stress.
- b) Define Marital adjustment.
- c) Define happiness.
- d) Define Adjustment.
- e) Who Introduced the Psychological analytical Approach?
- f) State the Full-Form of DSM.
- g) What is abnormal behaviour?
- h) State the Full-Form of OCB.

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

**[8]**

- a) Explain the Nature of adjustment Psychology.
- b) Explain any two types of Auxxiety disorders.
- c) Explain any one kind of test used of career decision.

**P.T.O.**



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

- a) Co-habitation.
- b) Narcissistics.
- c) Sexual harsshment.

**Q4)** a) Define coping. Explain the coping strategies. **[8]**

- b) Describe the marital adjustment across the family Life cycle.



Total No. of Questions : 4]

SEAT No. :

**P328**

[Total No. of Pages : 2

**[5522] - 120**

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

**PSYCHOLOGY**

**Experimental Psychology and Reseach Methodology  
(2013 Pattern) (Paper - II) (Semester - I) (Regular)**

*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 observation.
- b) What is unconditional stimulus?
- c) Define thinking.
- d) Define Experimental Psychology.
- e) What is research?
- f) Define Interview.
- g) Define reinforcement
- h) Define Questionnaire.

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

**[8]**

- a) Describe various conditioning phenomenon.
- b) Explain characteristics of good questionnaire.
- c) Describe Learning in Problem solving.

**P.T.O.**

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

**[8]**

- a) Validity in Research.
- b) Trial and error method.
- c) Abstraction.

**Q4)** a) Describe the characteristics of Research and explain the steps in research.

**[8]**

OR

- b) Describe various schedules of reinforcement.



Total No. of Questions :4]

SEAT No. :

**P329**

**[5522]-123**

[Total No. of Pages : 2

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

**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 the 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 multistage amplifier. [1]
- b) List the basic building blocks of op Amp. [1]
- c) What are the two requirement of oscillation? [1]
- d) Define CMRR. [1]
- e) ‘Basically all amplifiers are power amplifiers’ comment. [2]
- f) ‘Common mode rejection is improved in an instrumentation amplifier ’ comment [2]
- g) In negative feedback system, if feedback gain AF is 50 and amplifier gain  $A=60$ , find the feedback factor. [2]
- h) In an op amp integrator circuit  $c=0.1 \mu\text{f}$  and  $R = 1 \text{ m}\Omega$ , find its integrated gain. [2]

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

- a) Draw the block diagram of voltage series and current shunt feedback. [4]
- b) Show that efficiency of class A power amplifier with transformer coupled load is 50% [4]
- c) Explain in detail ,designing steps for single stage class A audio amplifier [4]

**P.T.O.**

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

- a) What do you mean by negative feedback? derive the expression for gain? [4]
- b) Explain with circuit diagram, direct coupled amplifier. [4]
- c) Draw the circuit diagram of voltage to current converter. Derive the expression for output current. [4]

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

- a) Draw and explain class- B push pull amplifier and show that collector efficiency for class-B power amplifier is 78.5% [6]
- b) Draw the diagram of op amp as a differentiation circuit derive the expression for its output voltage. [6]

OR

**Q5)** Attempt all of the following.

- a) The phase shift oscillator circuit use 5 the resistor  $1\text{m}\Omega$  and capacitor of  $68\mu\text{f}$  calculate frequency of oscillation [4]
- b) Calculate the value of bypass capacitor for designing single stage RC coupled amplifier, its lower cutoff frequency is 400 Hz.  
Assume:  $R_E=180\Omega$  [4]
- c) A power transistor dissipate 4 watt energy If  $T_j$  is  $90^\circ\text{c}$ , find ambient temperature at which it can be operated safely.(Given  $\nu=10^\circ\text{c/w}$ ) [4]



Total No. of Questions : 4]

SEAT No. :

[Total No. of Pages : 2

**P330**

**[5522]-124**

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

**ELECTRONIC SCIENCE**

**EL-212: Digital Circuit Design**

**(2013 Pattern) (Semester - I) (Paper - II) (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 indicate full marks.*

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

- a) What do you mean by pair in K-map? [1]
- b) What is totaliser? [1]
- c) Write excitation table of T-flip-flop. [1]
- d) Define accuracy in DAC. [1]
- e) Draw K-map for following equation. [2]

$$ABC\bar{C} + ABC + A\bar{B}\bar{C} + A\bar{B}C$$

- f) “Non-multiplexed display system draws larger current from power supply”. Comment. [2]
- g) “R - 2R ladder is better than resistive divider method in DAC”. Comment. [2]
- h) Draw the state diagram of mod-5 counter and write its state table. [2]

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

- a) Draw the logic diagram of 3-bit up-down counter and explain its working. [4]
- b) Explain with neat diagram counter type ADC. [4]
- c) Design and implement a 4-bit binary to gray converter using K-map. [4]

**P.T.O.**

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

- a) Describe the working of tracking A to D converter with the help of block diagram. [4]
- b) Design full adder using K-map. [4]
- c) Draw block diagram of digital clock and explain minutes counter in detail. [4]

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

- a) Explain in detail: [6]
  - i) Electromechanical relay.
  - ii) Electrical relay.
- b) Design 3 - bit synchronous binary counter using JK flip-flop. [6]

OR

Attempt all of the following:

- a) Find the output voltage from 4-bit R-2R ladder network for digital input 1010 given input voltage levels are 0=0volt and 1 = 5 volt. [4]
- b) Design a counter using JK flip-flop for the sequence 1, 2, 3, 1, 2, 3, ---[4]
- c) What will be the output of 4-bit magnitude comparator using IC 7485, if A = 1011 and B = 1010. Draw its logic diagram. [4]

*EEE*

Total No. of Questions : 4]

SEAT No. :

[Total No. of Pages : 2

**P331**

**[5522] - 125**

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

**DEFENCE AND STRATEGIC STUDIES**

**DS-101: STUDY OF CONFLICT AND PEACE**

**(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.*

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

**[8×2=16]**

- a) Define war studies
- b) What do you mean by civil society?
- c) Define cultural integration
- d) Define Nation-State
- e) Define self determination
- f) Define Human Rights
- g) Define nationalism
- h) What do you mean by politics of power?

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

**[2×4=8]**

- a) Write a note on the scope of conflict studies.
- b) Explain importance of war studies in the present context.
- c) Discuss pacific methods of conflict settlement.

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



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

**[2×4=8]**

- a) Challenges to peace studies.
- b) Contribution of Research in peace studies.
- c) Methodology of Conflict resolution.

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

**[1×8=8]**

- a) Write a note on the role of peace studies in world order.
- b) Discuss approaches to the study of conflict and peace.



Total No. of Questions : 4]

SEAT No. :

**P332**

[Total No. of Pages : 2

**[5522]-126**

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

**DEFENCE AND STRATEGIC STUDIES**

**DS SY. - 102 : Military Geography**

**(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.*

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

**[16]**

- a) Define "Disaster".
- b) How you would like to define "Tactics".
- c) Why the study of High Altitude warfare is essential for us?
- d) Define "Logistics".
- e) State the vehicles of Desert warfare.
- f) Define "Strategy".
- g) What do you mean by "Civil Defence".
- h) Define "National Security".

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

**[8]**

- a) Explain the grand strategy of shivaji.
- b) Write on "Strategy during peace".
- c) Discuss in brief concept of Military Geography.

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

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

**[8]**

- a) Logistics problems of plain warfare.
- b) Characteristics of Jungle warfare.
- c) Concept of Tactics.

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

**[8]**

- a) Explain the implications of war on “Environment”.
- b) Highlight on various resources of logistics.



Total No. of Questions : 4]

SEAT No. :

**P333**

[Total No. of Pages : 2

[5522]-127

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

**DEFENCE STRATEGIC STUDIES**

**DSSY-103: Contemporary Strategy**

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

**[16]**

- a) Define “Contemporary strategy”.
- b) Define “War”.
- c) What do you mean by “Nuclear Deference”?
- d) Define ‘National security’.
- e) State any two components of National security strategy.
- f) What is conventional War?
- g) What do you understand by C.B.M.?
- h) Define ‘strategy’.

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

**[8]**

- a) Explain the concept of “Flexible Response”.
- b) Write in brief “Operation Shakti of India -1998”
- c) Explain in brief the concept of Nuclear Doctrine.

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

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

**[8]**

- a) P.N.E. of India - 1974.
- b) Massive Retaliation.
- c) Concept of “strategic thinking”

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

**[8]**

- a) Explain theory of Nuclear Deference with example.
- b) Write an essay on “Judias” Nuclear policy”.

*EEE*

Total No. of Questions : 4]

SEAT No. :

**P334**

[Total No. of Pages : 2

**[5522]-128**

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

**ENVIRONMENTAL SCIENCE**

**EVS-201: Ecology and Ecosystem**

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

*Time : 2 Hours]*

*[Max. Marks :40*

*Instructions to the candidates:*

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

**Q1)** Answer the following in one to two lines:

**[10]**

- a) Define Synecology and give one example.
- b) Differentiate between Primary and Secondary production.
- c) What are Biogeochemical cycles?
- d) Define the term Population Ecology.
- e) What is meant by carrying capacity of environment.
- f) Define: Ecological Niche.
- g) Write the difference between Macro and Micro-nutrients with ex.
- h) Give the definition of Ecological succession.
- i) What is Ecotone?
- j) What is food chain? Give one example of it.

**Q2)** Write short notes on ANY TWO of the following:

**[10]**

- a) Explain Ecological classification based on levels of organisation.
- b) Describe any two types of Ecological pyramids with one example of it.
- c) Nitrogen cycle with diagram.

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

**Q3)** Answer ANY TWO of the following:

**[10]**

- a) Discuss any five population characteristics in detail.
- b) Explain Analytical characters used in community structure.
- c) Describe Hydrosere with diagram.

**Q4)** Answer ANY ONE of the following in 10-15 lines:

**[10]**

- a) Explain any five Interspecific relationship with one example of each.
- b) Discuss any two Energy flow models with diagram.

*EEE*

Total No. of Questions : 4]

SEAT No. :

**P335**

[Total No. of Pages : 2

**[5522]-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 are compulsory.*
- 2) Neat and labeled diagrams must be drawn wherever necessary.*
- 3) Figures to the right indicate full marks.*

**Q1)** Answer the following in 1-2 lines:

**[10]**

- a) Define: "Energy Audit".
- b) Define: EDP.
- c) Enlist two causes of 'change in land use pattern'.
- d) Define: 'Sustainable Agriculture'.
- e) Define: "Watershed".
- f) Enlist atleast two demerits of 'Nuclear Energy'.
- g) Define: Ex situ conservation.
- h) Define: Food Crisis.
- i) Enlist: Two renewable and non-renewable energy sources.
- j) Define: "Solar Energy".

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

**[10]**

- a) Green Revolution in India.
- b) Soil conservation method.
- c) Bio-energy.

**P.T.O.**



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

- a) Discuss the role of Rain water Harvest in sustainable Agricultural practices.
- b) Give the classification of Energy Resources.
- c) What is Geothermal energy?

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

- a) What are the various ways of solar energy utilization?

OR

- b) What is meant by “Resource” add a note on resource management.

*EEE*

Total No. of Questions : 4]

SEAT No. :

[Total No. of Pages :3

**P336**

**[5522]-130**

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

**ENGLISH(Optional)**

**Textbook : 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: **[05]**

- i) Comment on the differences between a planet and a star?
- ii) Explain the role of scientific progress in the development of human science?

**b)** Attempt any one of the following in about 100 words each: **[05]**

- i) What basic facts does C.Jones describe about our planetary system in 'The Sun, the planets and the stars'?
- ii) What are the problems that the children, who are at the mercy of five to six hours of television a day, face when they move into the real world?

**Q2) a)** Attempt any one of the following in about 100 words each: **[05]**

- i) Purdah is criticized as 'oppression of women'. How does the poem argue this point?
- ii) What advice the poem 'A Psalm of Life' conclude with?

**b)** Attempt any one of the following in about 100 words each: **[05]**

- i) 'Shame and sin become a part of a girl's identity along with the purdah'. How does the poem 'Purdah' build this idea?
- ii) What, according H.W.Longfellow, are the virtues we should incorporate to live everyday meaningfully?

**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) Everyone \_\_\_\_\_ the manager attended the function.(except/accept)
  - ii) My friend has won many \_\_\_\_\_ in quiz-competitions.(awards/rewards)
- b) Match the words from A with their synonyms in B.
- | A           | B        |
|-------------|----------|
| i) conceal  | peaceful |
| ii) finish  | hide     |
| iii) futile | complete |
| iv) calm    | useless  |
- c) Choose the right combination of the words.
- i) press an icon/click on an icon
  - ii) background knowledge/earlier knowledge
- d) Pick out the word that is the closest antonym of the underlined word.
- i) diffident : difficult, confident, torment
  - ii) ambiguity : clarity, guilt, liveliness
- e) Differentiate between the following pairs of words.
- i) practical, practicable
  - ii) childish, childlike
- f) Add prefixes or suffixes to the words in brackets and rewrite the sentences.
- i) It is a very \_\_\_\_\_ day. (wind)
  - ii) Could you \_\_\_\_\_ the child's shoe laces please? (tie)

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

- a) She is \_\_\_\_\_ (give) her son a present. It is a mobile phone that he wanted.  
(Use the correct form of the verb given in the bracket)
- b) Kalidas \_\_\_\_\_ (be) a great poet. He \_\_\_\_\_ 2000 years ago.(live)  
(Use the correct form of the verb given in the bracket)

- c) Sitting under the tree, the family enjoyed their picnic lunch.  
(Change into a compound sentence)
- d) The girl sent me an email, but it bounced.  
(Change into a complex sentence)
- e) He was so tired that he could not walk any longer.  
(Change into a simple sentence)
- f) What an interesting game we had!  
(Change into a declarative sentence)
- g) It is a very interesting story.  
(Change into a exclamatory sentence)
- h) Could you open the door, please?  
(Change into an imperative sentence)
- i) I cannot help you.  
(Change into an affirmative sentence)
- j) The Moon can be seen through the clouds.  
(Change into a negative sentence)
- k) The dogs have not been fed.  
(Change the voice)
- l) The nurse said to the patient, “Has the pain become worse”?  
(Change into reported speech)



Total No. of Questions : 3]

SEAT No. :

P337

[5522] - 131

[Total No. of Pages : 1

S.Y. B.Sc. (Regular)

मराठी (Marathi) (Theory)

पाठ्यपुस्तक : विज्ञानसृष्टी (मराठी विज्ञान साहित्य)

(2013 पॅटर्न) (Semester - I)

(मराठी रूपांतर)

वेळ : 2 तास/

/एकूण गुण : 40

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

**प्र.1)** खालीलपैकी कोणत्याही एक विषयावर चारशे शब्दांपर्यंत निबंध लिहा.

[10]

- अ) युवक आणि विज्ञान
- ब) जल प्रदुषण
- क) माहिती तंत्रज्ञान आणि देशाचा विकास

**प्र.2)** खालीलपैकी एका प्रश्नांचे उत्तर तीनशे शब्दांपर्यंत विज्ञानकथेचे स्वरूप व वैशिष्ट्यांचा आढावा घ्या. [15]

किंवा

सौंदर्यवर्धक शस्त्रक्रियांविषयीची माहिती पाठाच्या आधारे विशद करा.

**प्र.3)** टिपा लिहा. (कोणत्याही तीन)

[15]

- अ) आर्यभट्ट उपग्रहाची माहिती
- ब) सौर ऊर्जेचे फायदे लिहा
- क) नॅनोटेक्नालॉजी
- ड) डॉ. होमी भाभा
- इ) पर्यावरणाविषयक जागृती
- ई) डॉ. सी. एन. आर. राव यांचे संशोधन



Total No. of Questions : 3]

SEAT No. :

P338

[5522] - 132

[Total No. of Pages : 2

S.Y. B.Sc.

हिंदी (Hindi) (General)

नयापाठ्यक्रम

पाठ्यपुस्तकें : 1) भारती गद्य-संग्रह सं. डॉ. मधु धवन

2) कवितायन सं. डॉ. भोलानाथ तिवारी

(2013 पॅटर्न) (Regular) (Semester - I)

समय : 2 घंटे/

/पूर्णांक : 40

- सूचनाएँ :- 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) चाय पीकर हम आ रहा हूँ।
- ii) वह व्यक्ति गुणि है।
- iii) सरकार ने लगान वसुल की।
- iv) उस की माँ बहुत बीमार है।
- v) तू तेरा काम कर, मैं मेरा काम करता हूँ।
- vi) मेरे चार चाचे आए।
- vii) सुशीला गाने की कसरत कर रही है।
- viii) पेड़ों पर पक्षी बैठा था।

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

Mahatma Gandhi is very famous in India as “Bapu” or “Rastrapita”. The full name of him is Mohandas Karamchand Gandhi. He was a great freedom fighter who led India as a leader of the nationalism against British rule. He was born on 2<sup>nd</sup> of October in 1869 in Porbandar, Gujarat, India. He died on 30<sup>th</sup> of January in 1948. M. K. Gandhi was assassinated by the Hindu activist, Nathuram Godse, who was hanged later as a punishment by the government of India. He has been given another name by the Rabindranath Tagore as “Martyr of the Nation” since 1948.

*P.T.O.*

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

क) “संस्कृति ऐसी चीज नहीं कि जिसकी रचना दस-बीस या सौ-पचास वर्षों में की जा सकती हो।”

अथवा

“आप लोगों के बीच खड़े होकर मुझे भी अपने कॉलेज के दिन याद आ रहे हैं। ऑफ, वे दिन भी कितने नीरस थे।”

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

ख) “स्वयं सुसज्जित करके क्षण में  
प्रियतम को प्राणों के पण में  
हमीं भेज देती है रण में-  
क्षात्र-धर्म के नाते।”

अथवा

“कोई न छायादार  
पेड़ पर वह जिसके तले बैठी हुई स्वीकार,  
श्याम तन, भर बँधा यौवन,  
नत नयन, प्रिय कर्म रत मन।”

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

- i) श्मशान इंसान क्यों बनना चाहता है?
- ii) ‘बैलून-एंजियोप्लास्टी’ तकनीक क्या है?
- iii) शोर-नियंत्रण पर प्रकाश डालिए।

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

- i) ‘सुख-दुख’ कविता के आशय को समझाइए।
- ii) ‘इतिहास का न्याय’ कविता का भावार्थ लिखिए।
- iii) ‘बीते दिन कब आनेवाले’ कविता की मूल संवेदना पर प्रकाश डालिए।



Total No. of Questions : 4]

SEAT No. :

[Total No. of Pages : 4

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[5522] - 133

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

**SANSKRIT**

**Geervana Bharati**

**(गीर्वाणभारती)**

**(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)** Write short answers in 2-4 lines on the following questions.

**[16]**

- i) Which are the चतुष्कला in प्रकाशवान्
- ii) What did Chyavana say to Sukanya?
- iii) Which are the चतुष्कला in आयतवान्
- iv) Who is the Author of अभिज्ञानशाकुन्तलम् & which lesson is taken from this book.
- v) Who is the author of शतोपदेशप्रबन्धः?
- vi) How many काण्ड in Ramayana, which are they?
- vii) Explain the meaning - धीरः समयंप्रतीक्षेत?
- viii) Explain the meaning - धृतिर्दृष्टिर्मतिर्दाक्ष्यं स कर्मसु न सीदति.

**P.T.O.**



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

- i) च्यवनभार्गवः
- ii) काश्यपः
- iii) कालिदासः

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

- i) Explain : जय जय करूणाब्धे श्रीमहादेव शम्भो।
- ii) Explain : विवहि विजह्यान्न शुरुत्वम्।
- iii) Explain : श्रयेन्महान्तं महत्वाय।

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

Character sketch of सत्यकामजाबाल.

OR

Character sketch of हनुमान from छायाग्राहिसत्त्वम्.



Total No. of Questions : 4]

P339

[5522] - 133

S.Y. B.Sc. (Regular)

SANSKRIT

Geerwana Bharati

(गीर्वाणभारती)

(2013 Pattern) (Semester - I)

(मराठी रूपांतर)

वेळ : 2 तास/

/एकूण गुण : 40

- सूचना :- 1) सर्व प्रश्न अनिवार्य आहेत.  
2) उजवीकडील अंक पूर्ण गुण दर्शवितात.
- 

प्र.1) पुढील प्रश्नांची 2 ते 4 ओळीत उत्तरे लिहा.

[16]

- i) प्रकाशवान् पादाच्या चतुष्कला कोणत्या?
- ii) सुकन्येस च्यवन काय म्हणाला?
- iii) आयतवान् या पादाच्या चतुष्कला कोणत्या?
- iv) अभिज्ञानशाकुन्तलम् या ग्रंथाचा कर्ता कोण या ग्रंथातून कोणता पाठ घेतलेला आहे?
- v) शतोपदेशप्रबन्धः ग्रंथाचा कर्ता कोण?
- vi) रामायणात किती काण्ड आहेत व ते कोणते?
- vii) धीरः समयं प्रतिक्षेत – अर्थ स्पष्ट करा.
- viii) धृतिर्दृष्टिर्मतिर्दाक्ष्यं सकर्मसु न सीदति – अर्थ स्पष्ट करा.

**प्र.2)** पुढीलपैकी कोणत्याही दोहोंवर 8 ते 10 ओळींत संक्षिप्त टीपा लिहा. [8]

- i) च्यवनभार्गवः
- ii) काश्यपः
- iii) कालिदासः

**प्र.3)** पुढीलपैकी कोणत्याही दोहोंवर 8 ते 10 ओळींत संक्षिप्त टीपा लिहा. [8]

- i) स्पष्ट करा : जय जय करूणाब्धे श्रीमहादेव शम्भो।
- ii) स्पष्ट करा: विवदि विजहान्न शुरत्वम्।
- iii) स्पष्ट करा : श्रयेन्महान्तं महत्त्वाय।

**प्र.4)** पुढीलपैकी कोणत्याही एका प्रश्नांचे 16 ते 20 ओळींत उत्तर लिहा. [8]

सत्यकामजाबालाची व्यक्तिरेषा स्पष्ट करा.

अथवा

छायाग्राहिसत्त्वम् यापाठातील हनुमानाची व्यक्तिरेषा स्पष्ट करा.



Total No. of Questions :4

SEAT No. :

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[5522]-134

S.Y.B.Sc.

Arabic Functional (Regular)  
(2013 Pattern) (Semester - I)

Time : 2 Hours]

[Max. Marks : 40

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

(١) اُمْبُنْتَدَا وَالْخَبْرُ

(٢) حُرُوفُ الْهَجَاءِ

(٣) الضَّمَائِرُ

(٤) الْأَعْرَابُ

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

(١) هُوَ ذَاهِبٌ إِلَى بَيْتِ صَدِيقِهِ

(٢) مَكْتَبُهُ بَعِيدٌ مِنْ بَيْتِهِ -

(٣) عَلِيٌّ رَاجِعٌ مَعَ فَاطِمَةَ مِنَ السُّوقِ -

(٤) لَأَ... كَلَيْتُهُ مَعُ لَقْتَهُ -

(٥) وَالِدِي عَامِلٌ فِي غُرْفَتِهِ -

(٦) هَذِهِ الْمَدْرَسَةُ جَيِّدَةٌ -

(٧) الْبِنْتُ جَالِسَةٌ عَلَى الْكُرْسِيِّ

(٨) حَدِيقَتُهُ الْجَامِعَةِ كَبِيرَةٌ وَجَمِيلَةٌ -

P.T.O.

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

1. This bus is Coming from the College.
2. In the Fridge there is an Apple.
3. The new teacher is a tall man.
4. My brother is going to the School.
5. The new chair is Comfortable-.
6. on the window there is a curtain.
7. The Student is going to the school.
8. That bus is going to University.

**4. Write in Arabic any ten of the following Termino logies: (10)**

- (1) Planet . (2) Orbit .
- (3) Axis. (4) Zone.
- (5) Motion. (6) Chemistry. (7) Voltage.
- (8) Mars. (9) Liquid.
- (10) Science. (11) Atom. (12) Soft.
- (13) Computer.(14) Physics.
- (15) Heat. (16) Gas.



Total No. of Questions :4

SEAT No. :

P341

[Total No. of Pages :1

[5522]-135

S.Y.B.Sc.

URDU

General Paper-II (UR G2) (Regular)

Time : 2 Hours]

(2013 Pattern)(Semester-I)

[Max. Marks : 40

- ہدایات: (۱) تمام سوالات لازمی ہیں۔
- (۲) بائیں جانب درج نمبرات مارکس ہیں۔
- سوال نمبر ۱: علامہ اقبال کی نظموں میں حب الوطنی کے جذبے نوٹ لکھیے۔ (10)
- یا
- علامہ اقبال کی سیرت و شخصیت پر روشنی ڈالیے۔
- سوال نمبر ۲: بانگ درا کی مقبولیت کے اسباب بتائیے۔ (10)
- یا
- اقبال کی نظموں تشبیہات و استعارات کو مثالوں سے بتائے۔
- سوال نمبر ۳: کسی ایک نظم کا مرکزی خیال بیان کرتے ہوئے تشریح کیجیے۔ (10)
- ۱۔ چاند ۲۔ پرندے کی فریاد ۳۔ ہمالہ
- سوال نمبر ۴: مندرجہ ذیل اشعار میں سے کوئی پانچ اشعار کی تشریح کیجیے۔ (10)
- ۱۔ ایک جلوہ تھا کلیم طور سینا کے لیے تو تجلی ہے سراپا چشم پینا کے لیے
- ۲۔ میری قسمت میں ہے ہر روز کا مرنا جینا
- ۳۔ کیا بد نصیب ہوں میں گھر کو ترس رہا ہوں
- ۴۔ سونی پڑی ہوئی ہے مدت سے کی بستی
- ۵۔ میں رہ منزل میں ہوں، تو بھی رہ منزل میں ہے تیری محفل میں جو خاموشی ہے، میرے دل میں ہے
- ۶۔ شکستی بھی شانتی بھی بھکتوں کے گیت میں ہے دھرتی کے باسیوں کی مکتی پریت میں ہے
- ۷۔ لگتی ہے چوٹ دل پر آتا ہے یاد جس دم شبنم کے آنسوؤں پر کلیوں کا مسکرانا

✓ ✓ ✓ ✓

Total No. of Questions : 4]

SEAT No. :

**P342**

[Total No. of Pages : 2

[5522]-137

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

**BIOTECHNOLOGY - I**

**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: Autocrine signaling.
- b) What is  $\text{Na}^+/\text{k}^+$  transport?
- c) State the role of desmosome.
- d) What are proteoglycans?
- e) How  $\text{F}^+$  strain is formed during conjugation.
- f) What is bidirectional replication?
- g) Define: SOS repair.
- h) Give the role of  $\text{H}_1$ . Histone protein in nucleosome.
- i) What is specialised transduction?
- j) Enlist two examples of cell signalling molecules.

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

**[10]**

- a) Conjugation.
- b) N and O glycosylation.
- c) Cell differentiation.

**P.T.O.**

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

**[10]**

- a) What are mobile elements? Explain with suitable example.
- b) Explain structure and function of endoplasmic reticulum.
- c) What is gene? Explain the prokaryotic gene structure.

**Q4)** Explain the process of transcription in prokaryotes in detail.

**[10]**

OR

Compare and contrast prokaryotic and eukaryotic replication.

*EEE*



Total No. of Questions : 4]

SEAT No. :

**P343**

[Total No. of Pages : 2

**[5522]-138**

**S.Y. B.Sc. (Vocational -I) (Regular)**

**PHOTOGRAPHY AND AUDIO-VISUAL PRODUCTION - I**

**Still Photography, Processing & Printing**

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

*Time : 2 Hours]*

*[Max. Marks :40*

*Instructions to the candidates:*

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

**Q1)** Answer the following in short:

**[16]**

- a) Mention the important attributes of a subject that are useful for 'lighting' it.
- b) State the law of transmission and absorption of light.
- c) Explain the significance of the front elements 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) Define the angle of view of a camera lens. Calculate the angle of view of a lens with a focal length of 100 mm on a full frame DSLR camera.
- g) The guide number of a flash light is 56, what does it mean?
- h) Telephoto lenses are generally slower. Explain.

**Q2)** Attempt ANY TWO of the following:

**[8]**

- a) Discuss the different artificial light sources used in photography. Give one example and use of each.
- b) Discuss what is 'unwanted light' in photography. Give suitable examples.
- c) Compare the features of a telephoto lens and a wide angle lens.

**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) People 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 standard three point lighting set-up used for studio portrait Explain the importance of each light used in this set-up.

*EEE*

Total No. of Questions : 4]

SEAT No. :

[Total No. of Pages : 2

**P344**

**[5522]-139**

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

**ELECTRONIC EQUIPMENT MAINTENANCE - I**  
**EEM-211: Troubleshooting Electronic Equipment - A**  
**(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 log table/calculator is allowed.*

**Q1)** Answer the following:

- a) What is block diagram? [1]
- b) State the use of wiring diagram. [1]
- c) What is circuit diagram? [1]
- d) State the name of tools required for Dis-assembly. [1]
- e) Comment - cause of equipment failure is a poor design. [2]
- f) Comment - careless storage causes fault in a equipment. [2]
- g) State the effect of in appropriate operating conditions on equipment operation. [2]
- h) State the importance of grounding system. [2]

**Q2)** Answer any two:

**[2×4=8]**

- a) State nature of faults. Discuss fault location procedure.
- b) Discuss various fault finding aids.
- c) Explain faults in fixed resistor.

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

**Q3) Answer any two:**

**[2×4=8]**

- a) Discuss testing procedure of LDR and thermistor.
- b) Explain faults in capacitor.
- c) Explain the procedure of testing & measurement of inductance.

**Q4) Answer the following:**

**[2×6=12]**

- a) Discuss causes of failure in semiconductor devices.
- b) Explain test procedure of Diode and transistor.

OR

Answer the following:

**[2×6=12]**

- a) Explain any three types of semiconductor devices.
- b) Discuss fault diagnosis in Op-Amp circuits.

*EEE*

Total No. of Questions : 4]

SEAT No. :

**P345**

[Total No. of Pages : 2

**[5522]-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 indicate full marks.*

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

- i) Define Accuracy of DAC.
- ii) What is HDMI?
- iii) What is the size of address bus and data bus of 8086 Microprocessor.
- iv) State different types of port available in a computer.

**b) Attempt the following: [4×2=8]**

- i) What is DRAM?
- ii) What is sensor? List any two temperature sensor you know.
- iii) What is Cache memory?
- iv) What is USB? List any two devices that support USB.

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

- a) What is interrupt? Explain software interrupts in brief.
- b) What is DAC? Explain working of any one type of DAC.
- c) Write a short note on i5 processor.

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

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

**[2×4=8]**

- a) List and explain in brief computer based design and development tools.
- b) List various BUS architectures you know. Explain features of any one of the BUS.
- c) Explain DMA Controller operation with a neat diagram.

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

**[2×6=12]**

- a) List Intel and Non-Intel processors. Explain features of Pentium and i3 processor in brief.
- b) What is ADC? List different types of ADC. Explain working of any one.
- c) What is a matrix keyboard? Draw schematic diagram to interface matrix keyboard with microprocessor and explain its working.

*EEE*

Total No. of Questions : 4]

SEAT No. :

[Total No. of Pages : 2

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**[5522]-141**

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

**SEED TECHNOLOGY**

**VOC-SETE-211: Hybrid Seed Production**

**(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 and labeled diagrams wherever necessary.*

**Q1)** Attempt the following:

**[10×1=10]**

- a) Give the types of Apomixis.
- b) Define Genetic male sterility.
- c) What is self incompatibility?
- d) Define Roughing.
- e) What is Isolation?
- f) What is a variety?
- g) Define emasculation.
- h) What is the isolation distance required for Jowar hybrids?
- i) What is stigma receptivity?
- j) Enlist types of placentations.

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

**[2×5=10]**

- a) Describe cytoplasmic male sterility.
- b) Give the commercial utilization of heterosis.
- c) Comment on structure of stamen.

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

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

**[2×5=10]**

- a) Significance of Apomires.
- b) Compact area approach.
- c) Gametocides.

**Q4)** Give detail procedure for hybrid seed production in cotton.

**[10]**

OR

Give detail procedure for hybrid seed production in Arachis hypogea.

*EEE*



Total No. of Questions : 4]

SEAT No. :

**P347**

[Total No. of Pages : 2

[5522]-142

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

**INDUSTRIAL MICROBIOLOGY**

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

**(2013 Pattern) (Theory) (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) *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) State two disadvantages of Batch culture.
- b) Define Sterilization.
- c) State two methods of measuring biomass.
- d) What is Chemostat?
- e) State one feature of Rushton turbine.
- f) Sparger cannot be used for aeration and agitation both. State T/F.
- g) Define Immobilization.
- h) What is SIP?
- i) How would you sterilize amino acids?
- j) How do you sterilize vitamins?

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

**[10]**

- a) Draw a neat labelled diagram of CSTR.
- b) Explain process of fed batch culture with suitable example.
- c) Explain role of Del factor in designing sterilization regime.

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

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

**[10]**

- a) Plug flow reactor.
- b) Types of impellers.
- c) Dissolved Oxygen sensors.

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

**[10]**

- a) Discuss in details- Time-course of fermentation with suitable example.
- b) Describe on-line, in-line and offline data acquisition.

*EEE*

Total No. of Questions : 4]

SEAT No. :

**P348**

[Total No. of Pages : 2

[5522]-144

**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 plasmids?
- b) Give any two examples of shuttle vectors.
- c) Name the enzyme produced by Lac Z' gene.
- d) What are restriction enzymes?
- e) Give the function of Taq polymerase.
- f) What is transfection?
- g) Name two molecules used for non-radioactive labelling of nucleic acids.
- h) What is Western blotting?
- i) What are DNA modifying enzymes?
- j) Why Type-II restriction endonucleases are used for gene cloning?

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

**[10]**

- a) BAC vector.
- b) Site directed mutagenesis.
- c) Southern blotting.

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

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

**[10]**

- a) Describe the Sanger's method of DNA sequencing.
- b) Explain transformation as a method of introducing r-DNA into the host cell.
- c) Give the applications of PCR.

**Q4)** What is genomics? Describe various types of genomics and add a note on their applications **[10]**

OR

Describe the lytic cycle and lysogenic cycle of bacteriophage in detail.

*EEE*

Total No. of Questions : 4]

SEAT No. :

**P349**

[Total No. of Pages : 2

[5522] - 145

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

**PHOTOGRAPHY AND AUDIO-VISUAL PRODUCTION - II**

**Fundamentals of Acoustics and Sound for Media**

**(2013 Pattern) (Paper - IV) (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 indicate full marks.*

**Q1)** Attempt All of the following.

- a) What is an anechoic chamber? [2]
- b) Mention four basic requirements of an auditorium? [2]
- c) Define: Reverberation. [2]
- d) What is microphone? Mention any two types of special microphones. [2]
- e) Compare the frequency response of a tweeter and a woofer. [2]

**Q2)** Attempt ANY TWO of the following:

- a) With the help of a neat sketch, explain the functioning of a crystal microphone. Explain why ceramic crystal is more suitable than Rochelle salt crystal. [5]
- b) Sound intensity at 1 meter from a loudspeaker is  $400 \text{ mW/m}^2$ . The audio power fed to the loudspeaker is 10 W. Calculate the efficiency of the loudspeaker. [5]
- c) Calculate the reverberation time for an auditorium of 1000 cubic meters having total absorption equal to 230 Sabine. [5]

**P.T.O.**

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

- a) Design a crossover network to give 12 dB per octave attenuation for tweeter and woofer for critical frequency of 1 kHz. Loudspeaker resistance is  $16 \Omega$ . [5]
- b) Calculate power gain in dB if input power of 200 mW gives output power of 2 W. [5]
- c) Find the wavelength of sound of 1000 Hz presuming its velocity to be 344 m/s. [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 moving coil cone type loudspeaker. Explain why it is called direct radiating type loudspeaker. [5]
- c) State five characteristics of loudspeaker and explain them in brief. [5]



Total No. of Questions : 4]

SEAT No. :

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**P350**

**[5522] - 146**

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

**ELECTRONIC EQUIPMENT MAINTENANCE**

**EEM - 212: Audio, Video and Office Equipment - A**

**(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 wherever necessary.*

**Q1)** Attempt the following.

- a) Define AM. [1]
- b) What is FM? [1]
- c) State the use of receiver IC. [1]
- d) What is High fidelity? [1]
- e) Comment - Remote control operates on line of sight communication. [2]
- f) Comment - Blu - Ray player uses 460 nm Laser. [2]
- g) What is MP3 ? [2]
- h) What is Vestigial sideband transmission? [2]

**Q2)** Answer any two

**[2×4=8]**

- a) State and explain important receiver characteristics.
- b) Explain the alignment procedure of Radio receiver.
- c) Draw a neat labelled diagram of ACD player.

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

**Q3) Answer ANY TWO**

**[2×4=8]**

- a) Explain with diagram composite video signal.
- b) Discuss with neat diagram Public Address system.
- c) Write a short note on - Set top box.

**Q4) Draw a neat labelled block diagram of following**

**[2×6=12]**

- a) B/W TV receiver.
- b) Color TV receiver.

OR

Explain with neat diagram following.

**[2×6=12]**

- a) Block diagram of LCD TV.
- b) CCTV.





Total No. of Questions : 4]

SEAT No. :

**P351**

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[5522] - 147

**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 Corrosion?
- ii) What do you mean by EMI?
- iii) List various components on motherboard.
- iv) What is the importance of fan in your PC?

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

- i) What is Booting?
- ii) State common problems that may arise while using serial ports.
- iii) What is CDROM? List any two problems related to CDROM.
- iv) List various diagnostic and utility programs available in PC.

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

- a) Explain the effect of heat and cold as contributors to system failures?
- b) Explain in brief the preventive measures for disk drive failure.
- c) Explain backup and recovery procedure in brief.

**P.T.O.**

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

**[2×4=8]**

- a) Write a short note on preventive maintenance of PC.
- b) Explain keyboard and mouse problems and the measures for their troubleshooting.
- c) Write a short note on repair generated failure.

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

**[2×6=12]**

- a) What is SMPS? What are types of SMPS. Explain in brief the preventive maintenance of UPS and SMPS of a PC.
- b) List various electronic equipments used in troubleshooting. State and explain steps for successful troubleshooting of computer.
- c) State various display adaptors and there functions. Explain display related problems in brief.



Total No. of Questions : 4]

SEAT No. :

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**P352**

**[5522] - 148**

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

**SEED TECHNOLOGY - II**

**Seed Testing**

**(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 and labeled diagrams wherever necessary.*

**Q1)** Attempt the following.

**[10×1=10]**

- a) Define seed vigour.
- b) Name the equipment used for testing the moisture content of seed?
- c) What is reporting of results?
- d) Name the methods employed in testing of seed germination.
- e) Write any two principles of seed sampling?
- f) Give the importance of central seed Testing Laboratory.
- g) Write the methods used for testing seed moisture content?
- h) How guard samples are stored?
- i) What is seed testing?
- j) What is heterogeneity test?

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

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

**[2×5=10]**

- a) Write on state Seed Testing Laboratory
- b) Discuss on moisture meter
- c) Comment on physical purity work board.

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

**[2×5=10]**

- a) Layout of Seed Testing Laboratory.
- b) General principles of seed sampling
- c) Seed vigour testing

**Q4)** Explain the types of seed samples?

OR

Define seed germination? Explain in detail any two methods used for seed germination. **[10]**



Total No. of Questions : 4]

SEAT No. :

**P353**

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

**INDUSTRIAL MICROBIOLOGY**

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

**(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) *All questions carry equal marks.*
- 4) *Draw neat diagrams wherever necessary.*
- 5) *Use of scientific calculators is allowed.*

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

**[10]**

- a) Define 'Strain Improvement'.
- b) Enlist any two growth factors used in fermentation process.
- c) Define precursors.
- d) List the parameters to be scaled up in a fermentaiton process.
- e) What is secondary screening?
- f) Enlist any two antifoam agents used in fermentation process.
- g) Name any two industrially important bacteria.
- h) Enlist any two microbial preservation techniques.
- i) Define Auxotrophic mutant.
- j) Define Del Factor.

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

**[10]**

- a) Diagrammatically represent modes of feedback repression.
- b) Give importance of carbon source in industrial fermentation process with appropriate examples.
- c) Describe agar overlay method and its importance.

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

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

- a) Write a short note on response surface methodology.
- b) Write importance of recombinant DNA technology in strain improvement.
- c) Explain Function based targeted screening.

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

- a) Explain how Plackett Burman design can be used for the optimization of parameters in large scale fermentation process.
- b) Explain scale up for batch sterilization of media at industrial scale.

*EEE*

Total No. of Questions : 4]

SEAT No. :

**P354**

[Total No. of Pages : 2

**[5522]-150**

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

**NANOSCIENCE AND NANOTECHNOLOGY**

**NS-211: Physical Techniques for Synthesis of Nanomaterials**

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

*Time : 2 Hours]*

*[Max. Marks :40*

*Instructions to the candidates:*

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

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

- a) What is mineral dressing? [1]
- b) How filament tested for evaporation method. [1]
- c) What is reaction time? [1]
- d) Define resistivity? [1]
- e) What is mean by exfoliation. [1]
- f) Give the different types of CVD. [1]
- g) List of the plant that can synthesize silver nanoparticles. [1]
- h) Discuss conductivity of graphene. [1]
- i) Write a range of vacume in 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) Describe pulse laser deposition. [5]
- c) Explain liquid phase plasma synthesis. [5]

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

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

- a) Explain properties of graphene. [5]
- b) How Titanium Dioxide & zinc oxide nanoparticles are produced using plant extract. [5]
- c) Write a note on evaporation. [5]

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

- i) 1) Give application of nanoparticles. [4]
- 2) Explain in brief green synthesis. [4]

OR

- ii) 1) Give the factors affecting biological synthesis of metal nanoparticles. [4]
- 2) Write advantages of Green synthesis over other synthesis techniques. [4]

b) Attempt any one of the following:

- i) Draw neat labelled diagram of molecular beam epitaxy. [2]
- ii) Draw a neat labelled diagram of mechanical exfoliation using scotch tape method. [2]

*EEE*



Total No. of Questions : 4]

SEAT No. :

**P355**

[Total No. of Pages : 2

**[5522]-151**

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

**NANOSCIENCE AND NANOTECHNOLOGY**

**NS-212: Properties of Nanomaterials (Physical, Chemical, Optical  
& Magnetic)**

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

- a) Define mortality. [1]
- b) What is the value of magnetic susceptibility for diamagnetic substance. [1]
- c) What is quantum size effect? [1]
- d) Define cathodoluminescence. [1]
- e) What is Blocking temperature. [1]
- f) Define ferromagnetism. [1]
- g) Define Birefringence. [1]
- h) Define lubrication. [1]
- i) What is basic principle of electroluminescence. [1]
- j) Define wear. [1]

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

- a) Explain optical CL instrumentation with neat labelled diagram. [5]
- b) Define Hardness & explain it's in brief. [5]
- c) With the help of neat labelled diagram. Explain X-ray fluorescence spectroscopy (XRF). [5]

**P.T.O.**

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

- a) Write application of UV spectroscopy. [5]
- b) Explain excitons & its type. [5]
- c) Write advantages & limitation of optical cathodoluminescence. [5]

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

- a) i) Explain Redox cycling in brief. [4]
- ii) Explain colossal magnetoresistance. [4]

OR

- b) Write advantages & disadvantages of electroluminescence. [8]

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

- a) Define Frankel excitons. [2]
- b) Classify low dimensional materials. [2]

*EEE*