Total No. of Questions : 4] **[Total No. of Pages : 2**

P258

[3717] - 101

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

MATHEMATICS - I (51111)

Calculus of Several Variables (New Course)

Time : 2 Hours] ***[Max. Marks : 40***

Instructions to the candidates :

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

Q1) Answer the following questions. **[10]**

a) Evaluate $\lim\limits_{(x,y)\to(0,0)} \dfrac{x^2y^2}{x^4+y^4-x^2y^2}$, if exists.

b) If the function $f(x, y) = \log(x^2 + y^2 - 2x - 2y + 6)$ is continuous at the point (2, 1), find $f(2, 1)$.

c) State sufficient conditions for $f(x, y)$ to be differentiable at (a, b).

d) Find $x\dfrac{\partial f}{\partial x} + y\dfrac{\partial f}{\partial y}$, where $f(x, y) = \sin^{-1}\left(\dfrac{\sqrt{x}-\sqrt{y}}{\sqrt{x}+\sqrt{y}}\right)$.

e) If $f(x, y) = |x| + |y|$, show that $f_x(0, 0)$ doesnot exist.

f) If $f(x, y) = \log(x + y)$ and $x = t^2$, $y = 1 - t^2$, find $\dfrac{df}{dt}$.

g) Find Jacobian $J = \dfrac{\partial(x,y)}{\partial(u,v)}$, where $x = u - uv$, $y = uv$.

h) State Maclaurin's theorem for function of two variables.

i) Show that (1, 1) is a stationary point of the function $f(x, y) = xy + \dfrac{1}{x} + \dfrac{1}{y}$.

j) Evaluate $\int_0^1\int_0^x e^{y/x}\, dy\, dx$.

P.T.O.

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

a) Let $f(x, y)$ be a function defined on a neighbourhood of a point (a, b). If 'f' is differentiable at (a, b) then prove that

i) f is continuous at (a, b) and

ii) f_x and f_y both exist at (a, b).

b) If $f(x, y) = xy\,\dfrac{x^2 - y^2}{x^2 + y^2}$; $(x, y) \neq (0, 0)$ and $f(0, 0) = 0$. Show that

$f_{xy}(0, 0) \neq f_{yx}(0, 0)$.

c) If $e^u = \dfrac{x^4 + y^4}{x - y}$, using Euler's theorem for homogeneous function show

that $x^2 \dfrac{\partial^2 u}{\partial x^2} + 2xy \dfrac{\partial^2 u}{\partial x \partial y} + y^2 \dfrac{\partial^2 u}{\partial y^2} = -3$.

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

a) Using differentials, find approximate value of $\sqrt{(5.98)^2 + (8.01)^2}$.

b) Using Lagrange's method of undetermined multipliers, find the minimum value of $f(x, y, z) = x^2 + y^2 + z^2$ under the condition $x + y + z = 30$.

c) Show that $f(x, y) = \sqrt{|xy|}$ is not differentiable at $(0, 0)$.

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

a) i) State and prove Schwarz's theorem for equality of second order mixed partial derivatives.

ii) Evaluate $\iint_R dx\,dy$ over the region 'R' bounded by the curves $y = x^2$ and $y = x$.

b) i) Evaluate $\int_0^a \int_0^x \int_0^y x y^2 z^3 \, dz dy dx$.

ii) By changing to polar co-ordinates, evaluate $\iint_{x^2+y^2 \le 1} \left(x^2 + y^2\right)^{7/2} dx dy$.

Total No. of Questions : 4] **[Total No. of Pages : 2**

P259 [3717] - 102

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

MATHEMATICS

(A) : Differential Equations

(New Course) Paper - II (A)

Time : 2 Hours] ***[Max. Marks : 40***

Instructions to the candidates :

1) ***Candidates are advised to see the relevant question paper and solve the same.***
2) ***All questions are compulsory.***
3) ***Figures to the right indicate full marks.***

Q1) Answer the following questions: **[10]**

a) State the order and degree of the equation.

$$\left[\frac{d^2y}{dx^2}\right]^{1/3} = \left[y + \frac{dy}{dx}\right]^{1/2}.$$

b) Solve $\frac{dy}{dx} + \frac{\sqrt{1-y^2}}{\sqrt{1-x^2}} = 0$.

c) Test whether the differential equation is exact or not

$$(3xy^2 - x^2)\,dx + (3x^2y - 6y^2 - 1)\,dy = 0.$$

d) Find the integrating factor of the differential equation

$$(x^2 + y^2)\,dx - 2xy\,dy = 0.$$

e) Form the differential equation of family of curve $y = cx + c^2$, where c is a constant.

f) Find the particular solution of the differential equation

$$[D^3 + 3D^2 + 3D + 1]y = e^{-x}.$$

g) Solve $\frac{d^3y}{dx^3} - 6\frac{d^2y}{dx^2} + 9\frac{dy}{dx} = 0$.

h) If $f(D) \equiv xD + 2$ and $g(D) \equiv D + 5$ then find $[f(D)\ g(D)]y$, where $D \equiv \frac{d}{dx}$.

P.T.O.

i) Find the particular solution of $(D^2 + 4)y = \sin 2x$.

j) Verify that $y_1 = e^{x^2}$ satisfies the equation $y'' - 4xy' + \left(4x^2 - 2\right)y = 0$.

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

a) Prove that, if $\frac{\partial M}{\partial y} = \frac{\partial N}{\partial x}$ then the equation $Mdx + Ndy = 0$ is exact.

b) Solve $(x^2y - 2xy^2)\, dx - (x^3 - 3x^2y)dy = 0$.

c) Find r, if x^r is an integrating factor of the equation $(x + y^3)\, dx + 6xy^2dy = 0$ hence solve it.

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

a) Explain, how to find $\frac{1}{D^2 + a^2} \sin ax$.

b) Show that the family $y^2 = 4a\,(x + a)$ is self orthogonal.

c) Solve $6\cos^2 x \frac{dy}{dx} - y \sin x + 2y^4 \sin^3 x = 0$.

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

a) i) Explain how to solve the linear non-homogeneous differential equation by using the method of undetermined coefficients.

ii) Solve $(2D^2 - D - 6)y = e^{\frac{-3}{2}x} + \sin x$.

b) i) Find the particular solution of the equation.

$$(D^2 - 3D + 2)y = \cos(e^{-x})$$

by using the method of variation of parameters.

ii) Solve $\frac{d^2y}{dx^2} + a^2y = \sec ax$.

Total No. of Questions : 4] **[Total No. of Pages : 2**

P259 **[3717] - 102**

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

MATHEMATICS

(B) : Numerical Analysis

(New Course) 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.***
3) ***Use of non - programmable calculator is permitted.***

Q1) Attempt the following: **[10]**

a) An approximate value of π is given by 3.1427852 and it's true value is 3.14159265. Find absolute and relative error.

b) Use Newton - Raphson method for evaluating $\sqrt[4]{1/3}$.

c) Prove that - $\Delta -$ $\equiv \Delta$.

d) If $f(x) = \dfrac{1}{x^2}$, find $f(a, b)$.

e) Round - off following numbers to two decimal places.

61.0561, 105.7845.

f) Is it possible to solve the system of equations:-

$3x + 2y = 5;\ 7x - 5y = 8$

by Gauss - Seidel iterative method? Justify.

g) Evaluate $\left(\dfrac{\Delta^2}{E}\right) x^3$, take $h = 1$.

h) Find the number of changes of signs of the polynomial-

$f(x) = 2x^7 - 6x^4 + 8x^3 - 15 = 0.$

i) State Sturm's theorem.

j) Construct the divided difference table for the data.

x :	–1	1	2
$f(x)$:	–21	15	12

P.T.O.

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

a) Solve the system of equations; by Gauss - Seidel iterative method:

$10x + y + z = 12;\ 2x + 10y + z = 13,\ 2x + 2y + 10z = 14.$

b) Find the number and position of real roots of the equation:

$f(x) = x^4 - x^3 - 4x^2 + 4x + 1 = 0.$

c) Solve the equation : $\log x = \cos x$ by Newton - Raphson method.

(Root lies between 1 and 2).

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

a) Determine least square polynomial of second degree for the data:

x :	0	1	2	3
y :	1	6	17	34.

b) Use Lagrange's interpolation formula, to express the function as sums of partial fractions.

$$f(x) = \frac{x^3 + x - 3}{x^3 - 2x^2 - x + 2}.$$

c) Evaluate $\int_0^1 \frac{1}{1+x}\,dx$ with $h = \frac{1}{6}$ by Simpson's $\frac{1}{3}^{\text{rd}}$ and $\frac{3}{8}^{\text{th}}$ rule. Compare the result with actual value.

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

a) Use Runge - Kutta second order formula to find $y(0.5)$; Given $\frac{dy}{dx} = \frac{1}{x+y}$ with $y(0) = 1$.

b) Given : $\frac{dy}{dx} = x^2 + y$ with $y(0) = 1$.

Determine $y(0.02)$, $y(0.04)$ using Euler's modified method.

Total No. of Questions : 4] **[Total No. of Pages : 3**

P260

[3717] - 103

S.Y. B.Sc.

PHYSICS (Sem. - I)

PH - 211 : Mathematical Physics (New) (Paper - I)

(21211)

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 calculators and logtables is allowed.***
4) ***Neat diagrams must be drawn wherever necessary.***

Q1) Attempt all of the following:

a) State the polar form of complex number and represent it graphically. **[1]**

b) Find degree and order of given differential equation:

$$\frac{d^4y}{dx^4} + 6\sqrt{\left(\frac{dy}{dx}\right)^2 + y^2} = 0.$$ **[1]**

c) Determine the value of 'P' if $\vec{A} = 3\vec{i} + P\vec{j} + \vec{k}$ and $\vec{B} = 3\vec{i} - 2\vec{j} - 3\vec{k}$ are perpendicular to each other. **[1]**

d) Define conservative and non-conservative force fields. **[1]**

e) Prove that $\sinh\theta = -i \sin i\theta$. **[1]**

f) Find projection of $\vec{A} = \vec{i} - 2\vec{j} + \vec{k}$ on the vector $\vec{B} = 4\vec{i} - 4\vec{j} + 7\vec{k}$. **[1]**

g) If $\phi = 4x^2y - 2y^3z^3$, find $^2\phi$.

h) Find the area of parallel goam whose adjacent sides are $\vec{i} - 2\vec{j} + 3\vec{k}$ and $2\vec{i} + \vec{j} - 4\vec{k}$. **[1]**

i) If $\vec{v} = xyz\vec{i} + 4xy^2z\vec{j} - xyz^2\vec{k}$, find the value of divergence of $\vec{v}$ at (1, 1, 3). **[1]**

j) If $z = \sqrt{2 + \sqrt{5}\,i}$, find (i) complex conjugate of z and (ii) product $z\bar{z}$. **[1]**

P.T.O.

Q2) Attempt any <u>two</u> of the following:

a) Show that $x = 1$ is a regular singular point of the hypergeometric equation.

$$x(x-1)y'' + [(1+a+b)x - c]y' - \alpha y = 0.$$ **[5]**

b) If $y = e^{-i(wt-kx)}$ then show that

$$\frac{\partial^2 y}{\partial x^2} = \frac{k^2}{w^2}\frac{\partial^2 y}{\partial t^2}.$$ **[5]**

c) If the temperature at any point in the space is given by T = $xy + yz + zx$, then determine the derivative of 'T' in the direction of vector $(3\vec{i} - 4\vec{k})$ at point (1, 1, 2). **[5]**

Q3) Attempt any <u>two</u> of the following:

a) Obtain the quardratic equation in 'z' if its roots are $(2 \pm \sqrt{3}\,i)$. **[5]**

b) Show that the vectors

$$\vec{A} = 3\vec{i} - 2\vec{j} + \vec{k},\ \vec{B} = \vec{i} - 3\vec{j} + 5\vec{k} \text{ and } \vec{C} = 2\vec{i} + \vec{j} - 4\vec{k}$$

form a right angled triangle. **[5]**

c) Using total differentiation, find the approximate value of

$$\sqrt{(4.99)^2 + (12.02)^2}.$$ **[5]**

Q4) Attempt 'a' or 'b'.

A) a) i) If $Z = \dfrac{1+\sqrt{3}\,i}{2}$, evaluate Z^3. **[4]**

ii) If $\vec{F} = 3xy\vec{i} - y^2\vec{j}$ evaluate $\int_C \vec{F}\ d\vec{r}$, where 'C' is the curve $y = x^2$ in XY plane from (0, 0) to (2, 1). **[4]**

b) i) Explain how will you determine that the point x = 0 is an irregular singular point of the given linear, second order, homogeneous differential equation. **[4]**

ii) Show that the equation:

$dF = (y^2 - y + 2xy)\, dx + (x^2 - x + 2xy)\, dy$ is an exact differential. Hence determine 'F'. **[4]**

B) Attempt any one of the following:

i) If $\vec{A} = x^2 z\vec{i} + xy^2 z\vec{j} - 3yz^2\vec{k}$, determine curl of $\vec{A}$ at the point (1, 1, 1). **[2]**

ii) Determine the value of $(1 + i)^8 + (1 - i)^8$. **[2]**

Total No. of Questions : 4] **[Total No. of Pages : 3**

P261

[3717] - 104

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

PHYSICS

PH - 212 : Electronics

(Paper - II) (New)

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 calculators and log-tables are allowed.***
4) ***Neat diagrams must be drawn wherever necessary.***
5) ***Symbols have their usual meanings.***

Q1) Attempt all of the following:

a) Define capacitance of conductor. Give its unit. **[1]**

b) State maximum power transfer theorem. **[1]**

c) Define current amplification factors α and β of transistor. **[1]**

d) In a common - emitter configuration of transistor, the change in collector current is 2.5 mA for change in base current of 10μ A. Find β. **[1]**

e) Find the resistance of a aluminium wire 100 m long and having a cross sectional area of 1.04 mm^2 if its resistivity is $2.7 \times 10^{-8} \Omega$ - m. **[1]**

f) Draw pin diagram of IC - 741. **[1]**

g) Calculate the gain of an inverting amplifier. The value of input resistance is $11k\Omega$ and that of feedback resistor is $110k\Omega$. **[1]**

h) State different types of rectifiers. **[1]**

i) If the d.c. output voltage is 330V with no load attached to power supply but decreases to 240V at full load. Find the percentage voltage regulation. **[1]**

j) Convert binary number $(11101)_2$ to decimal number. **[1]**

P.T.O.

Q2) Attempt any <u>two</u> of the following:

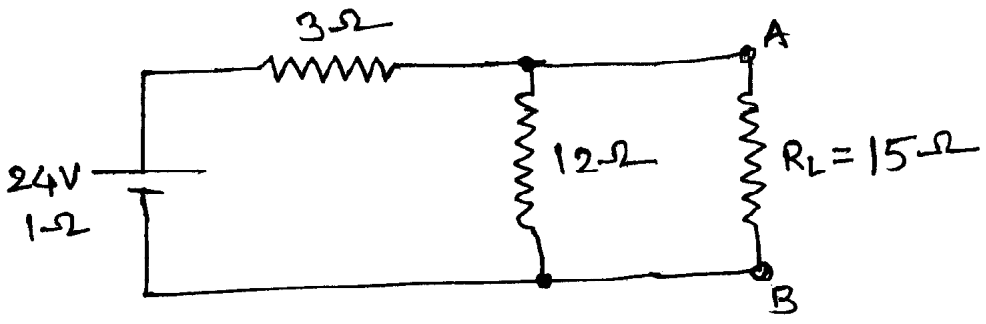
a) What is UJT? Draw the equivalent circuit and explain the working. **[5]**

b) Explain input and output characteristics of common - emitter configuration of a transistor. **[5]**

c) Explain with circuit diagram Op-Amp as an adder. **[5]**

Q3) Attempt any <u>two</u> of the following:

a) Using Thevenin's theorem, determine the current flowing through load resistor 'R_L' of the network given below. **[5]**



b) In a negative feedback amplifier, gain without feedback is A = 50, B = 0.08 and input V_i = 50 mV. **[5]**

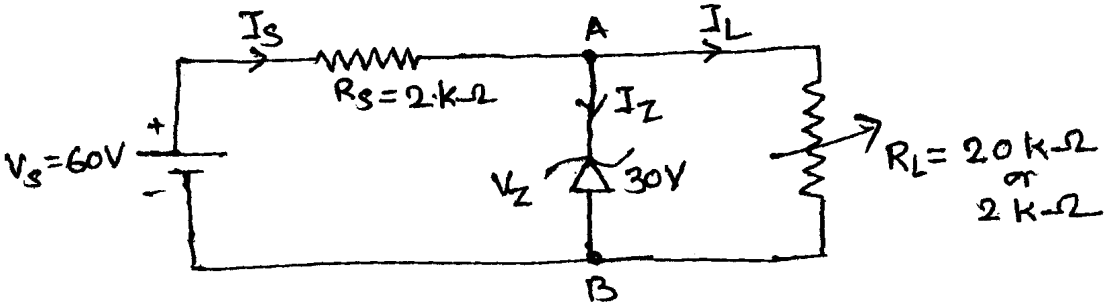
Find i) Gain with feed back

ii) Output voltage.

iii) Feedback factor.

iv) Feedback voltage.

c) Using Zener diode, find the current flowing through diode of following circuit, when the load resistance is (i) 20kΩ and (ii) 2kΩ. **[5]**



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

i) 1) Explain transistor as a switch. **[4]**

2) State and verify De - Morgan's first theorem. Draw the necessary logic diagram. **[4]**

ii) 1) Explain different parameters of Op - Amp. **[4]**

2) Explain AND and OR gate with symbol and truthtable. **[4]**

b) Attempt any one of the following:

i) Explain colour code method to find resistance of resistor. **[2]**

ii) Explain series voltage divider circuit. **[2]**

Total No. of Questions : 4] **[Total No. of Pages : 2**

P261 **[3717] - 104**

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

PHYSICS

PH - 212 : Instrumentation

(Paper - II) (New Course)

Time : 2 Hours] ***[Max. Marks : 40***

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Use of calculator and log-table are allowed.***

Q1) Attempt all of the following:

a) Define sensitivity of an instrument. **[1]**

b) What do you mean by electromechanical transducer? **[1]**

c) Explain the working principle of resistive transducer. **[1]**

d) Define absolute humidity. **[1]**

e) Define Hysteresis. **[1]**

f) State any two characteristics of transducer element. **[1]**

g) What do you mean by instrument error? **[1]**

h) What is diamagnetic substance? **[1]**

i) Define atmospheric pressure. **[1]**

j) The magnetic induction and magnetising field in a sample of magnetic material are 1 Wb/m^2 and 2 x 10^3 A/m respectively. Find magnetic permeability. **[1]**

Q2) Attempt any two of the following:

a) Explain the basic functional elements of typical measurement system with block diagram. **[5]**

b) What do you mean by cantilever beam? Explain how it is used for the measurement of force. **[5]**

c) Describe the pyranometer for measurement of global radiation. **[5]**

P.T.O.

Q3) Attempt any two of the following:

a) A magnet weighs 75 gm and its magnetic moment is 4×10^{-4} Am^2. If the density of the material of the magnet is 7.5×10^3 kg m^{-3}, calculate the intensity of magnetisation. **[5]**

b) When input voltage of an instrument changes from 5V to 10V, the corresponding output voltage changes from 60V to 90V. What will be the sensitivity of the instrument. **[5]**

c) Water flowing in a horizontal pipe has a speed 20 cm/s at one end point and 15 cm/s at another point. Determine the pressure drop between two points. **[5]**

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

i) 1) Explain different types of errors in measurement. **[4]**

2) Write short note on 'Pitot tube'. **[4]**

ii) 1) With neat diagram explain the working of LVDT. **[4]**

2) Explain the principle and use of Ringelmann chart for smoke density measurement. **[4]**

b) Attempt any one of the following:

i) Describe in brief 'Drift'. **[2]**

ii) A Pitot tube is fixed in water pipeline, a difference of pressure indicated by the gauge is 5 cm of water column. Calculate velocity of liquid through the pipe. Given density of water g - 1 gm / cm^3. **[2]**

Total No. of Questions : 4] **[Total No. of Pages : 2**

P262 **[3717] - 105**

S.Y. B.Sc.

CHEMISTRY

CH - 211 : Physical Chemistry (New)

(Sem. - I) (21311) (Theory)

Time : 2 Hours] ***[Max. Marks : 40***

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Use of logarithmic table and calculator is allowed.***
4) ***Neat diagrams must be drawn wherever necessary.***

Q1) Answer the following: **[10]**

a) State the third law of thermodynamics.

b) Give the equation to calculate amount of substance extracted.

c) Define the term molar heat of vaporisation.

d) State Le - Chatlier - Braun principle.

e) State Raoult's law of partial vapour pressure.

f) What is the Van't Hoff's factor?

g) Draw a labelled diagram of apparatus used in Landsberger's method.

h) Define the term isotonic solutions.

i) Give applications of Henry's law.

j) Define vapour pressure of a liquid.

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

i) Derive the expression for entropy change on mixing of ideal gases.

ii) What are K_C and K_P? Derive the relation between them.

iii) Describe the construction and working of modern osmometer.

b) Solve any one of the following: **[4]**

i) At 372.6K and 376.6K the vapour pressure of water are 0.982 atm and 1.018 atm respectively. What is the heat of vapourization of water.

[R = 8.314 J $mole^{-1}$ k^{-1}].

P.T.O.

ii) Acetic acid was shaken with water and ether following concentration in moles per liter were found in two solutions.

Conc. in ether	0.03	0.08	0.15	0.27
Conc. in water	0.45	0.86	1.21	1.51

Comment on the molecular condition of acetic acid in both solvents.

Q3) a) Attempt any two of the following: **[6]**

i) Explain the positive and negative deviations of a binary liquid system.

ii) Derive Nernst distribution law on the basis of thermodynamics.

iii) Derive the relation $\pi = CRT$

b) Solve any one of the following: **[4]**

i) Calculate the solubility of CO_2 in water at 25ºC at a partial pressure of CO_2 over the solution of 160mm of Hg.

(Given. Henry's law constant K (CO_2) = 1.25×10^6 mm Hg).

ii) 18.2gm of urea is dissolved in 100gm of water at 50ºC. The lowering of vapour pressure produced is 5mm Hg. Calculate molecular weight of Urea. The vapour pressure of water at 50ºC is 92mm Hg.

Q4) a) Attempt any one of the following:

i) Define Helmholtz free energy and Gibbs free energy. Derive the equation $DG = 2.303\ nRT \log_{10} {}^{P_2}/_{P_1}$. **[6]**

OR

Show that depression of freezing point of solution is a colligative property.

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

i) Explain the mutual solubility temperature behaviour of triethylamine - water and nicotine - water systems with suitable diagrams.

ii) State and explain the properties of change in Gibb's free energy.

Total No. of Questions : 4] **[Total No. of Pages : 2**

P263 **[3717] - 106**

S.Y. B.Sc.

CHEMISTRY

CH - 212 : Organic Chemistry

(Paper - II) (Sem. - I) (21321) (New Revised Syllabus)

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 structures and diagrams if necessary.***

Q1) Answer the following : **[10]**

a) Define meso compound.

b) How will you prepare oxime from acetaldehyde?

c) Give preparation of benzoic acid from toluene.

d) Give any one method of preparation of aniline.

e) Give use of biochemistry in Agriculture.

f) What is action of acetic anhydride in presence of $ZnCl_2$ on Glucose?

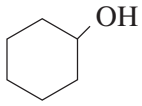
g) Draw structure of Ls-Proline.

h) Give classification of lipids.

i) Pyrrole is very weak base, explain.

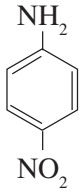
j) Draw structure of sugare present in DNA.

Q2) a) Assign the structures to (A) and (B) in the following reactions : (any three) **[6]**

i) 

$\xrightarrow[H_2SO_4]{K_2Cr_2O_7}$ (A) $\xrightarrow{NH_2OH}$ (B)

ii) $CH_3 - COOH \xrightarrow{PCl_5}$ (A) $\xrightarrow{NH_3}$ (B)

iii) 

$\xrightarrow{NaNO_2/HCl}$ (A) $\xrightarrow{H_2O/H^+}$ (B)

P.T.O.

iv) $2CH_3–CHO \xrightarrow{10\%\,NaOH} (A) \xrightarrow{\Delta} (B)$

v) $CH_3 – CH_2 – \overset{\overset{O}{||}}{C} – H \xrightarrow{NH_3} (A) \xrightarrow{H_2/Ni} (B)$

b) How will you bring about the following conversions? **[4]**

i) Nitrobenzene into phenol.

ii) Acetaldehyde into 2–propanol.

iii) Methyl bromide into acetamide.

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

a) Give Haworth synthesis of Naphthalene. What is action of the following reagents on furan?

i) SO_3 / pyridine.

ii) H_2/Ni, 200 - 250°C.

iii) $CHCl_3$ / KOH.

b) What are monosaccharides? Explain formation of ring in D-glucose and add a note on mutarotation in D-glucose.

c) What are lipids? Give any three functions of lipids. Write structure of β-Carotene.

Q4) a) Attempt any two of the following : **[6]**

i) What are enzymes? Discuss the classification of enzymes with suitable examples.

ii) How is acetophenone prepared from benzene? Give action of the following reagents on acetone.

1) HCN.

2) NH_2–NH–Ph.

iii) What are proteins? Give classification of proteins with one example each.

b) What is angle strain? Explain it's effect on stability of cycloalkanes.**[4]**

OR

Give important features of Watson-crick model of DNA and state it's importance.

Total No. of Questions : 4] **[Total No. of Pages : 2**

P264 [3717] - 107

S.Y. B.Sc.

BOTANY

BO - 211 : Fundamentals of Plant Systematics and Plant Ecology

(Paper - I) (Sem. - I) (New Course) (51411)

Time : 2 Hours] ***[Max. Marks : 40***

Instructions to the candidates :

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

Q1) Attempt the following: **[10]**

a) Enlist two objectives of taxonomy.

b) Give an example of natural system of classification.

c) Enlist two chemical constituents used in plant systematics.

d) State different phases of taxonomy.

e) What is nomena conservanda?

f) Define autecology.

g) What is food web?

h) Enlist different plant groups based on ecological adaptations.

i) State biotic components of ecosystem.

j) Enlist different stages of succession on rock.

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

a) Give broad outline of Bentham and Hookers system of classification.

b) Describe any three stages of succession in hydrosere.

c) Explain the pyramid of number.

P.T.O.

Q3) Write short notes on ANY TWO of the following: **[10]**

a) Binomial nomenclature.

b) Morphology as data source for systematics.

c) Adaptive features in mesophytes.

Q4) Give distinguishing characters, floral diagram and floral formula of family Rubiaceae and Euphorbiaceae. **[10]**

OR

Discuss the energy flow in an ecosystem.

Total No. of Questions : 4] **[Total No. of Pages : 2**

P265 [3717] - 108

S.Y. B.Sc.

BOTANY (New Course)

BO - 212 : Fundamentals of Plant Physiology

(Paper - II) (Sem. - I) (51421)

Time : 2 Hours] ***[Max. Marks : 40***

Instructions to the candidates :

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

Q1) Attempt the following: **[10]**

a) Give any two applications of plant physiology.

b) Define buffer.

c) What is Clay soil?

d) Define root pressure.

e) What is guttation?

f) Define major elements.

g) State the region of root involved in salt absorption.

h) Define short Day plants.

i) Give the importance of Gibberellins in parthenocarpy.

j) What is grand period of growth?

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

a) What is diffusion? Give the importance of diffusion in plants.

b) Water ‘The Elixir of Life’. Explain.

c) Explain ‘Transpiration Pull’ theory of ascent of sap.

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

a) Role of phosphorus in plants.

b) Practical applications of auxins.

c) Long Day Plants.

Q4) Describe the structure of stomata. Explain the mechanism of opening and closing of stomata with the help of $K^{\pm}$ pump hypothesis. **[10]**

OR

Define growth. Explain the phases of growth. Add a note on measurement of growth.

Total No. of Questions : 4] **[Total No. of Pages : 2**

P266 [3717] - 109

S.Y. B.Sc.

ZOOLOGY

ZY - 211 : General Zoology and Biological Techniques - I

(Paper - I) (Semester - I) (2008 Pattern) (New Course)

Time : 2 Hours] ***[Max. Marks : 40***

Instructions to the candidates :

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

Q1) Attempt the following: **[10]**

a) Name any one organism showing ciliary movement.

b) What is sinistral shell?

c) Mention any two theories of developmental biology.

d) Define - homolecithal egg.

e) Enlist any two types of blastulae.

f) Mention any two advantages of test tube baby.

g) Mention any two types of centrifuges.

h) Define the term - colorimetry.

i) What is the use of sphygmomanometer.

j) Define - pH.

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

a) Any five types of metamerism.

b) Wet sterilization.

c) Gel filtration chromatography.

P.T.O.

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

a) Describe chewing and lapping type of mouthparts.

b) Explain harmful Protista.

c) Sketch and label - Electrode system for pH measurement.

Q4) Describe the water vascular system of starfish. **[10]**

OR

What is fertilization? Describe the process of fertilization. Add a note on its significance.

Total No. of Questions : 4] **[Total No. of Pages : 2**

P267 [3717] - 110

S.Y. B.Sc.

ZOOLOGY (New Course)

ZY - 212 : Applied Zoology - I

(Paper - II) (Semester - I) (2008 Pattern)

Time : 2 Hours] ***[Max. Marks : 40***

Instructions to the candidates :

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

Q1) Attempt the following: **[10]**

a) Define marine fisheries.

b) Write the biological name of jowar stem borer.

c) Write the meaning of craft.

d) Write the biological name of mrigal.

e) Enlist names of any two non-insect pest.

f) Mention habit and habitat of Labeo rohita.

g) Define pheromone.

h) Define contact poison.

i) What is the use of fish glue.

j) Write the full form of IPM.

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

a) Gill net.

b) Physical measures of pest control.

c) Knapsack sprayer.

P.T.O.

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

a) Explain culture method for Catla Catla.

b) Write in brief nature of damage and control measures of Batocera rubus.

c) Explain fish liver oil and fish glue.

Q4) What is gears? Describe different types of gears used in Indian fishery? **[10]**

OR

Describe marks of identification, nature of damage and control measures of rice Weevil. (Sitophilus Oryzae).

Total No. of Questions : 4] **[Total No. of Pages : 2**

P268 **[3717] - 111**

S.Y. B.Sc.

GEOLOGY

GL - 211 : Mineralogy

(New Course) (Sem. - 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 two or three lines : **[10]**

a) Define hemimorphic form.

b) State the gem varieties of beryl.

c) What is crystalline mineral?

d) Define oblique extinction.

e) Name two polymorphs of orthoclase.

f) What is Diploid?

g) Define Isotropism.

h) State the silicate structure of olivine minerals.

i) Define repeated twinning.

j) What is the extinction of Hornblende in transverse sections?

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

a) Physical properties of gemstones.

b) Newton's scale of Interference colours.

c) Chemical composition and structure of chlorite minerals.

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

a) Structure and paragenesis of amphibole minerals.

b) Twin-plane, twin-axis and composition plane giving suitable examples.

c) Physical and optical properties of mica group of minerals.

Q4) Describe the silicate structure, chemical composition, physical and optical properties and paragenesis of 'Pyroxene' group of minerals. **[10]**

OR

Give the crystallographic axes, elements of symmetry and forms with Indices of Hexagonal system type calcite and Quartz.

Total No. of Questions : 4] **[Total No. of Pages : 3**

P270 [3717] - 113

S.Y. B.Sc.

STATISTICS

ST - 211 : Discrete Probability Distributions and Time Series

(Sem. - I) (Paper - I) (New Course)

Time : 2 Hours] ***[Max. Marks : 40***

Instructions to the candidates :

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

i) if the probability mass function (p.m.f.) of a discrete random variable (r.v.) is

$$p(x) = k\left(\frac{1}{4}\right)^x, \quad x = 1, 2, 3, \ldots\ldots$$

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

then the value of k is

A) $\frac{3}{4}$ B) $\frac{4}{3}$

C) 3 D) $\frac{1}{3}$

ii) If X is a Poisson r.v. with variance 2 then fourth central moment of X is

A) 2 B) 6 C) 12 D) 14

iii) If X $\rightarrow$ NB (k, p) such that E(X) = 16 and Var (X) = 80 then

A) $k = 4, p = \frac{1}{5}$ B) $k = 4, p = \frac{4}{5}$

C) $k = 8, p = \frac{1}{3}$ D) $k = 8, p = \frac{2}{3}$

P.T.O.

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

i) Median of discrete probability distribution may not be unique.

ii) If X and Y are independent and identically distributed (i.i.d.) geometric random variables then X + Y is a geometric random variable.

iii) Irregular variations are predictable in the analysis of time series.

c) State range set of r.v.X denoting number of α - particles emitted in the specified interval of time. **[1]**

d) Define $(r, s)^{th}$ raw moment of bivariate discrete r.v. (X, Y) where r and s are non - negative integers. **[1]**

e) If $M_X(t) = e^{3.2\,(e^t - 1)}$ is moment generating function (m.g.f.) of r.v.X then state the modal value of X. **[1]**

f) Explain the term 'calling population' used in queuing theory. **[1]**

Q2) Attempt any <u>two</u> of the following: **[5 Each]**

a) Define the following terms:

i) A discrete r.v.X defined on countably infinite sample space.

ii) Probability distribution of a discrete r.v.X.

iii) Mathematical expectation of a discrete r.v.X.

b) The joint p.m.f. of bivariate discrete r.v. (X, Y) is

$$p(x, y) = q^2 \quad p^{y-2} \quad , \quad x = 1, 2, \ldots\ldots, y-1$$

$$y = 2, 3, 4, \ldots\ldots$$

$$0 < p < 1, q = 1 - p$$

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

Find (i) conditional distribution of X given Y = y and (ii) E(X | Y = y).

c) Let X and Y be independent Poisson random variables with means 2 and 4 respectively. Find (i) P(X + Y = 4) and (ii) P(Y = 3 | X + Y = 6).

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

a) Let X be a discrete r.v. with p.m.f.

$$p(x) = q^x \quad p \qquad , \qquad x = 0, 1, 2, \ldots\ldots\ldots$$

$$0 < p < 1, q = 1 - p$$

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

Find mean and variance of X.

b) If X $\rightarrow$ P(m) then show that, for a positive integer K,

$$P(X > K) < \frac{m^k}{k!}.$$

c) A departmental store operates with a single cashier. Customers arrive at a rate of 20 per hour. Average number of customers processed by the cashier is 24 per hour. Assuming Poisson process, find

i) the probability that cashier is idle,

ii) the average number of customers in the queuing system,

iii) the average time a customer spends in the system.

Q4) Attempt any <u>one</u> of the following:

a) i) Describe the method of ratio of moving averages for computing seasonal indices. Discuss its merits and demerits. **[6]**

ii) With usual notation, show that

A) $M_{ax+b}(t) = e^{bt} M_X(at)$,

B) $M_{X+Y}(t) = M_X(t) \quad M_Y(t)$ where X and Y are independent random variables. **[4]**

b) i) Explain the fitting of autoregression models AR (1) and AR (2) to the time series data. **[5]**

ii) A scientist inoculates mice, one at a time, with a disease germ until he finds 2 mice that have contracted the disease. If the probability of contracting the disease is $\frac{1}{6}$, what is the probability that at the most 4 mice are required to be inoculated? **[5]**

Total No. of Questions : 4] **[Total No. of Pages : 2**

P274 **[3717] - 117**

S.Y. B.Sc.

MICROBIOLOGY

MB - 211 : Microbial Physiology

(Paper - I) (Sem. - I) (New Course)

Time : 2 Hours] ***[Max. Marks : 40***

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***All questions carry equal marks.***
3) ***Draw neat labelled diagrams wherever necessary.***

Q1) Answer the following :

a) Enlist any two applications of ultracentrifugation.

b) State principle of mol.exclusion chromatography.

c) Define Beer and Lambert's law.

d) Write units used to measure radioactivity.

e) Define fermentation.

f) Write net gain of ATP molecule when one molecule of glucose is completly oxidised in to CO_2 & H_2O.

g) Write biochemical reaction of conversion of pyruvate to Lactate.

h) Enlist diff. classes of enzymes as per IUB.

i) Which of the following is a cofactor of enzyme

   i) Fe^{++} ions

   ii) FAD & NAD

   iii) ATP

   iv) Pyruvate.

j) $x + y + \text{ATP} \rightleftharpoons xy + \text{ADP} + \text{Pi}$

   The above reaction is catalysed by ..... class

   i) Transferases.

   ii) Lyases.

   iii) Ligases.

   iv) Isomerases.

Q2) Attempt any two of the following :

a) Write principle and working of Warburg's respirometer.

b) Describe effect of p^H on enzyme activity.

c) Describe E.D. path way with chemical structure.

Q3) Explain any two of the following :

a) Ion-exchange chromatography.

b) Lock and key hypothesis.

c) Substrate level phosphorylation.

Q4) Explain HMP path-way with chemical structures and significance.

OR

Describe :

a) Polyacrylamide gel electrophoresis.

b) Enzyme specificity.

✦✦✦✦

Total No. of Questions : 4] [Total No. of Pages : 2

P275 **[3717] - 118**

S.Y. B.Sc.

MICROBIOLOGY

MB - 212 : Microbial Genetics

(Paper - II) (Sem. - I) (New Course)

Time : 2 Hours] *[Max. Marks : 40*

Instructions to the candidates :

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

Q1) Attempt the following (All subquestions are compulsory) : **[10]**

a) Draw the structure of thymine.

b) What is the conservative mode of DNA replication?

c) Write two examples of alkylating agents.

d) What are transversion mutations?

e) Define transcription.

f) What is initiation codon?

g) Define 'Okazaki fragments'.

h) Intercalating agents cause _____

i) Frameshift mutations.

ii) Nonsense mutations.

iii) Mis-sense mutations.

i) Write the function of DNA gyrases in supercoiling of DNA.

j) _____ causes formation of pyrimidine dimers

i) Ionising radiations.

ii) Non ionising radiations.

iii) Base analogues.

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

a) Write the properties of genetic code.

b) Explain J Cairn's experiment to prove DNA as genetic material.

c) Schematically represent semiconservative, conservative and dispersive mode of DNA replication.

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

a) Comment on the replica plate technique.

b) Explain mutagenic action of pyrimidine base analogue.

c) Comment on supercoiling of DNA.

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

a) Write the comparative account of different forms of DNA.

b) Define mutation. Enlist different types of mutations. Comment on Frameshift mutations.

✦✦✦✦

Total No. of Questions : 4] **[Total No. of Pages : 3**

P279 **[3717] - 122**

S.Y. B.Sc.

STATISTICS

STT - 212 : Statistical Techniques - II

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

Time : 2 Hours] ***[Max. Marks : 40***

Instructions to the candidates :

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

i) In sampling with proportions under SRSWOR, the standard error of estimator of population proportion is given by

A) $\sqrt{\frac{N-n}{Nn}S^2}$ B) $\sqrt{\frac{N-n}{(N-1)}\frac{PQ}{n}}$

C) $\sqrt{\frac{PQ}{n}}$ D) $\sqrt{\frac{S^2}{n}}$

ii) In stratified random sampling with optimum allocation, the size of ith stratum sample is given by

A) $n_i = n \; W_i S_i$ B) $n_i = n \; W_i$

C) $n_i = n \; W_i S_i^2$ D) $n_i = n \frac{W_i S_i}{\sum_{i=1}^{k} W_i S_i}$

where $W_i = \frac{N_i}{N}$

iii) In double sampling plan, the decision of accepting or rejecting a lot can not be taken based on first sample if number of defectives in the first sample (d_1) is

A) $d_1 > c_2$ B) $d_1 \le c_1$

C) $d_1 > O$ D) $c_1 + 1 \le d_1 \le c_2$

P.T.O.

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

i) The number of simple random samples of size 3 that can be drawn from a population consisting of 6 units by SRSWR is 6^3.

ii) In, sampling with proportions under SRSWOR, the estimator of population proportion is sample proportion (p).

iii) In single sampling plan, probability of acceptance of lot (p_a) increases with the increase in the value lot quality p.

c) Define ATI for single sampling plan. **[1]**

d) State the estimator of population total under SRSWR. **[1]**

e) What is the role of acceptance number C in single sampling plan? **[1]**

f) In stratified random sampling under proportional allocations determine n_1 & n_2 if $N_1 = 2500$, $N_2 = 1500$ and $n = 200$. **[1]**

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

a) Explain the term 'sampling for proportion'. Give one real life situation suitable for it. State estimator of population proportion and standard error of it under SRSWR.

b) Given the following information, obtain the estimate of population mean under stratification and the estimate of standard error of this estimator.

Stratum (i)	N_i	n_i	$\bar{x}_{n_i}$	s_i (sample s.d.)
1	500	40	15	5
2	300	35	12	6
3	200	25	10	5

c) Explain the terms:

i) AQL. ii) LTPD.

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

a) Explain stratified random sampling method. Give a real life situation where this method is applicable.

b) In SRSWOR, prove that probability of a specified unit being selected in a sample at any given draw is equal to the probability that it is selected at the first draw.

c) For a double sampling plan,

$$\{ N = 1000, n_1 = 50, n_2 = 100, c_1 = 0, c_2 = 1\}$$

find the probability of rejecting the lot of quality $p = 0.01$.

Q4) Attempt <u>any</u> <u>one</u> of the following:

a) i) Explain the working of a double sampling plan. State the expression for AOQ for the double sampling plan. **[6]**

ii) Write down all possible samples of size 2 from population {1, 1, 2, 4, 6} by SRSWOR and verify whether sample mean is unbiased estimator of population mean. **[4]**

b) i) Draw an OC - curve for the single sampling plan {N = 1000, $n = 50$, $c = 0$} taking lot quality $p = 0.01, 0.05, 0.1, 0.2$ and 0.5. **[6]**

ii) Explain the terms:

1) Producer's risk.

2) Consumer's risk. **[4]**

Total No. of Questions : 4] **[Total No. of Pages : 2**

P280 **[3717] - 123**

S.Y. B.Sc.

ELECTRONIC SCIENCE

EL - 211 : Analog Circuits and Systems - I (New)

(Semester - I) (Paper - I) (22211)

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 indicates full marks.***
4) ***Use of non-programmable calculator is allowed.***

Q1) Attempt all of the following:

a) Express power gain in decibels. **[1]**

b) Define the slew rate of an OP - AMP. **[1]**

c) What is harmonic distortion? **[1]**

d) Define the term CMRR. **[1]**

e) Mostly transformer coupling is preferred in large signal amplifiers - comment. **[2]**

f) The effect of distortion can be minimized with the use of negative feedback - comment. **[2]**

g) The OP - AMP is used in inverting mode and non - inverting mode with $R_1 = 1\ K\Omega$ and $R_f = 100\ K\Omega$, $\mathbf{V}_{in} = 10$ mV and $\mathbf{V}_{CC} = \pm\ 12$V. Find $\mathbf{V}_0$ in each case. **[2]**

h) A power transistor dissipates 4W. If the junction temperature T_{jmax} is 100ºC and the thermal resistance θ = 5ºc/W. Calculate the maximum ambient temperature at which it can be operated. **[2]**

Q2) Attempt any TWO of the following: **[2 x 4 = 8]**

a) State the design steps involved in a single stage class - A amplifier circuit.

b) Draw a circuit diagram of differential amplifier with constant current source. Explain its need and significance.

c) Explain with block diagram voltage series feedback and shunt feedback.

P.T.O.

Q3) Attempt any TWO of the following: **[2 x 4 = 8]**

a) Draw the circuit diagram of class - B push - pull amplifier. Show that efficiency of class - B amplifier is 78.5%.

b) Explain the working of the integration amplifier. Sketch the input and output waveforms.

c) What is the effect of negative feedback on the gain of an amplifier? Show that the closed loop gain A_f is given by $A_f = \frac{A}{(1 + A\beta)}$, where A is open loop gain of the amplifier, β is feedback fraction.

Q4) Attempt all of the following:

a) Draw the circuit diagram of a two stage RC coupled amplifier. Write an expression for the voltage gain due to two stages in it. Comment on the gain of the amplifier in decibel and voltage gain in volts. **[6]**

b) Discuss the features of commercially available power amplifier TDA 810 or TDA 2020, in audio frequency use. **[6]**

OR

Attempt all of the following:

a) Design first order low pass Butterworth filter for cutoff frequency 10KHz, select suitable value of C. **[4]**

b) Draw DC load line for a CE amplifier using V_{CC} = + 10 volts, $R_1 = 10K\Omega$, $R_2 = 5K\Omega$, $R_C = 800\Omega$ and $R_E = 100\Omega$. **[4]**

c) Calculate the gain of an amplifier with negative feedback with feedback fraction β = 0.05 and open loop gain of 50. **[4]**

Total No. of Questions : 4] **[Total No. of Pages : 2**

P281 [3717] - 124

S.Y. B.Sc.

ELECTRONIC SCIENCE

EL - 212 : Electronic Instrumentation

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

Time : 2 Hours] ***[Max. Marks : 40***

Instructions to the candidates :

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

Q1) Attempt all of the following:

a) State the unit of Lux. **[1]**

b) Define accuracy of a measuring instrument. **[1]**

c) Distinguish between fundamental and derive units. **[1]**

d) What will be vms value if amplitude of a sine wave is 1 volt. **[1]**

e) The expected value of current through a 100Ω resistor is 80 mA. The meter reads 78 mA. Calculate absolute and percentage error. **[2]**

f) A moving coil voltmeter has a linear scale with 100 divisions. The fuel scale reading is 10 volt. Determine the resolution. **[2]**

g) "Input resistance of voltmeter should be very low". Comment. **[2]**

h) "Battery is the key factor in UPS" - Comment. **[2]**

Q2) Attempt any two of the following:

a) Explain with the neat diagram the working of true rms meter. **[4]**

b) Explain the sensor action of LDR in the detection of light in Lux-meter. **[4]**

c) What is meant by 'regulation' in power supply. State the expression for percent load Regulation. **[4]**

P.T.O.

Q3) Attempt any two of the following:

a) How D' Arsonvol movement is converted into multirange ammeter. **[4]**

b) Draw the circuit diagram of unregulated power supply and explain the working of each block. **[4]**

c) Explain the working of Inductive pick-up tachometer. **[4]**

Q4) Attempt any two of the following:

a) With the help of block diagram explain the working of DC to DC converter. **[6]**

b) Draw neat labeled diagram of dual beam CRO. **[6]**

c) i) How oscilloscope is used to measure phases.

ii) How square wave is obtained in function generator. **[6]**

OR

Attempt all of the following:

a) Design 0 - 10V range voltmeter with D' Arsonvol movement. Full scale deflection is 50μA and interval resistance of a coil is 500Ω. Find the value of series resistance. Draw the diagram. **[4]**

b) For a signal generator 30 volt is output resistance value and 3 volt is in range value. Find the attenuation in dB. **[4]**

c) i) For the CRO vertical amplifier control is set of 10mV/dR and peak to peak display is at 4 dB. Find the peak voltage of the signal. **[2]**

ii) For a microvoltmeter the deflection is 10 division for 10 mV input. Find the sensitivity of its. **[2]**

Total No. of Questions : 4] [Total No. of Pages : 2

P269

[3717]-112
S.Y B.Sc.
GEOLOGY
GL - 212 : Structural Geology
(Sem.-I) (New Course)

Time : 2 Hours] *[Max. Marks : 40*

Instructions to the candidates:

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

Q1) Answer the following questions in two or three lines : **[10]**

a) Define width of outcrop.

b) Define couple.

c) Define 'Hade' of a fault.

d) What are Diastem?

e) Define Rake of a linear feature.

f) Define overturned fold.

g) Give any two methods of representation of folds.

h) What are inliers.

i) Define 'Salient' and 'Recess'.

j) Define Peripheral fault.

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

a) Symmetrical and Asymmetrical fold.

b) Classification of fault based on the attitude of the fault and affected beds.

c) Determination of top of bed with help of cross bedding.

P.T.O.

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

a) Geometric classification of joints.

b) Rotational and translational movement along fault.

c) Angular unconformity.

Q4) Define 'Slip'. Describe different types of slip along fault. **[10]**

OR

Define a fold. Describe the recognition of folds by plotting attitude of beds on map.

Total No. of Questions : 4] [Total No. of Pages : 4

P271

[3717]-114
S.Y B.Sc.
STATISTICS
ST - 212 : Continuous Probability Distributions - I
(Sem.-I) (Paper - II) (New Course)

Time : 2 Hours] *[Max. Marks : 40*

Instructions to the candidates:

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

Q1) Attempt each of the following :

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

i) If X is continuous random variable (r.v.) taking positive values then geometric mean (G.M.) is given by

A) Antilog [E(X)] B) Antilog $\left\{E\left[\log\left(\frac{1}{X}\right)\right]\right\}$

C) Antilog {E [log (X)]} D) Antilog {E [x.log (X)]}

ii) If X and Y are independent random variables then the conditional probability density function (p.d.f.) of Y given X = x is

A) Marginal p.d.f. of X.

B) Marginal p.d.f. of Y.

C) Ratio of joint p.d.f. of X and Y to marginal p.d.f. of Y.

D) Ratio of marginal p.d.f. of X to marginal p.d.f. of Y.

iii) If $M_x(t) = (1 - 2t)^{-8}$, $t < \frac{1}{2}$ then the probability distribution of X is

A) G (2, 8) B) G (8, 2) C) $G\left(8, \frac{1}{2}\right)$ D) $G\left(\frac{1}{2}, 8\right)$

P.T.O.

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

i) For continuous r.v. X with p.d.f. $f(x)$ and c.d.f. $f(x)$, $p(a \le X \le b) = f(b) - f(a)$.

ii) The points on the normal probability plot lying almost along straight line indicates that observations are from N (μ, σ^2) distribution.

iii) If X and Y are independent random variables then moment generating function (m.g.f.) of (2X + 6Y + 8) is $e^{8t} M_X^{(2t)} M_Y^{(6t)}$.

c) Let X be a continuous r.v. with c.d.f.

$$F(x) = \frac{1}{\pi}\left[\tan^{-1}(x) + \frac{\pi}{2}\right]; -\infty < x < \infty$$ find p.d.f. of X. **[1]**

d) Let X and Y be independent N (4, 4) and N (4, 5) variables respectively. State the mean of $\frac{(X-Y)^2}{9}$. **[1]**

e) If $E(X \mid y) = \frac{y}{2}$ and $E(Y \mid x) = \frac{1+x}{2}$ then find the value of correlation coefficient between X and Y. **[1]**

f) State 'Lack of Memory Property' of exponential distribution. **[1]**

Q2) Attempt <u>any two</u> of the following : **[5 each]**

a) If $X \to P(m)$ then show that as $m \to \infty$, probability distribution of $\frac{X-m}{\sqrt{m}}$ tends to N (0, 1).

b) Let X be a continuous r.v. with p.d.f.

$f(x) = 6x(1-x)$; $0 < x < 1$

$= 0$; otherwise

find : i) harmonic mean ii) mode.

c) The joint p.d.f. of continuous bivariate r.v. (X, Y) is

$f(x, y) = 12xy(1-y)$; $0 < x < 1$, $0 < y < 1$

$= 0$; otherwise

i) Find marginal probability distributions of X and Y.

ii) Verify whether X and Y are independent.

Q3) Attempt <u>any two</u> of the following :

a) i) If X is continuous r.v. with p.d.f. $f(x)$ and c.d.f. $f(x)$ then obtain the probability distribution of $Y = f(x)$. **[3]**

ii) The conditional p.d.f. Y given X is

$$g_2(Y \mid x) = \frac{2(x+y)}{2x+1} \; ; 0 < y < 1$$

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

find conditional mean of Y given X. **[2]**

b) Find mean deviation about mean of Exp (α) distribution. **[5]**

c) The joint p.d.f. of bivariate random variable (X, Y) is

$f(x, y) = k.e^{-(x+y)}$; $x \geq 0, y \geq 0$

$= 0$; otherwise.

find : i) K,

ii) P [X + Y > 1]. **[5]**

Q4) Attempt any one of the following :

a) i) If $X_1, X_2, \ldots, X_n$ are independent identically distributed $N(\mu, \sigma^2)$ variables,

show that

A) $\sum_{i=1}^{n} X_i \rightarrow N(n\mu, n\sigma^2)$,

B) $\overline{X} \rightarrow N\left(\mu, \frac{\sigma^2}{n}\right)$. **[5]**

ii) The p.d.f. of continuous r.v. X is

$$f(x) = \frac{x}{25} \quad ; \quad 0 \leq x \leq 5$$

$$= \frac{1}{25}(10 - x) \quad ; \quad 5 \leq x \leq 10$$

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

find :

A) E (X) B) P ($3 \leq X \leq 8$). **[5]**

b) i) Find mean and variance of G (α, λ) distribution. **[5]**

ii) If mean and variance of U (a, b) r.v. are 1 and 3 respectively then determine the values of a and b. **[3]**

iii) Let X be a continuous r.v. with p.d.f.

$$f(x) = \frac{1}{2\sqrt{2\pi}} e^{-\frac{1}{8}(x-5)^2} \quad ; -\infty < x < \infty$$

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

find P [X > 5]. **[2]**

☒☒☒☒

Total No. of Questions : 4] [Total No. of Pages : 1

P272

[3717]-115
S.Y B.Sc.
GEOGRAPHY
Gg - 211 : Fundamentals of Geography of Resources
(Sem.-I) (Paper - I) (New Pattern - 2008)

Time : 2 Hours] *[Max. Marks : 40*

Instructions to the candidates:

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

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

a) Mention any two examples of renewable resources.
b) Mention any two direct uses of forests.
c) Define the resources.
d) Give two disadvantages of ground water.
e) Give any two bad effects of mining on land resources.
f) Mention any four uses of water.
g) Write any two methods of conservation of land resources.
h) Give two examples of components of human resources.
i) What do you mean by deforestation?
j) What do you mean abiotic resources?

Q2) Write short notes on <u>any two</u> of the following : **[10]**

a) Conservation of forests.
b) Non-renewable abiotic resources.
c) Land degradation due to agriculture.

Q3) Attempt <u>any two</u> of the following : **[10]**

a) Give the classification of resources.
b) Describe the various uses of land resources.
c) Describe the various causes of deforestation.

Q4) Describe the various sources of water.

OR

Define Geography of Resources and give the importance of the study of resources. **[10]**

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Total No. of Questions : 4] [Total No. of Pages : 1

P273

[3717]-116
S.Y B.Sc.
GEOGRAPHY
Gg - 212 : Introduction to Hydrology
(Sem.-I) (Paper - II) (New-2008 Pattern)

Time : 2 Hours] *[Max. Marks : 40*

Instructions to the candidates:

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

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

a) Define ground water.
b) Name the major oceans of the world.
c) Which are the states of water?
d) What are the various sources of water?
e) What is the unit of rainfall measurement?
f) What is the fog?
g) Where is the highest amount of rainfall recorded in world?
h) What is the full form of PMP?
i) What is depression storage?
j) Which state of India receives minimum amount of rainfall?

Q2) Write short notes on <u>any two</u> of the following : **[10]**

a) Measurement of humidity.
b) Gross and net precipitation.
c) Hydrological cycle.

Q3) Answer <u>any two</u> of the following : **[10]**

a) Describe the sources of hydrological data.
b) What is hydrology? Explain its scope.
c) Describe the distribution of water on the earth's surface.

Q4) What are the types of precipitation? Give an account on global distribution of precipitation. **[10]**

OR

Write an explanatory note on importance of hydrology.

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Total No. of Questions : 4] [Total No. of Pages : 1

P276

[3717]-119
S.Y. B.Sc.
PSYCHOLOGY
Psychology of Adjustment
(Sem.-I) (Paper - I) (New Course)

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) Explain two advantages of the scientific approach to understanding behaviour.
b) Who was the originator of the psychoanalytical approach?
c) Which factors are strongly related to overall happiness?
d) Define cohabitation.
e) What is underemployment?
f) Specify the three most widely used occupational interest inventories.
g) Define work.
h) What is the abnormal behaviour?

Q2) Attempt <u>any two</u> of the following in eight or ten sentences : **[8]**

a) Explain the unimportant determinants of subjective well-being.
b) Describe the stages of family life cycle.
c) Explain Super's theory (five stage model) of occupational development.

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

a) Behaviourism : a adjustment approach.
b) Sources of job stress.
c) Schizoid personality disorder.

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

OR

List and describe four types of anxiety disorders.

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Total No. of Questions : 4] [Total No. of Pages : 1

P277

[3717]-120
S.Y. B.Sc.
PSYCHOLOGY
Experimental Psychology
(Sem.-I) (Paper - II) (New Course)

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) What is colour mixing?
b) How the wave length is measured?
c) What is differentiation in thinking?
d) What is the threshold of duality?
e) What is size constancy?
f) How our bodily movement influences motion perception.
g) What is apparent visual movement?
h) What is problem solving?

Q2) Attempt any two of the following in eight to ten sentences : **[8]**

a) Explain the classical conditioning experiment.
b) Explain the binocular cues.
c) Discuss the nature and determination of thinking.

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

a) Light adaptation.
b) Generalization.
c) Thoughts and images.

Q4) Explain conditioning as an instrumental response in detail.

OR

Critically explain the rod and cone vision. **[8]**

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Total No. of Questions : 4] [Total No. of Pages : 2

P278

[3717] - 121
S.Y. B.Sc.
STATISTICAL TECHNIQUES
STT-211 : Statistical Techniques - I
(New Course) (Sem. - 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 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]**

i) The equation of regression plane X_1 on X_2 and X_3 is $2X_1 + 5X_2 + X_3 = 10$. The value of $b_{12.3}$ is :

A) –5/2 B) –1/3

C) –2/5 D) –2

ii) If $X \rightarrow N(10, 4)$ then $p(X < 10)$ is equal to :

A) 0.10 B) 1/2

C) 0 D) 10/4

iii) If $X \rightarrow NB(4, 2/3)$ then variance of X is :

A) 4 B) 8/3

C) 3 D) 1/4

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

i) If $X \rightarrow NB(k, p)$ then mean > variance.

ii) Let $X \rightarrow N(10, 10)$ and $Y \rightarrow N(10, 10)$. If X and Y are independent then $X-Y \rightarrow N(0, 0)$.

iii) $b_{12.3} \times b_{13.2} = r^2_{12.3}$.

c) Define standard normal distribution. **[1]**

d) State lack of memory property of geometric distribution. **[1]**

e) Define partial correlation coefficient $r_{12.3}$. **[1]**

f) Give a real life situation where multinomial distribution can be applied. **[1]**

P.T.O.

Q2) Attempt <u>any two</u> of the following : **[5 Each]**

a) State p.m.f. of geometric distribution with parameter p. State its mean and variance. Also state a real life situation where it can be applied.

b) Define multiple correlation coefficient $R_{1.23}$. Also state its properties.

c) There are 30% of the donors of blood group A. A blood bank needs 6 donors of blood group A. What is the probability that 10th donor will be the 6th one of blood group A.

Q3) Attempt <u>any two</u> of the following : **[5 Each]**

a) Define exponential distribution with mean $\frac{1}{\alpha}$. State its variance and distribution function. Also state its lower quartile.

b) A box contain 5 red, 5 blue and 4 black balls. Four balls are selected at random with replacement. Find the probability that the sample contains one red and at most one blue balls.

c) Let $X \rightarrow N(100, 25)$ and $Y \rightarrow N(200, 16)$. If X and Y are independent r.v.s. find $p(290 < X+Y < 295)$.

Q4) Attempt <u>any one</u> of the following :

a) i) State the equation of regression plane X_2 on X_1 and X_3. Also state the formulae for $b_{21.3}$ and $b_{23.1}$. **[5]**

ii) A fair coin is tossed 400 times. Using normal approximation find the probability of getting number of heads between 190 and 205. **[5]**

b) i) In an examination, 33% students secured marks less than 40 and 45% students secured marks more than 80. Assuming marks secured follows normal distribution. Find mean and variance of the distribution. **[5]**

ii) The probability of successful launching of a rocket is 0.85. Find the probability that fewer than 4 attempts will be required to make a successful launching. **[5]**

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Total No. of Questions : 4] [Total No. of Pages : 2

P282

[3717] - 125

S.Y. B.Sc.

DEFENCE AND STRATEGIC STUDIES

DS. No. 101 : International Relations & Foreign Policy

(2008 Pattern) (New Course) (Sem. - 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) What do you mean by International Society?

b) Define "Foreign Policy".

c) State any two elements of National Power.

d) What do you mean by Power Race?

e) Write the meaning of "Idealist Theory".

f) State any two types of National Interest.

g) Define "National Interest".

h) What do you mean by "Determinants of Foreign Policy".

Q2) Answer in 8 to 10 sentences each (any two) : **[8]**

a) Write in brief subject-matter of International Relations.

b) Explain in brief the utility of "Realist Theory".

c) Highlight on purpose of "National Interests".

P.T.O.

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

a) Population as an Element of National Power.

b) Geography as a Determinant of Foreign Policy.

c) Significance of International Relations in the age of Globalization.

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

a) Critically evaluate the utility of "Idealist Theory" in the present context.

b) Explain any two basic tenets of Indias foreign policy.

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Total No. of Questions : 4] [Total No. of Pages : 2

P283

[3717] - 126

S.Y. B.Sc.

DEFENCE AND STRATEGIC STUDIES

DS-102 : Elements of National Security

(2008 Pattern) (New Course) (Sem. - 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 : **[8 × 2 = 16]**

a) Define state.

b) Explain the meaning of National Security.

c) What do you mean by Non-Strategic threat?

d) Explain the meaning of Economic Sustainability.

e) Define Defence policy.

f) What do you mean by strategic planning?

g) State the meaning of Scientific Research.

h) Explain the meaning of Defence industrialisation.

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

a) Discuss relationship between strategy and security.

b) Explain relationship between Economy and utilitary power.

c) Describe objectives of India's defence planning.

P.T.O.

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

a) Military Diplomacy.

b) Nuclear elements.

c) Technological capability and Research.

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

a) Assess external security threats to India's national security.

b) Write a note on new perspectives on security.

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Total No. of Questions : 4] [Total No. of Pages : 2

P284

[3717] - 127

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

DEFENCE AND STRATEGIC STUDIES

DS-103 : Geopolitics

(2008 Pattern) (New Course)

Time : 2 Hours] *[Max. Marks : 40*

Instructions to the candidates:

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

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

a) State the meaning of geopolitics.

b) Write the long form of E.E.Z.

c) What do you understand by border?

d) State the meaning of "Delimitations of Boundary".

e) Define land locked state.

f) Write the location of Lakshdweep.

g) State the uses of iron for defence preparedness.

h) Write the meaning of Raw Material.

Q2) Answer in 8 to 10 sentences each (any two) : **[8]**

a) Explain the geostrategic importance of Jammu & Kashmir.

b) Write in brief the problems of "Land locked states".

c) Explain in short "Role of Boundaries".

P.T.O.

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

a) Super powers Rivalry in Middle East.

b) Concept of Nation.

c) Difference between Natural Resources & Raw Material.

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

a) Evaluate the geostrategic position & importance of "Siachen Glacier".

b) Explain the various dimension of power as a factor of geopolitics.

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Total No. of Questions : 4] [Total No. of Pages : 2

P285

[3717] - 128
S.Y. B.Sc.
ENVIRONMENTAL SCIENCE
ENV 201 : Ecology & Ecosystem
(New Syllabus) (Paper - I) (Sem. - I)

Time : 2 Hours] *[Max. Marks : 40*

Instructions to the candidates:

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

Q1) Attempt the following in 1-2 lines each : **[10]**

a) Define : Ecological niche.

b) What is Primary Productivity?

c) Define the term : Biome ecology.

d) Give the difference between inter & intra specific competition.

e) What are biogeochemical cycles?

f) Name the bacterias which help in denitrification.

g) What is meant by trophic structure?

h) Give 2 examples each of biotic & abiotic limiting factors.

i) What is Hydrosere?

j) Give any 2 significance of food chain.

Q2) Write short notes on Any Two of the following each in 8-10 lines : **[10]**

a) Explain carbon cycle with diagram.

b) What is Ecological Spectrum?

c) Explain Grassland Ecosystem with respect to its type.

P.T.O.

Q3) Answer Any Two of the following each in 8-10 lines : **[10]**

a) Explain various stages of atmospheric evolution.

b) Discuss the process of ecological succession.

c) Explain the zonation in marine ecosystem.

Q4) Answer Any One of the following in 20-22 lines : **[10]**

a) What are Ecological Pyramids? Explain its type.

b) Explain Ecosystem characteristic with respect to structural & functional attributes.

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Total No. of Questions : 4] [Total No. of Pages : 2

P286

[3717] - 129
S.Y. B.Sc.
ENVIRONMENTAL SCIENCE
ENV - 202 : Hydrology
(New Syllabus) (Paper - II) (Sem. - I)

Time : 2 Hours] *[Max. Marks : 40*

Instructions to the candidates:

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

Q1) Attempt the following in 1-2 lines each : **[10]**

a) Give the sources (any 2) of surface water.

b) Define : Meteoric water.

c) What is infiltration?

d) What is secondary acquifer?

e) Define Aquicludes.

f) What is a renewable resource? Give one example.

g) What do you mean by cannate water?

h) Define recharge of ground water.

i) What is meant by catchment area?

j) Define the term : Water pollution.

Q2) Write short notes on Any Two of the following each in 8-10 lines : **[10]**

a) Give a diagrammatic representation of hydrological processes explaining each step.

b) Write a note on consequences of water pollution.

c) Describe ground water contamination.

P.T.O.

Q3) Answer Any Two of the following each in 8-10 lines : **[10]**

a) Give the physical & chemical properties of water.

b) Write a note on ground water problems.

c) Describe the process of Euhophication with diagram.

Q4) Answer Any One of the following in 20-22 lines : **[10]**

a) Describe the problems of Arsenic, Nitrate & Fluride with case studies.

b) Describe in detail effects of water contamination on man & environment.

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Total No. of Questions : 4] [Total No. of Pages :3

P287

[3717] - 130
S.Y. B.Sc.
OPTIONAL ENGLISH
Enriching Oral and Written Communication in English
(New Course) (Sem. - 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 two of the following : **[10]**

a) Explain the term 'downward communication' and state how as a Librarian of your college you would use it effectively for communication with students and teaching-non-teaching staff.

b) What is the importance of nonverbal communication at the time of interview? Explain with suitable examples.

c) You are listening to a lecture by APJ Abdul Kalam. List six ways of effective communication that would help you in receiving the message delivered.

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

a) Find out meanings of the underlined words in the given sentences from the list given in the brackets.

i) Please draw a chair for yourself.

ii) The meeting is drawing to a close.

(come, take, take out)

b) Use anyone of the following words in separate sentences as noun and verb in order to bring out meaning. : open, present

c) Use the following pair of words in separate sentences :
happy : delighted.

d) Match the synonymous words.

A	B
meticulous	wide
lucid	useless
broad	careful
futile	clear

P.T.O.

e) Choose the correct alternatives and fill in the gaps.

i) Ranjini is a _____ dancer. (graceful, gracious)

ii) The new satellite launched is _____ (stationary, stationery)

f) Change the following words into their opposites by adding prefixes. (any two)

accurate, wanted, honest

Q3) Attempt <u>any five</u> of the following : **[10]**

a) Find out the correct spellings. (any two)

i) accomodation, accommodation, acommodation

ii) ocurrence, occurrance, occurrence

iii) equiepment, equipment, equipement

b) Identify the part of speech of the underlined words. (any two)

i) The house stands <u>between</u> two tall trees.

ii) Glass instruments tend to <u>break</u> easily.

iii) <u>Failures</u> are stepping stones to success.

c) Match the meanings of phrasal verbs in **A** with their meanings in **B**.

A: back up, back away

B: to move away, to give extra help, to run away

d) Provide a lexical set of four words each for the following.

hotel, nature

e) Make four words each using the letters in the following words.

horizontal, arrangement

f) Rearrange the jumbled letters to form meaningful words with the help of hints given. (any two)

ylogmo (a feeling), treenva (a person who has a long experience), vetinebali (something that cannot be avoided)

Q4) Attempt <u>any two</u> of the following : **[10]**

a) Answer <u>any five</u> of the following :

i) Say whether the initial sound in the following words is a vowel, a consonant or a diphthong. (any one)

college, identity

ii) Transcribe phonemically any one of the following words.

keep, fun

iii) Mark stress in the words ‘private’ and ‘receive’.

iv) Underline the stressed words in the following sentence.

The dog jumped into the street

v) Say whether the following sentences will be said with a falling or a rising tone. (any one)

Do you speak Marathi?

I live in this apartment.

vi) Underline the weak forms in the following sentence.

I’m a supervisor.

b) Write down short responses in the form of an utterance or two according to the situations given below. (any five)

i) You are seeing your sister off at railway station. Give closing remarks at the time of the departure.

ii) You are at a bank in the evening. You meet your teacher. Greet him/her.

iii) Introduce your brother to your friend.

iv) Your uncle presents you with an expensive gift on your birthday. Thank him.

v) Your mother’s friend comes your house to meet your mother. Welcome her.

vi) Ask the traffic police for help.

c) You want to travel to Mumbai by bus. You go to the bus stand and ask information about the bus, its time, fare and reservation-cum-ticket. The person at the counter gives you the necessary information. Write this in the form of a short dialogue of about fifteen utterances.

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Total No. of Questions : 3] [Total No. of Pages : 3

P288

[3717] - 132

S.Y. B.Sc. (2008 Pattern) (Sem. - I)

हिंदी (HINDI)

(New Syllabus)

समय : 2 घंटे] **[पूर्णांक : 40**

पाठ्यपुस्तकें : ii) प्रतिनिधि कहानियाँ :

संपादक – हिंदी विभाग, एस्. एन्. डी. टी. विश्वविद्यालय, मुंबई

ii) छायावाद : प्रतिनिधि रचनाएँ

संपादक – नीरा परमार

सूचनाएँ : i) सभी प्रश्न अनिवार्य हैं।

ii) दाहिनी ओर लिखे अंक प्रश्न के पूर्णांक हैं।

प्रश्न 1) अ) निम्नलिखित में से किन्हीं दस वाक्यों को शुद्ध करके फिर से लिखिए। **[10]**

1) बैंक दो बजे बंद होती है।

2) राम ने मोहन को पचास रुपये की नोट दी।

3) चौराहे पर पुलिस खड़े हैं।

4) क्या तुमने वह पुस्तक पढ़ा ?

5) कबीर बहोत बड़े संत थे।

6) पुस्तकें पढ़ने से हमें ग्यान मिलता है।

7) तुमने पत्र पर पत्ता क्यों नहीं लिखा ?

8) प्रतियोगिता में लड़के भाग रहे हैं।

9) शेर हिरन की शिकार नहीं कर पाया।

10) उस सभा में चार वक्ते बोले।

11) तुम्हारी आँखों से आँसू क्यों बह रहा है।

12) बंदर पेड़ के ऊपर बैठा है।

P.T.O.

आ) निम्नलिखित अंग्रेज़ी परिच्छेद का हिन्दी में अनुवाद कीजिए। [4]

Scientific inventions are neither good nor bad; it is the use we make of them that is good or bad. An aeroplan can take lives by dropping bombs, or save lives by flying medicines to the sick or the injured. It is the human mind. Which is itself can make a hell of heaven when they had tasted the forbidden fruit of the tree of knowledge. Humanity has tasted the forbidden fruit of science and is waiting to the see the shape of things to come in future.

प्रश्न 2) अ) निम्नलिखित गद्य अवतरण की ससंदर्भ व्याख्या कीजिए। [5]

क) महाराज नाराज न हों, आपसे तो एक टोकरी भर मिट्टी नहीं उठाई जाती और इस झोंपड़ी में तो हजारों टोकरियाँ मिट्टी पड़ी है, उसका भार आप जन्म भर क्यों कर उठा सकेंगे ?

अथवा

तुझे तो खुश होना चाहिए कि उनके लिए एक रोज भूखे रहने का तुझे पुण्य मिला। मैं क्यों उन्हें नाराज करती हूँ ? अब से नाराज न करुँगी।

आ) निम्नलिखित पद्य अवतरण की ससंदर्भ व्याख्या कीजिए। [5]

ख) विजन–वन–वल्लरी पर
सोती थी सुहागभरी –
स्नेह–स्वप्न–मग्न–अमल कोमल–तनु–तरुणी
दृग बंद किये, शिथिल पत्रांक में।

अथवा

हाय ! मृत्यु का ऐसा अमर, अपार्थिव पूजन ?
जब विषण्ण, निर्जीव पड़ा हो जग का जीवन !
संग–सौध में हो श्रृंगार मरण का शोभन,
नग्न, क्षुधातुर वास विहीन रहें जीवित जन ?

प्रश्न 3) अ) निम्नलिखित में से किन्हीं दो प्रश्नों के उत्तर लिखिए। **[8]**

ग) लहनासिंह का चरित्र चित्रण कीजिए।

घ) नन्हकूसिंह ने राजमाता पन्ना की रक्षा क्यों की ?

ङ) हल्कू और जबरा की मित्रता का परिचय दीजिए।

च) चौधरी पीरबख्श की घर की दयनीय स्थिति का चित्रण लेखक ने किस प्रकार किया है ?

आ) निम्नलिखित में से किन्हीं दो प्रश्नों के उत्तर लिखिए। **[8]**

छ) 'जागो फिर एक बार' कविता का आशय स्पष्ट कीजिए।

ज) 'एक बार बस और नाच तू श्यामा' ऐसा निराला क्यों कहते हैं ?

ञ) 'नौका विहार' कविता में कवि ने प्राकृतिक सुषमा का वर्णन किस प्रकार किया है ?

ट) कवि पंत के अनुसार जीवन में सुख-दुख का क्या महत्त्व है ?

❑❑❑❑

Total No. of Questions : 4] [Total No. of Pages :2

P292

[3717] - 136

S.Y. B.Sc.

VOC - 211 : INDUSTRIAL CHEMISTRY

Utilities and Unit Operations & Process Instrumentation

(Paper - I) (Vocational) (Old and New Course) (Sem. - I)

Time : 2 Hours] *[Max. Marks : 40*

Instructions to the candidates:

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

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

a) Convert 1g cm^{-3} into SI units.

b) Name the different type of mixers.

c) Convert – 58 K into ºC.

d) State the principle of densitometer.

e) State four industrial uses of steam.

f) What is the fundamental interval in temperature scale?

g) What is the difference between filter aids and filter media?

h) Define hardness of water and mention its types.

Q2) Attempt <u>any two</u> of the following : **[8]**

a) Write a short note on radiation level detector.

b) Describe the spray drier system.

c) How are thermocouples used in temperature measurement?

P.T.O.

Q3) Attempt <u>any two</u> of the following : **[8]**

a) Spray and packed extraction towers.

b) Explain the working of a micro manometer with a neat sketch.

c) Write a short note on pyrometers.

Q4) What are the different types of crystallizers? Discuss each of them in detail. **[8]**

OR

Sketch and explain the working of differential pressure flow meter.

✪✡✪✡

Total No. of Questions : 4] [Total No. of Pages :2

P293

[3717] - 137
S.Y. B.Sc.
BIOTECHNOLOGY
VOC - Biotech - 211 : Cell and Molecular Biology
(Paper - I) (New Course) (Vocational) (Sem. - I)

Time : 2 Hours] *[Max. Marks : 40*

Instructions to the candidates:

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

Q1) Answer each of the following (1 - 2 lines) : **[10]**

a) What are lysosomes?

b) Define passive transport.

c) What are carrier proteins?

d) Give the meaning of the term "polycistronic gene".

e) Mention main role of Rho factor in transcription.

f) What are okazaki fragments?

g) Mention initiation factors essential for transcription.

h) Give role of ligase in DNA replication.

i) Mention the types of cell-junctions.

j) What is antport?

Q2) Attempt <u>any two</u> of the following : **[10]**

a) Discuss the various functions of chloroplast.

b) Describe the structure of prokaryotic ribosome.

c) Give an account of extracellular matrix.

P.T.O.

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

a) Programmed cell death.

b) Mismatch repair of DNA.

c) Membrane proteins.

Q4) What is DNA damage? Enlist the agents responsible for DNA damage and add a note on excision repair mechanism. **[10]**

OR

Give an account of separation of cell organelles.

✪✡✪✡

Total No. of Questions : 4] [Total No. of Pages :2

P294

[3717] - 139
S.Y. B.Sc.
ELECTRONIC EQUIPMENT MAINTENANCE
VOC - EEM - 211 : Audio, Video & Office Equipments - A
(Paper - I) (New Course) (Sem. - I) (Vocational)

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 / log table is allowed.***

Q1) Answer all of the following :

a) Give the spectrum of AM wave. **[1]**

b) What band of frequencies are alloted to FM broadcast? **[1]**

c) State any two characteristics of radio receiver. **[1]**

d) What is the audio sampling rate used for digital audio? **[1]**

e) Equilization is used in audio tape recorder. Comment. **[2]**

f) Vestigial sideband transmission is used in TV picture transmission. Comment. **[2]**

g) What is the advantage of MP3 over regular audio files? **[2]**

h) State applications of TV. **[2]**

Q2) Attempt any <u>two</u> of the following :

a) Describe the principle of recording of electrical signals on magnetic tape. **[4]**

b) Explain the working of AM receiver with the help of neat diagram. **[4]**

c) Draw a block diagram of PA system & explain its working. **[4]**

P.T.O.

Q3) Attempt any two of the following :

a) Draw a neat labelled diagram of composite video signal. What is colour burst? **[4]**

b) Explain the construction of colour picture tube. **[4]**

c) Explain the working of MP3 player. **[4]**

Q4) Attempt the following :

a) Describe recording section of VCR in brief. **[6]**

b) Draw a neat labelled diagram of black and white TV receiver & explain. **[6]**

OR

a) Explain the working of DVD player with the help of neat block diagram.

b) Write short note on - "construction of R/P head and Erase head".

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Total No. of Questions : 4] [Total No. of Pages :2

P295

[3717] - 140

S.Y. B.Sc.

COMPUTER HARDWARE AND NETWORK ADMINISTRATION

Microprocessor and Interface Techniques - I

(Paper - I) (New Course) (Vocational) (Sem. - I) (58711)

Time : 2 Hours] *[Max. Marks : 40*

Instructions to the candidates:

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

Q1) a) Attempt the following : **[4]**

i) Define interrupt.

ii) What do you mean by EISA bus?

iii) What is DMA transfer?

iv) Elaborate SRAM and DRAM.

b) Attempt the following : **[8]**

i) Explain bounce and debounce of a switch with proper timing diagram in brief.

ii) Distinguish between Hardware and Software interrupts.

iii) State characteristics of analog to digital converter.

iv) What are the different technologies used in mother board?

Q2) Attempt <u>any two</u> of the following : **[8]**

a) Explain in brief different modes of 80286 and its working.

b) How can a keyboard be interfaced to the main computer.

c) Explain functions of the following pins :

$\overline{MEMR}$, $\overline{MEMW}$, $\overline{IOR}$ and $\overline{IOW}$.

P.T.O.

Q3) Attempt <u>any two</u> of the following : **[8]**

a) Explain the working of thermistor and AD590.

b) List different types of buses. Explain any one in brief.

c) Write a short note on display adaptors.

Q4) Attempt the following : **[12]**

a) i) Discuss the history of microprocessor w.r.t model (type) and memory addressable capacity.

ii) State the functions of Bus Interface Unit (BIU).

b) Explain with neat diagram the mode of identifying a key press in a 4×4 matrix key board.

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Total No. of Questions : 4] [Total No. of Pages :2

P296

[3717] - 141
S.Y. B.Sc.
SEED TECHNOLOGY
Hybrid Seed Production
(Paper - IV) (Vocational) (Sem. - I) (New Course)

Time : 2 Hours] *[Max. Marks : 40*

Instructions to the candidates:

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

Q1) Attempt the following : **[10 × 1 = 10]**

a) What is heterosis?

b) Define gametophytic male sterility.

c) What is self incompatibility?

d) Define gametocides.

e) Give the types of variety.

f) What is planting ratio?

g) Comment on pollen viability.

h) What do you mean by maintainer line-B?

i) Give any two significance of apomixis.

j) Define detasseling.

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

a) Explain genetic basis of inbreeding depression.

b) What is cytoplasmic male sterility? Add a note on their use in hybrid seed production.

c) Describe any two types of pollination.

P.T.O.

Q3) Write short notes on any two of the following : **[2 × 5 = 10]**

a) Compact area approach.

b) Utilization of self incompatibility.

c) Apomixis.

Q4) Give stepwise procedure for hybrid seed production in sunflower. **[10]**

OR

Explain in detail, procedure for hybrid seed production in Jowar.

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Total No. of Questions : 4] [Total No. of Pages :2

P297

[3717] - 142

S.Y. B.Sc. (Vocational)

INDUSTRIAL MICROBIOLOGY

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

(Paper - I) (New Course 2008) (Sem. - 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; Fill in the blanks; State whether the statement is true or false. **[10]**

a) State whether the following statement is TRUE or FALSE
"Positive pressure is maintained within the head space during a fermentation to prevent contamination".

b) State whether the following statement is TRUE or FALSE
"Foam formation during a fermentation is due to excess carbohydrate in the fermentation broth".

c) State whether the following statement is TRUE or FALSE
"Baffles are used to smoothen the flow of broth within the fermenter".

d) State whether the following statement is TRUE or FALSE
"Exit gas from a fermentation broth is a mixture of gases".

e) State the disadvantage of batch process as compared continuous process of fermentation.

f) Justify that Hollow Fibre Reactors are not preferred for high viscosity fermentation broths.

g) Justify the following statement
"Heating / cooling jackets not used in production scale fermenters".

h) List the type of fermenter in which non-mechanical agitation is practical.

i) Define the term "X_{90} value" for fibrous filters.

j) Define 'dual fermentation'.

P.T.O.

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

a) Draw a neat labeled diagram of a turbidostat and briefly explain how it differs from a chemostat.

b) With the help of a diagram, explain the principle of operation of a sensor used for monitoring DO during a fermentation process. State the importance of monitoring DO.

c) With the help of a diagram, explain the difference between a turbine impeller and a propeller impeller.

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

a) Diagrammatically represent the four methods used for immobilization of cells and enzymes. Explain gel entrapment method of cell immobilization and its application(s) in the fermentation industry.

b) With the help of a diagram, explain the construction and functioning of cooling towers.

c) Explain the advantages of a continuous process of fermentation over a batch process. Draw the profile for product formation during a continuous process.

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

a) Explain why monitoring of a fermentation is important. Draw a profile for the Time-Course of a batch process for production of biomass and delineate the important parameters that need to be monitored.

b) Using a diagram, draw a fermenter outer vessel, impellers and baffles for a CSTR with a working volume of 10,000 litres.

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Total No. of Questions : 4] [Total No. of Pages : 2

P298

[3717] - 143

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

INORGANIC PROCESS INDUSTRIES

VOC. 212/25621 : Industrial Chemistry

(Paper - II) (Vocational Course) (Old & New Course)

Time : 2 Hours] *[Max. Marks : 40*

Instructions to the candidates:

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

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

a) What is varnish?

b) Define alloy. What are the advantages of preparing alloys?

c) Why is glass called super cooled liquid?

d) Why is gypsum added to clinker of cement?

e) Define vehicle with suitable examples.

f) How is colored glass made?

g) Give composition of steel alloys.

h) Define matix phase with example.

Q2) Attempt <u>any two</u> of the following : **[8]**

a) What are the different types of ceramics?

b) Give the composition of two types of aluminium alloys and their uses.

c) How is fabrication done with molten glass?

P.T.O.

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

a) Soil corrosion.

b) Setting and hardening of cement.

c) Classification of composite materials.

Q4) Describe the manufacture of glass by pot furnace method **[8]**

OR

Describe any four methods of protection against corrosion.

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Total No. of Questions : 4] [Total No. of Pages : 2

P299

[3717] - 144

S.Y. B.Sc.

BIOTECHNOLOGY

VOC. Biotech - 212 : RDT and Bioinformatics

(Paper - II) (Sem. - I) (New Course) (Vocational)

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.***
4) ***All questions carry equal marks.***

Q1) Answer each of the following in (1-2) lines : **[10]**

a) Give any two applications of RDT.

b) What are restriction enzymes?

c) Define cosmids.

d) What is transfection?

e) Enlist the components involved in PCR technique.

f) What is site-directed mutagenesis?

g) Define cloning vector.

h) What is proteomics?

i) Enlist any two phage vectors used in RDT.

j) What do you mean by Western blotting?

Q2) Write short notes on 'Any Two' of the following (8-10 lines) : **[10]**

a) YAC vectors.

b) DNA modifying enzymes.

c) Transformation.

P.T.O.

Q3) Attempt 'Any Two' of the following (8-10 lines) : **[10]**

a) What are essential features of vector?

b) Explain in brief process of southern hybridization.

c) Explain Maxam and Gilbert procedure of DNA sequencing.

Q4) Describe in detail various steps involved in r-DNA experiment. Add a note on its applications. **[10]**

OR

Define Genomics. Explain the role of genomics in genome sequence project.

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Total No. of Questions : 4] [Total No. of Pages : 2

P300

[3717] - 146

S.Y. B.Sc.

ELECTRONIC EQUIPMENT MAINTENANCE (EEM)

VOC - EEM - 212 : Maintenance Concepts and Repair - II-A (Vocational) (New Syllabus) (Paper - II) (Sem. - 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.***
4) ***Use of log tables and/or calculators is allowed.***

Q1) Answer all of the following :

a) List typical causes of failure in equipment. **[1]**

b) Which of the two systems is more reliableseries or parallel? **[1]**

c) Name the parts of taperecorder, which wear out fast. **[1]**

d) Name five types of fire extinguishers. **[1]**

e) What potential problems may one face in maintaining electronic equipment? **[2]**

f) Comment on system reliability and its relation with failure rate. **[2]**

g) Define the terms 'troubleshooting' and 'repair'. **[2]**

h) Why is the lead acid battery not left in discharged condition for long? What is the desired precaution in the eventuality of such a situation?**[2]**

Q2) Answer any <u>two</u> of the following :

a) Write a note on Total Quality Management and its importance in ISO certification. **[4]**

b) What activities are involved in the preventive maintenance schedule of a DC? **[4]**

c) List the typical items of information in a service manual. Explain the role of service manual in corrective maintenance. **[4]**

P.T.O.

Q3) Answer any two of the following :

a) What is CVCC power supply? State how to set up the CVCC power supply. State a typical fault condition of it. **[4]**

b) List four tools used for servicing along with function of each. **[4]**

c) Discuss installation plan for a TV receiver. **[4]**

Q4) Answer all :

a) Write a note on the following aspects of successful installation : **[6]**

i) Selection of the site.

ii) Preparation of the site.

b) What are the advantages and disadvantages of nickel-cadmium batteries? State applications of these. **[6]**

OR

a) Write a note on 'Power Supply System' with an example of calculating/ estimating electric load for a typical PC(desktop).

b) Explain the term 'Preventive Maintenance' and write the advantages of 'Preventive Maintenance' giving suitable examples.

❖❖❖❖

Total No. of Questions : 4] [Total No. of Pages : 2

P301

[3717] - 147

S.Y. B.Sc.

COMPUTER HARDWARE AND NETWORK ADMINISTRATION

Computer System Management - I (Vocational)

(58721) (Paper - II) (New Course) (Sem. - 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 are the two major contributors to failures?

ii) Maintenance of which storage device must be given priority.

iii) Write any one method for preventive maintenance of a printer.

iv) What first step would you take when UPS beeps?

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

i) Write any two common troubles which occur in a modern PC frequently.

ii) Describe in brief two types of access control mechanisms for a computer system.

iii) Write any two run problems that can cause immense trouble.

iv) What are the two indicators of motherboard or RAM failure?

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

a) Describe hardware and software fault isolation techniques you know.

b) Explain how repair generated failures can create havoc during troubleshooting.

c) Describe two safety precautions to be undertaken during troubleshooting and repairs.

P.T.O.

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

a) Explain any two ways of implementing regular power supply maintenance.

b) Write a note on the personal attitudes which should be adopted during troubleshooting.

c) What are the indicators of disk drive failures? Suggest possible procedure for its recovery.

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

a) Explain the importance of disaster recovery plan and different options available for it.

b) Explain an efficient schedule for implementing preventive maintenance.

c) Describe various diagnostic software programs and utilities which are widely used.

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Total No. of Questions : 4] [Total No. of Pages : 2

P302

[3717] - 148

S.Y. B.Sc.

SEED TECHNOLOGY

Seed Testing

(Vocational) (Paper - V) (Sem. - I) (New)

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 × 1 = 10]**

a) Give any two objectives of International seed testing association.

b) Define seed testing.

c) Enlist equipments used for physical purity analysis.

d) What is primary sample.

e) Define certification sample.

f) What is meant by inert matter.

g) Enlist the methods employed in testing of seed moisture.

h) Give any two objectives of germination testing.

i) Define seed vigour.

j) What is a hard seed.

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

a) Give the Organisation of central seed testing laboratory.

b) Explain the kinds of seed sampling.

c) Describe generalized procedure for seed vigour testing.

Q3) Write notes on any two of the following. **[2 × 5 = 10]**

a) Layout of seed testing Laboratory.

b) Heterogenity test.

c) Storage of guard samples.

Q4) What is seed germination ? Give the objectives and methods employed in testing of seed germination. **[10]**

OR

Describe the procedure for registration and give the precautions to be taken during registration of samples.

Total No. of Questions : 4] [Total No. of Pages : 2

P303

[3717] - 149

S.Y. B.Sc. (Vocational)

INDUSTRIAL MICROBIOLOGY

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

(Paper - II) (Semester - I) (New 2008 Course)

Time : 2 Hours] *[Max. Marks :40*

Instructions:

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

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

a) State whether the following statement is TRUE or FALSE.

In Penicillin production, Corn Steep Liquor plays an important role.

b) State whether the following statement is TRUE or FALSE.

Peptones in nutrient media serve a dual purpose.

c) Fill in the blank.

_____ is used as a source of carbon as well as antifoam agent in fermentation media.

d) Fill in the blank.

_____ method is widely used for preservation of sporulating fungi.

e) Fill in the blank.

The _____ plate technique is used for isolation of analogue resistant mutants.

f) Define "Lyophilization".

g) Define "Del Factor".

h) Define targeted screening.

i) What does the term "exhaust gas" mean in fermentation?

j) What is the role of "dummy variables" in Plackett-Burman Design for medium optimization.

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

a) Secondary screening.

b) Raw materials used as source of nitrogen in fermentation media.

c) Preservation of microbial cultures at very low temperature.

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

a) Explain how the dissolved oxygen concentration is measured and controlled during fermentation.

b) Describe major factors involved in Scale-up.

c) Explain the method to monitor and control foaming during fermentation.

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

a) What are unculturable bacteria ? Describe newer cultivation approaches for these types of bacteria.

b) What are auxotrophic mutants? Explain the use of the same for overproduction of primary metabolites.

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Total No. of Questions : 3] **[Total No. of Page : 1**

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

_amR>r! (Marathi)

{dkmZ!H$aVm! {dH$[

dbi ! 2 \Vrg] **[H$y%JUW : 40**

gyMZm!;¯ 1) !! gd½åZ!gmoS>{dUo!AmoÕ`H$%!AmhoV/ %

2) !! CodH$S>ro!AH$%!nyU½JWU!X$e½{dUmV/

åZ 1) nwT>ro H$a!H$moÕ`mr! H$m!{df`mda! 400 e©Xm¹n`³V!{Z~¹Y!{bm/ **[10]**

A* gm©aD$Vm½.!H$amimMr!JaO

~* {dkmZ!Am{U!åXyfU

H$* _hm{dÂmb`mV!///////!dJm½mhoa!)c{dV*

åZ 2) #Va¹Jmam!g¹emoY$%(!`m!H$aVyZ!_mZdr!ÔdmdMo!X$e½Z!H$go!KS>Vo!Vo!gmoXmaU!{bm/ **[15]**

d¡kdm

#dm_bmoMZm!AwMm½V!~m`H$am¹Zm!COi`m!S>moüìmZo!{XgV!Zmhr!"(!`m!{gwÊm!nwo>H$aUmV½ {dÕZmwV!H$moUH$moUVo!nwamob!XÕmV!Vo!{bm/

åZ 3) {Qmm!{dm/!)H$moÕ`mr!VZ* **[15]**

A* #M¹ÛmdaMm!IyZ(!H$aVVrc!VÙdqMZ/

~* Am¹VaJ¹hr`!AUw`wMo!n[aUm_/

H$* ~Zmon¹V!Am{U!`¹×mZd/

S* #A¹VamimVrc!_¹Ö`y(!H$aVVrb!S>m!{dH$mg!mQ>o!`m¹Mm!_¹Ö`y/

B* #`¹xm¹Zr!H$b¹!~¹S>(!H$aVrb!XmH$/

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