Total No. of Questions : 5]

SEAT No. :

P690

[Total No. of Pages : 4

[4817]-1001
F.Y. B.Sc.
MATHEMATICS
MT - 101 : Algebra and Geometry
(Paper - I) (2013 Pattern)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

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

Q1) Attempt any eight of the following: **[16]**

a) A relation R on Z^* be defined as R = $\{(x, y) \in Z^* \times Z^* / x \text{ divides } y\}$. Determine which of the following ordered pairs belong to R.

(2, 3), (2, 4), (5, 15), (7, 10).

b) Define:

i) Equivalence relation

ii) Prime number

c) If $p(x) = x^7 - 3x + 2$ and $q(x) = x^7 + 4x + 3$ then find $p(x) + q(x)$ and $p(x)\, q(x)$.

d) Define row echelon form of a matrix.

e) Find rank of the matrix A where $A = \begin{bmatrix} 2 & -3 & 6 & -5 & 3 \\ 0 & 1 & -4 & 1 & 1 \\ 4 & -5 & 8 & -9 & 7 \end{bmatrix}$.

f) Find centre of the conic

$x^2 - 5xy + y^2 + 8x - 20y + 15 = 0$.

g) Show that the points (–2, 2, –1) and (1, –1, 1) lie on different sides of the plane

$x - 2y + z + 5 = 0$.

P.T.O.

h) If the lines $\frac{x+3}{2}=\frac{y+5}{3}=\frac{z-7}{-3}$ and $\frac{x+1}{4}=\frac{y+1}{5}=\frac{z+1}{-1}$ are coplanar, then find equation of the plane containing them.

i) Find centre and radius of the sphere

$x^2 + y^2 + z^2 + 6x - 4y - 6z - 14 = 0$.

j) Define right circular cylinder.

Q2) Attempt any four of the following: **[16]**

a) Using principle of Mathematical induction prove that for every positive integer n, $n^3 - n$ is divisible by 3.

b) The g.c.d. of two positive integers is 81 and their l.c.m. is 5103. Find the numbers.

c) Solve $4x^3 + 20x^2 - 23x + 6 = 0$, given that two of its roots being equal.

d) Solve the following system using Gauss-Jordan method.

$2x - y - 3z = 5$

$5x + 2y - 6z = 5$

$3x - y - 4z = 7$

e) Find eigenvalues and eigenvectors of the matrix $\begin{bmatrix} 3 & -1 \\ 1 & 1 \end{bmatrix}$.

f) Show that $x - \alpha$ is a factor of $f(x)$ in R[x] if and only if $f(\alpha) = 0$.

Q3) Attempt any two of the following: **[16]**

a) i) If p is prime and a, b are integers such that $p|ab$ then prove that either $p|a$ or $p|b$.

ii) If a, b, c are integers such that $a|b$ and $a|c$ then show that $a|bx+cy$ for any integers x and y.

b) i) Find the g.c.d. of 5291 and 4514. Also find integers x and y such that $(5291, 4514) = 5291x + 4514y$.

ii) Let a, b, x, y be integers and $a \equiv b \pmod{m}$, $c \equiv d \pmod{m}$ then prove that

$a + c \equiv b + d \pmod{m}$.

c) Verify Cayley Hamilton theorem for the matrix $A = \begin{bmatrix} 1 & 2 & 2 \\ 0 & 2 & 1 \\ -1 & 2 & 2 \end{bmatrix}$. Hence find A^{-1}.

Q4) Attempt any four of the following: **[16]**

a) The origin is changed to the point $(h, -1)$. Determine the value of h so that the new equation of the locus given by $2x^2 + 4x + 3y - 7 = 0$ will not contain first degree term in x.

b) If the homogeneous second degree equation $ax^2 + by^2 + cz^2 + 2fyz + 2gzx + 2hxy = 0$ represents two planes then show that

$abc + 2fgh - af^2 - bg^2 - ch^2 = 0$.

c) Find equation of the plane containing the line $\frac{x+2}{2} = \frac{y+3}{3} = \frac{z-4}{-2}$ and the point $(0, 6, 0)$.

d) Find equation of the tangent plane at $P(x_1, y_1, z_1)$ to the sphere $x^2 + y^2 + z^2 = a^2$.

e) Find the equation of a cone with vertex at origin and containing the curve $x^2 + y^2 = 4$; $z = 5$.

f) Find equation of the right circular cylinder whose axis is the line

$\frac{x-\alpha}{l} = \frac{y-\beta}{m} = \frac{z-\gamma}{n}$, where l, m, n are d.r.s. and radius r.

Q5) Attempt any two of the following: **[16]**

a) If under rotation of axes, without shifting the origin, the expression $ax^2 + 2hxy + by^2$ is transformed to $a'x'^2 + 2h'x'y' + b'y'^2$ then show that $a + b = a' + b'$ and $ab - h^2 = a'b' - h'^2$.

b) i) Find the co-ordinates of the centre and radius of the circle

$x^2 + y^2 + z^2 - 2x - 4y + 2z - 30 = 0$, $2x - y + 2z - 7 = 0$.

ii) Find the equations of the planes bisecting the angles between planes

$x + 2y + 2z = 9$ and $4x - 3y + 12z + 13 = 0$.

c) Find the shortest distance and the equations of the line of shortest distance between the skew lines

$$\frac{x-1}{2}=\frac{y-2}{3}=\frac{z-4}{4};$$

$$\frac{x-2}{3}=\frac{y-4}{4}=\frac{z-5}{5}$$

Total No. of Questions : 5]

SEAT No. :

P691

[Total No. of Pages : 3

[4817]-1002
F.Y. B.Sc.
MATHEMATICS
MT-102 : Calculus and Differential Equations
(2013 Pattern) (Paper-II)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

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

Q1) Attempt Any Eight of the following: **[16]**

a) Find the greatest lower bound and least upper bound of the set $S = \left\{ \frac{(-1)^n}{n} / n \in N \right\}$, if they exist.

b) Evaluate $\lim_{x \to 1} \frac{x^3 - 1}{x^2 - 1}$.

c) Discuss continuity of f at $x = \frac{1}{2}$ where $f(x) = \begin{cases} x, & 0 \le x < \frac{1}{2} \\ 1, & x = \frac{1}{2} \\ 1 - x, & \frac{1}{2} < x < 1 \end{cases}$.

d) Find the derivative of $f(x) = \sqrt{x + \sqrt{x}}$. w.r.t. x.

e) State Taylors theorem with Lagranges form of remainder.

f) Evaluate $\int_0^{\pi/2} \cos^6 x \, dx$.

g) Define order and degree of the differential equation.

h) Solve: $\frac{dy}{dx} + \frac{1 + y^2}{1 + x^2} = 0$.

P.T.O.

i) Find orthogonal trajectories of the family of curves $xy = k^2$ where k is a parameter.

j) Solve: $\sin(y - xp) = p$ where $p = \frac{dy}{dx}$.

Q2) Attempt Any Four of the following: **[16]**

a) Prove that for $x, y \in R \left| |x| - |y| \right| \leq |x \pm y|$.

b) State and prove Cauchy's mean value theorem.

c) If f is continuous at $x = c$ and g is continuous at $f(c)$ then show that the composite function gof is continuous at c.

d) Evaluate $\lim_{x \to 0} (\text{cosec}\, x)^{\frac{1}{\log x}}$.

e) If $y = (x^2 - 1)^n$ then prove that $(x^2 - 1)y_{n+2} + 2xy_{n+1} - n(n+1)y_n = 0$.

f) Assuming the validity of expansion prove that

$$e^x \cos x = 1 + x - \frac{x^3}{3} - \frac{x^4}{6} - \frac{x^5}{30} \ldots .$$

Q3) Attempt Any Two of the following: **[16]**

a) i) If $y = e^{ax} \cos(bx + c)$ then prove that $y_n = r^n e^{ax} \cos[bx + c + n\theta]$ where $r = \sqrt{a^2 + b^2}$ and $\theta = \tan^{-1}\left(\frac{b}{a}\right)$.

ii) Find the intervals on which $f(x) = -x^3 + 12x + 5, x \in (-3, 3)$ is decreasing or increasing.

b) Let f be continuous function on a closed and bounded interval $[a, b]$ such that $f(a) < 0 < f(b)$. Prove that there is at least one c in (a, b) such that $f(c) = 0$.

c) i) Verify Rolles mean value theorem and find c for $f(x) = x(x-2)e^x$ on $(0, 2)$.

ii) Expand $\sin x$ in ascending powers of $\left(x - \pi/2\right)$.

Q4) Attempt Any Four of the following: **[16]**

a) Evaluate: $\int \frac{dx}{(x+1)(x^2+1)}$.

b) Define homogeneous differential equation and explain the method of solving it

c) Solve: $\frac{dy}{dx} = \frac{x-y+3}{2x-2y+5}$.

d) Define Bernoulli's equation. Explain the method of solving it.

e) Find the orthogonal trajectories of family of curves $y = ax^2$, where a is parameter.

f) Solve: $(x^2 + y^2 + 2x)\,dx + 2y\,dy = 0$.

Q5) Attempt Any Two of the following: **[16]**

a) If $I_n = \int (x^2 + a^2)^{n/2} dx$, where n is a positive integer, then prove that

$$I_n = \frac{x(x^2+a^2)^{n/2}}{n+1} + \frac{na^2}{n+1} I_{n-2}$$

Hence find $\int (x^2 + a^2)^{3/2}\,dx$.

b) i) Explain the method of solving differential equation $\frac{dy}{dx} + PY = Q$ where P and Q are functions of x only.

ii) Solve: $(3x^2y - 6x)\,dx + (x^3 + 2y)\,dy = 0$.

c) i) Explain the method of solving differential equation $f(x, y, p) = 0$, which is solvable for x.

ii) Solve: $y = 2px + p^4x^2$ where $p = \frac{dy}{dx}$.

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Total No. of Questions :5]

SEAT No. :

P692

[Total No. of Pages :3

[4817]-1003
F.Y.B.Sc.
PHYSICS - I
Mechanics, Heat and Thermodynamics
(New 2013 Pattern) (Paper - I)

Time : 3 Hours] *[Max. Marks :80*

Instructions to the candidates:

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

Q1) Attempt All of the following (Each of two marks): **[16]**

a) State and explain Newton's IIIrd law of motion.

b) Why frictional force is non - conservative.

c) State Pascal's law.

d) A uniform metal wire has length of 4m and a diameter of 4 mm. When it is stretched by 0.5 mm, its diameter decreases by 0.15 μm. Find the Poisson's ratio for the metal of the wire.

e) Explain the principle of Joul Thomson experiment.

f) Define reversible and irreversible process.

g) What is thermocouple and give its uses.

h) Find the efficiency of Carnot's engine working between the steam point and ice point.

Q2) Attempt any four of the following (Each of four marks): **[16]**

a) What is electromagnetic force? Give its properties.

b) Explain term workdone. Calculate the work done by a constant force.

c) Describe in detail Jaeger's method to determine surface tension of a liquid.

P.T.O.

d) A body of mass 8 kg at rest is subjected to a force of 32 N. What is the kinetic energy acquired by the body at the end of 5 sec.

e) Show that the workdone during the longitudinal strain is ½ x Longitudinal stress x Longitudinal strain.

f) Water is flowing through a horizontal venturimeter with a bore of 0.2 m at the entrance and of 0.15m at the throat. The level of water column in the two limbs differ by 0.15m. Calculate the rate of flow of water.
[Given - Density of water = 10^3 kg /m^3].

Q3) Attempt any four of the following (Each of four marks): **[16]**

a) Describe Andrew's experiment on Carbon dioxide.

b) Prove that the slope of adiabatic curve through a point in PV - diagram is ν times the slope of the isothermal curve through the same point.

c) Derive first Tds equation.

d) A two litre of hydrogen at 127°C and 10^6 dyne/cm^2 pressure expands isothermally, when pressure reduces to 5 x 10^5 dyne /cm^2. Find the volume of the gas after expansion.

e) Calculate the change in entropy when 2 mole of an ideal gas is allowed to expand from a volume of 2 litres to a volume of 10 litres at 27°C.

f) On a certain day the temperature is 12°C. What will be the temperature in Fahrenheit and Reaumur scale?

Q4) Attempt any two of the following: **[16]**

a) Discuss in detail the working of venturimeter and obtain an expression for the rate of flow of water in a pipe.

b) i) What is torsional oscillation? Derive an expression for the modulus of rigidity (η).

ii) What force is required to accelerate 1200 kg car from 5 m/s to 25 m/s in time of 3 sec.

c) i) Show that the value of -

Poisson's ratio cannot be greater than ½.

ii) Calculate the workdone in blowing a soap bubble of 1.6 cm radius if the surface tension of soap solution is 0.035 N/m.

Q5) Attempt any two of the following: **[16]**

a) Explain Diesel cycle with an indicator diagram. Obtain an expression for the efficiency of the Diesel engine.

b) i) Describe vapour - compression refrigerator.

ii) Calculate the Van der Waal's constant for a dry air, given that $T_c = 132\ ^oK$, $P_c = 37.2$ atm, $R = 82.07\ cm^3$ atm / mol /K.

c) i) Explain construction and working of platinum resistance thermometer.

ii) A Carnot's engine working as a refrigerator between 272^oK and 312^oK receives 520 calories of heat from the reservoir at the lower temperature:

1) Calculate the amount of heat rejected to the reservoir at the high temperature.

2) Calculate the amount of workdone in each cycle to operate the refrigerator.

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Total No. of Questions : 5]

SEAT No. :

P693

[Total No. of Pages :3

[4817]-1004
F.Y. B.Sc.
PHYSICS-II
Physics Principles and Applications and Electromagnetics
(2013 Pattern) (New Course) (Paper-II)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

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

Q1) Attempt all of the following: **[16]**

a) What is hydrogen bonding?

b) What is optical pumping?

c) What do you mean by photon?

d) Given energy level of 6.624×10^{-18} J imparted to an electron stream by X-ray device. Calculate frequency.

e) Define-polar, and non-polar molecule.

f) State Coulomb's law. Express it in vector form.

g) State Biot Savart's law.

h) The maximum value of the permeability of some metal is 0.15 T-m/A. Find the value of maximum relative permeability.

[Given- $\mu_0 = 4\pi\times10^{-7}$ T-m/A].

Q2) Attempt <u>any four</u> of the following: **[16]**

a) What are drawbacks of Bohr's model?

b) Explain Vander Waal's bonding in molecule with suitable example.

c) Explain the working of RADAR with schematic diagram.

d) The input power of solar cell is 1.25 W and it has I_{SC}=300mA, V_{OC}=0.5 V and F.F=0.6. Calculate the efficiency of the solar cell.

P.T.O.

e) An electron drops from the fourth energy level of hydrogen to the second energy level. What is the energy released and the frequency of emitted photon? [Given - E_2=-3.4 eV, E_4=-0.85 eV, h=6.624×10^{-34}Js]

f) CO molecule absorbs infrared radiation of frequency 6.42×10^{13}Hz. What is the force constant of the bond in CO molecule and spacing between the vibrational energy levels? [Given-Reduced mass of CO is 1.14×10^{-26}kg]

Q3) Attempt any four of the following: **[16]**

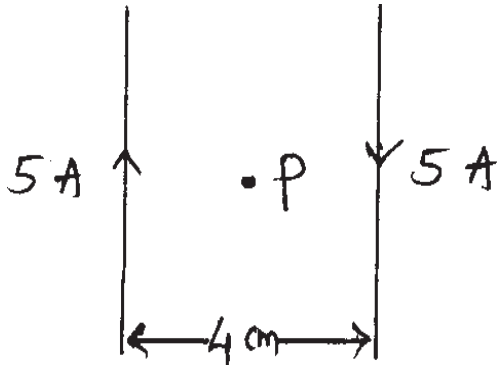
a) Distinguish between paramagnetic and ferromagnetic materials.

b) Discuss the concept of electric field and obtain an expression for electric field intensity due to point charge +q.

c) State and prove Gauss's Law in dielectrics.

d) Figure shows two long straight wires carrying electric current 5Amp. in opposite directions. The separation between the wires is 4cm. Find magnetic field at point P midway between the wires.

[Given $\mu_0 = 4\pi\times10^{-7} Wb/A-m$]



e) An ideal solenoid of a aluminium core have 50 turns per cm and a current of 3 Amp. Calculate magnetization M developed in the wire and the magnetic field at the centre. [Given- $\chi_{\text{aluminium}} = 2.3\times10^{-5}$]

f) The electric field intensity at a point at a distance of 1m from the centre of a charged sphere of radius 30 cm is 10^4N/C. Find surface charge density on the surface of sphere. The sphere is placed in air. [Given- $\in_0 = 8.85\times10^{-12}$ C^2/N-m^2].

Q4) Attempt <u>any two</u> of the following: **[16]**

a) What is X -ray radiography? State its applications.

b) i) What is mean by metallic bonding? State the properties of metallic crystals.

ii) Find the linear velocity of an electron in the first orbit of hydrogen atom. [Given- $\epsilon_0 = 8.85 \times 10^{-12}$ C^2/N-m^2, h=6.624×10^{-34}Js]

c) i) Explain the terms-Spontaneous Emission and Stimulated Emission.

ii) The force constant in oxygen O_2molecule is 1180 N/m. The mass of oxygen atom is 2.66×10^{-26}kg. Find the energy separation between adjacent vibrational levels of molecule. [Given- h=6.624×10^{-34}Js].

Q5) Attempt any two of the following: **[16]**

a) What is electric dipole and dipole moment? Obtain an expression for electric potential at any point due to an electric dipole.

b) i) Using Gauss's theorem, obtain an expression for the electric field intensity at any point due to a line charge.

ii) A charge of 3 μC moves with speed 3×10^6m/s along positive X-axis. A magnetic field of strength $(0.1\hat{j} + 0.2\hat{k})$ T exists in space. Find the magnetic force acting on the charge.

c) i) Obtain an expression for $\vec{B}$ on the axis of a current carrying circular loop.

ii) A solenoid of 400 turns/m is carrying a current of 2A . Its core is made of iron which has a relative permeability of 5000. Determine the magnitudes of the magnetic intensity, magnetization and the magnetic field inside the core.

Total No. of Questions : 5]

SEAT No. :

P694

[Total No. of Pages :3

[4817]-1005
F.Y. B.Sc.
CHEMISTRY-I
Physical and Inorganic Chemistry
(2013 Pattern) (Theory) (Paper-I)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

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

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

a) Give the rule of integration for addition and subtraction.

b) Explain lyotropic liquid crystal.

c) Define: i) Lyophilic sols ii) Lyphobic sols

d) Explain black body radiation.

e) Identify the following processes as spontaneous and non-spontaneous process.

i) Up-hill rolling of ball ii) Osmosis.

f) Define : i) Reduction ii) Oxidation.

g) Explain atomic orbital overlap with suitable example.

h) If atomic weight of nitrogen is 14, then how many atoms would it be present in 14 grams of it?

Q2) Attempt <u>any four</u> of the following: **[16]**

a) Give any four postulates of kinetic theory of gases.

b) Explain chemical or activated adsorption.

c) Write the equation of the line passing through point i) (2,1) and slope $-\frac{2}{3}$ & ii) (4,1) and slope $-\frac{1}{3}$.

P.T.O.

d) Explain de-Broglie's hypothesis and derive the expression for wavelength in terms of momentum of particle.

e) Define entropy and give its statistical importance.

f) Explain the terms i) frequency ii) Wavelength and iii) Wavenumber. How are the related?

Q3) Answer any four of the following. **[16]**

a) i) If $y = \frac{(2+x^2)}{(3-x^2)}$ find dy/dx

ii) Solve integral $\int x^{4/3}.dx$.

b) Give time independent Schrödinger equation. Describe wavefunctions for 'S and' P orbitals

c) Explain various types of catalysis with examples.

d) Obtain the expression for entropy change of an ideal gases at isothermal process.

e) Discuss the effect of temperature on i) Vapour pressure ii) Viscosity iii) Surface tension.

f) What is wave particle duality? Explain its significance in everyday object with an example.

Q4) Attempt <u>any four</u> of the following: **[16]**

a) What is atomic orbital overlap? Give factors affecting it.

b) What is SP^3 hybridization? Explain with suitable example.

c) Define: i) Molarity ii) Molality iii) Mole fraction iv) Normality.

d) Balance the following reaction by ion-electron method.
$KM_nO_4 + H_2SO_4 + Na_2S_2O_3 \rightarrow K_2SO_4 + Na_2SO_4 + MnSO_4$.

e) Draw the structures of XeO_3, $XeOF_3$, BrF_5 and Te Cl_4

f) Explain the formation of N_2 molecule on the basis of atomic orbital overlap.

Q5) Solve <u>any four</u> of the following: **[16]**

a) What volume of carbon dioxide gas will be evolved at NTP by heating 7.3 grams of $Mg(HCO_3)_2$?
(Mol.wt. of $Mg(HCO_3)_2$=146 & Mol.wt. of CO_2=44)

b) 10 ml of the solution of NaOH containing 2 grams of alkali per liter is exactly neutralized by 20ml of a solution of H_2SO_4 and 25ml of HCl solution separately. Calculate the strength of acids in grams per liter.

c) Viscosity measurement by Ostwald's viscometer for two liquids A and B was carried out. Liquid A whose density is 995 g dm^{-3} took 80seconds to flow, while the other liquid with density 1400g dm^{-3} took 120 seconds to flow. If viscosity of liguid A is 0.01002 poise calculate the viscosity of liquid B.

d) 8 moles of an ideal gas expand so that its temperature and volume changes from 33ºC and 6 L to 74ºC and 30 L. Calculate the change in entropy.

[Given: R=8.314J $(mole\text{-}k)^{-1}$; $C_v=\frac{3}{2}$ x R, J $(mole)^{-1}$].

e) Calculate the frequency and wave number associated with the radiation of wavelength 635nm and 465nm.

f) A heat engine operates between boiling point of mercury (357ºC) and 45ºC. If the maximum work done by the engine is 2000 calories. Calculate the heat absorbed by the engine from the source.[Given:1cal=4.184J].

Total No. of Questions :5]

SEAT No. :

P695

[Total No. of Pages :4

[4817]-1006
F.Y.B.Sc.
CHEMISTRY -II
Organic & Inorganic Chemistry
(2013 Pattern) (Paper - II) (Theory)

Time : 3 Hours] *[Max. Marks :80*

Instructions to the candidates:

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

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

a) Explain the following terms:

i) Chiral centre ii) Configuration

b) Define and explain the term "Bond energy".

c) Draw zig-zag structures of following compounds.

i) Butanone ii) Alanine

d) What is hydrogen bonding? Give examples to illustrate your answer.

e) How will you distinguish cyclohexylamine and aniline using chemical test?

f) Alkali metals are more reactive than alkaline earth metals; Explain.

g) Draw the structures of

i) H_2SO_4 ii) IF_7

h) Write the names and electronic configuration of group IA elements.

P.T.O.

Q2) Attempt any four of the following: **[16]**

a) What is resonance effect? Draw resonance structures of

i) Aniline ii) Nitrobenzene

b) What are carboxylic acids? How will you prepare acetic acid starting from

i) Ethyl alcohol ii) Methyl chloride

c) Explain the conformational isomerism in propane with energy profile diagram.

d) What are alcohols? How will you prepare ethyl alcohol from

i) Ethylene ii) Acetaldehyde

e) What is F.C acylation? How will you prepare acetophenone by using

i) Acetyl chloride ii) Acetic acid

f) What are alkanes? How will you prepare n-Butane from

i) Ethyl chloride ii) l-Butene

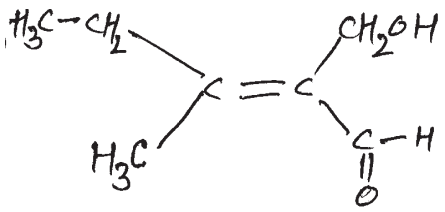
Q3) Attempt any four of the following: **[16]**

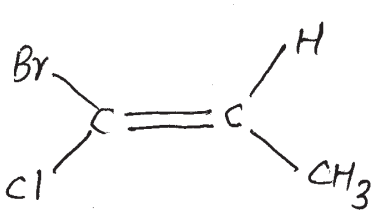
a) What are amines? How will you prepare following compounds from aniline?

i) Chlorobenzene ii) Phenol

b) What are alkyl halides? Discuss any two methods of preparation of alkyl halides.

c) Assign E and Z configuration of the following compounds.

i) 

ii) 

d) What are alkenes? How will you prepare propene from

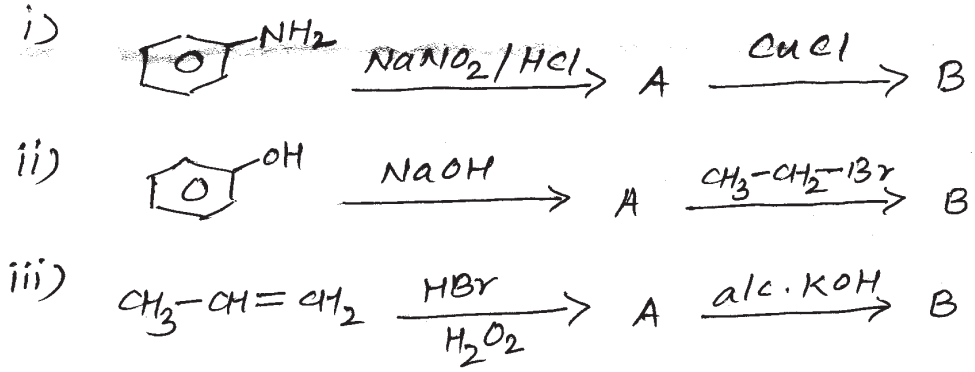
i) Propyl bromide ii) 1-propanol

e) Explain Aldol condensation with suitable example.

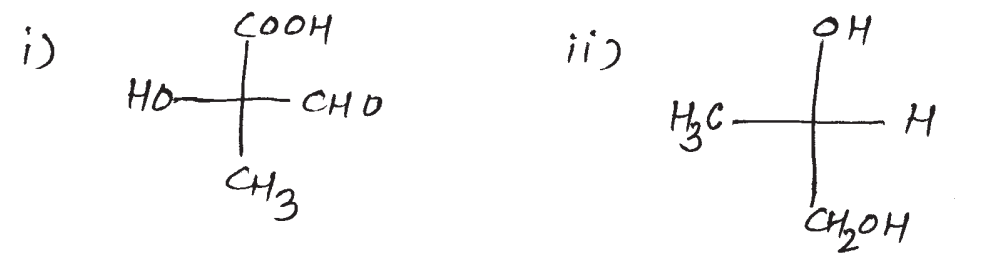
f) What is hybridisation? Discuss the formation of ethane molecule using the concept of hybridisation.

Q4) Attempt any four of the following: **[16]**

a) Identify the products A and B and rewrite the reactions (any two):



b) Assign the R and S configuration of following compounds.



c) What is inductive effect? How does it affects the strength of acids?

d) Write short notes on :

i) Cannizzaro reaction

ii) Williamson synthesis

e) Lithium shows anomalous behaviour in the family of alkali metals; Explain.

f) Write note on “Silicates”.

Q5) Attempt any four of the following: **[16]**

a) What are alkaline earth metals? Write their names and electronic configuration. Explain their reactivity.

b) Explain different applications of alkaline earth metals in biology, industry and agriculture.

c) Write note on solution of alkali metals and alkaline earth metals in liquid ammonia.

d) Explain structure and bonding of IF_5 molecule.

e) Oxygen shows anomalous behaviour in group VI A elements. Explain.

f) Write the names and electronic configuration of group III A elements and discuss the trends in atomic size and electronegativity.

EEE

Total No. of Questions : 5]

SEAT No. :

P696

[Total No. of Pages : 2

[4817]-1007
F.Y. B.Sc.
BOTANY
BO - 111 : Fundamentals of Botany (Plant Diversity, Morphology and Anatomy) (New Syllabus) (2013 Pattern) (Theory) (Paper-I)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

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

Q1) Attempt the following: **[16]**

a) What are Phanerogams?

b) What is Phycobiont?

c) Give any two examples of Monocotyledons.

d) Name any two classes of Bryophytes.

e) Give any two characters of Dicotyledons.

f) What is placentation?

g) Define Stomata.

h) What is the function of Xylem?

Q2) Attempt Any Four of the following: **[16]**

a) Write the symptoms of white rust disease.

b) Describe the Fruticose lichen.

c) Give the general characters of pteridophyta.

d) Describe the structure of typical leaf.

e) Describe any two types of cymose inflorescence.

f) Give the scope of Morphology.

P.T.O.

Q3) Write short notes on Any Four of the following: **[16]**

a) Sexual reproduction in Cystopus (Albugo).

b) Sporangium of Nephrolepis.

c) Characters of Monocotylendons.

d) Bulb.

e) Drupe.

f) Pneumatophores.

Q4) Attempt Any Two of the following: **[16]**

a) Describe thallus structure in Spirogyra.

b) Describe Vegetative reproduction in Riccia.

c) Describe the forms of Corolla.

d) What is mechanical tissue? Comment on different mechanical tissues.

Q5) Describe the external structure of Cycas sporophyte. Add a note on internal structure of Cycas rachis. **[16]**

OR

Describe the internal structure of Dicot and Monocot stem.

●●●●●

Total No. of Questions :5]

SEAT No. :

P697

[Total No. of Pages :2

[4817]-1008
F.Y.B.Sc.
BOTANY
BO- 112: Industrial Botany - I & II
(New Syllabus - 2013 Pattern) (Theory) (Paper - II)

Time : 3 Hours] *[Max. Marks :80*

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: **[16]**

a) What is tannin?

b) Define floriculture.

c) What is hardening?

d) Enlist types of biofertilizer?

e) Give any two plant resources of fibre.

f) Give any two plants used for biofuel production.

g) What is squash?

h) Give any two products of Aspergillus.

Q2) Attempt any four of the following: **[16]**

a) Give the concept of greenhouse technology and any two limitations of it.

b) Explain the process of incubation.

c) Write any two value added products of mushroom.

d) Give the commercial significance of biofuel.

e) Explain the commercial significance of biopesticide.

f) Give the concept and need of biofertilizers.

P.T.O.

Q3) Write short notes on any four of the following: **[16]**

a) Types of organic fertilizers.

b) Preparation of media for plant tissue culture.

c) Uses of mushroom.

d) Azadirachtin.

e) Nitrogen fixing biofertilizer.

f) Biofuel.

Q4) Answer any two of the following: **[16]**

a) Give an account of cultivation practices in tuberose.

b) What is seed industry? Give the importance of seed industry.

c) Describe in detail products and applications of Penicillium.

d) What is fruit processing? Describe the process of pickle preparation.

Q5) What is layering? Enlist the types of layering and describe in detail the air layering. **[16]**

OR

Give the botanical source, active principles and medicinal uses of Asparagus and add note on nutraceuticals.

EEE

Total No. of Questions : 5]

SEAT No. :

P698

[Total No. of Pages : 2

[4817]-1009
F.Y. B.Sc.
ZOOLOGY
ZY-101:Animal Systematics and Diversity-I & II
(2013 Pattern) (Theory) (Paper-I)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

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

Q1) Define/ explain: **[16]**

a) Holozoic nutrition

b) Protista

c) Contractile vacuole.

d) Spermatheca.

e) Aestivation.

f) Urochordata.

g) Gustato receptors.

h) Cartilagenous Fish.

Q2) Write short notes on (Any four) **[16]**

a) Significance of conjugation in paramoecium.

b) Binomial nomenclature.

c) Sketch and label T.S. of Earthworm passing through gizzard.

d) Write the salient features of protochordata.

e) Explain catadromous migration in fishes.

f) Give an account of sexual dimorphism in frog.

P.T.O.

Q3) Attempt the following (Any four) **[16]**

a) Sketch and label the structure of paramoecium.

b) Give distinguishing characters of class ciliata.

c) Give the general characters of Phylum-Coelenterata.

d) Discuss parental Care in Amphibia.

e) Define neoteny. Give an example of neoteny.

f) Sketch and label hepatic portal system of frog.

Q4) Explain in brief (Any Two): **[16]**

a) Give the general characters of Phylum - Annelida. Write name of any one class with suitable example.

b) With the help of neat labelled diagram describe the structure of septal nephridia of earthworm.

c) Describe the structure of dorsal view of brain of frog.

d) Give salient features of Anura with suitable example.

Q5) Define reproduction? Describe male reproductive system of earthworm. **[16]**

OR

Describe the internal structure and working of heart of frog.

Total No. of Questions :5]

SEAT No. :

P699

[Total No. of Pages :2

[4817]-1010
F.Y.B.Sc.
ZOOLOGY
ZY-102: Fundamentals of Cell biology and Genetics
(2013 Pattern) (Theory) (Paper - II)

Time : 3 Hours] *[Max. Marks :80*

Instructions to the candidates:

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

Q1) Define / Explain the following: **[16]**

a) Phagocytosis

b) Cytoplasm

c) Oxysomes

d) Cytology

e) Colour blindness

f) Holandric genes

g) Phenotype

h) Syndrome

Q2) Write short notes on (Any Four): **[16]**

a) Scope of cell biology.

b) fluid mosaic model of plasma membrane.

c) Significance of mitosis.

d) Monohybrid ratio with suitable example.

e) Lethal genes.

f) Kappa particles.

P.T.O.

Q3) Attempt the following (Any Four): **[16]**

a) Describe the chemical composition of plasma membrane.

b) Differentiate between prokaryotic and Eukaryotic cells.

c) Write note on cytoplasmic stain with any two examples.

d) What is gene interaction? Explain codominance with suitable example.

e) What is chromosomal aberrations? Describe any one structural aberration of chromosome.

f) Describe genetic counselling.

Q4) Attempt the following (Any Two): **[16]**

a) With the help of suitable diagram describe the stages of prophase - I of meiosis.

b) Describe the ultrastructure of nuclear envelope.

c) Describe any two methods of sex determination with suitable examples.

d) What is syndrome? Explain genetic basis of Klinefelter's syndrome.

Q5) Describe the structure and functions of lysosomes and peroxisomes. **[16]**

OR

Waht is polygenic inheritance? Explain if with reference to skin colour in man.

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Total No. of Questions :5]

SEAT No. :

P700

[Total No. of Pages :2

[4817]-1011
F.Y.B.Sc.
GEOLOGY
Mineralogy and Petrology
(2013 Pattern) (Paper - I)

Time : 3 Hours] *[Max. Marks :80*

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 in 2 - 3 lines: **[16]**

a) Define a fold.

b) Define Axis of symmetry of a crystal.

c) What is cleavage?

d) What is basalt?

e) What is gemmology

f) What are the agents of metamorphism?

g) Define Isomorphism.

h) Name the instrument used to find the strike and dip of a strata.

Q2) Answer the following (Any 4): **[16]**

a) Give an account of minerals used in cement industry.

b) Describe the Nesosilicate structure with examples.

c) Explain co-valent bonding in minerals with examples.

d) What is fracture? Explain the different types of fractures.

e) What are Residual Deposits?

f) Explain the process of crystallisation of magma-in the formation of minerals.

P.T.O.

Q3) Answer the following (Any 4): **[16]**

a) Give the diagnostic characters of sedementary rocks.

b) Give the classification of Igneous Rocks based on silica percentage.

c) Explain flow structure.

d) Explain contact metamorphism with suitable egs.

e) Describe the clastic texture in sedementary rocks.

f) What is magma? Give the composition of magma.

Q4) Answer the following (Any 2): **[16]**

a) State the various optical properties of minerals between Crossed Nicols. Explain Extinction.

b) Define a rock. Explain the rock cycle.

c) Explain the following structure of sedementary rock.

i) Graded Bedding

ii) Current Bedding

d) What is an unconformity? Write note on angular unconformity.

Q5) Answer <u>any one</u> of the following: **[16]**

Define a fault. Describe the different parts of the fault with the help of neat diagram. Describe Normal and Reverse fault.

OR

Give the Elements of symmetry, crystallographic axes, the various forms present with indices in cubic system, Type - Galena.

EEE

Total No. of Questions :5]

SEAT No. :

P701

[Total No. of Pages :2

[4817]-1012
F.Y.B.Sc.
GEOLOGY
Physical Geology and Palaeontology
(2013 Pattern) (Paper - II)

Time : 3 Hours] *[Max. Marks :80*

Instructions to the candidates:

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

Q1) Define / Answer the following in 2 / 3 lines: **[16]**

a) Define Disaster.

b) Give a list of equipments used in collection of fossil samples.

c) Give the conditions for fossilisation.

d) Mention the types of suture lines in cephalopods.

e) Draw a neat labelled diagram of Gastropod shell.

f) Define seismic waves.

g) Give the average density of the earth.

h) Define meandering.

Q2) Answer the following questions (Any Four): **[16]**

a) State the Historical methods in the age determination of earth.

b) Give the concept of Geological time scale.

c) Explain the Big Bang theory for the origin of the universe.

d) Uses of the fossils.

e) Distinguish between regular and irregular echinoids.

f) Describe the various sample techniques used in the collection of fossils in the field.

P.T.O.

Q3) Answer the following questions (Any Four): **[16]**

a) Define palaeontology. Give its branches.

b) Describe the Head / cephalon of trilobite.

c) Explain the Apical disc of Echinoids.

d) Define weathering. Describe the types of mechanical weathering.

e) Describe the central type of volcanic eruption. Add on products of volcanoes.

f) What is Isostacy? Explain Pratt's model of Isostatic compensation.

Q4) Answer the following question (Any Two): **[16]**

a) Explain the theory of continental Drift and give its supportive evidences.

b) Describe the landforms formed by the action of sea.

c) Describe different modes/ types of preservation of fossils.

d) Describe the coiling and different forms of Gastropod shells.

Q5) Describe the different erosional and depositional landforms formed by the action of river. **[16]**

OR

Give the similarities and dissimilarities between Lamellibranchia and Brachiopoda shell. **[16]**

EEE

Total No. of Questions : 5]

SEAT No. :

P702

[Total No. of Pages : 3

[4817]-1013
F.Y. B.Sc.
STATISTICS/STATISTICAL TECHNIQUES
Descriptive Statistics
(2013 Pattern) (Paper-I)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

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

Q1) Attempt each of the following:

a) i) Define simple random sampling. **[1]**

ii) State any two important properties of arithmetic mean. **[1]**

iii) Define "Leptokurtic" distribution. **[1]**

iv) Define "independence of two attributes". **[1]**

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

i) If cov (X, Y)= -40, then cov $(\frac{X}{5}, -Y)$ is equal to:

A) 8 B) 40 C) -40 D) -8

ii) Mean square deviation is minimum when deviation is measured from:

A) Median. B) Mode.
C) Mean. D) Any arbitrary number a.

iii) If (AB)N>(A)(B), then attributes A and B are:

A) Independent B) Positively associated
C) Dissociated D) Negatively associated

iv) Percentage number of observations above the fourth decile are:

A) 40% B) 6%
C) 4% D) 60%

P.T.O.

c) i) If b_{yx}= -0.8, $\sigma_x = \sigma_y$=8, find r. Also comment on correlation between X and Y. **[2]**

ii) Using method of dot operator in case of two attributes A and B, express ($\alpha\beta$) in terms of class frequencies. Find ($\alpha\beta$) if (α)=60,(B)=40, (AB)=30. **[2]**

iii) Explain "uncorrelated variables" using scatter diagram. **[2]**

iv) Given that A.M.=30, median=35; find - mode. Also comment on skewness (using diagram). **[2]**

Q2) Attempt any four of the following: **[4 each]**

a) Compute Paasche's and Laspeyre's price index number for the following data:

Item	Current year		Base year	
	Price	Quantity	Price	Quantity
A	25	7	35	5
B	48	12	60	10
C	35	10	45	10
D	25	20	20	25

b) Compute the first four central moments if n=100, $\mu_1' = 2, \mu_2' = 20, \mu_3' = 40, \mu_4' = 200$.

c) State any four demerits of mode.

d) Explain systematic sampling with an illustration.

e) If attributes A and B are positively associated then show that attributes A&β are negatively associated.

f) Explain one absolute measure of dispersion and one relative measure of dispersion.

Q3) Attempt Any four of the following. **[4 each]**

a) Mean and the second order raw moment of symmetric and mesokurtic distribution are 4 and 26 respectively, compute the third and the fourth raw moment.

b) Derive the formula of combined variance of two groups with equal size and equal arithmetic mean.

c) Out of 80 employees in the company, 60% are males, of which 50%are experienced. The number of experienced employees is 50. Find number of employees who are

i) Unexperienced.

ii) Experienced female.

iii) Either experienced or male.

d) Arithmetic mean and geometric mean of two observations are 26 and 24 respectively. Find the two observations and hence find harmonic mean.

e) Show that Bowley's coefficient lies between -1 and +1.

f) If cov(X,Y)=-90, var(X)=121, r = -0.8 find var(Y) and residual sum of squares for the linear model Y=a+bX+r.

Q4) Attempt any two of the following: **[8 each]**

a) Explain the following terms:

i) Ultimate class frequency.

ii) Positive attribute

iii) Positively skewed distribution.

iv) Positively correlated variables.

b) Show that: i) $\beta_2 \geq 1$ ii) $\beta_2 \geq \beta_1 + 1$

c) Define "rank". Derive Spearman's rank correlation coefficient for bivariate data without ties.

d) Show that $-1 \leq \rho(X, Y) \leq 1$.

Q5) Attempt any one of the following:

a) i) What is meant by index numbers. Discuss any two problems or considerations while index numbers are constructed. **[8]**

ii) Explain the procedure of fitting second degree curve $Y = a + bX + cX^2$ for a bivariate data. **[8]**

b) i) Compute Karl-Pearson's coefficient of correlation for the following data and interpret the result. **[8]**

Export	10	11	14	14	20	22	16	12
Import	12	14	15	16	21	26	21	15

ii) Compute Bowley's coefficient of skewness if quartile deviation is 10 and average of lower and upper quartiles is 40, and median is 47. Also comment on skewness. **[4]**

iii) Show that variance is invariant of change of origin but is affected by the change of scale. **[4]**

Total No. of Questions : 5]

SEAT No. :

P703

[Total No. of Pages : 5

[4817]-1014
F.Y. B.Sc.
STATISTICS / STATISTICAL TECHNIQUES
Discrete Probability and Probability Distributions
(2013 Pattern) (Paper - II)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

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

Q1) Attempt each of the following:

a) i) Define a finite sample space. **[1]**

ii) Define a degenerate distribution. **[1]**

iii) Give one real-life situation where binomial distribution can be applied. **[1]**

iv) If A and B are independent events with P(A) = 0.3, P(B) = 0.5, find $P(A' \cap B')$. **[1]**

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

i) In an experiment of planting four seeds, the number of seeds germinated after a week are recorded. The sample space of this experiment is

A) (0, 4) B) {1, 2, 3, 4}

C) {0, 1, 2, 3, 4} D) [0, 4)

ii) If E(X) = 4 and Var (X) = 3, then Var (2X – 1) is equal to

A) 11 B) 12

C) 5 D) 7

P.T.O.

iii) The classical approach to probability assumes that all possible outcomes of an experiment are

A) dependent B) independent

B) mutually exclusive D) equally likely

iv) If X follows discrete uniform distribution on 0, 1, 2,..., n and the mean of the distribution is 6. Hence the value of n is

A) 11 B) 6

C) 36 D) 12

c) i) State any two limitations of classical definition of probability. **[2]**

ii) Let X ~ B(10, 0.6), find mode of X. **[2]**

iii) Define negative binomial distribution. **[2]**

iv) State the multiplication theorem for two events A and B defined on sample space Ω. **[2]**

Q2) Attempt <u>any four</u> of the following: **[4 each]**

a) A r.v. X has the following probability distribution:

X	0	1	2	3	4
P(x)	0.15	0.15	0.30	0.25	0.15

Find the probability distribution of

i) $Y = X - 2$

ii) $W = \dfrac{2X+1}{3}$

b) If $P(A) = P(B) = \dfrac{1}{2}$ and $P(A \cup B) = 0.8$, Find

i) $P(A \cap B)$

ii) P (exactly one of A and B occurs)

c) For a Bernoulli r.v. X, $\mu_3' = 0.6$, find Var (X).

d) An integer is chosen at random from 1 to 100. What is the probability that the number is divisible by 11? Also find the probability that number is divisible by 11 as well as it is divisible by 7.

e) Explain the following with one illustration each:

i) occurrence of an event.

ii) mutually exclusive events.

f) Let X~ B(n, p), find the m.g.f. of X.

Q3) Attempt <u>any four</u> of the following : **[4 each]**

a) Let $\Omega = \{a, b, c, d, e, f, g\}$ with probability model given below:

Sample point	a	b	c	d	e	f	g
Probability	0.05	0.10	0.20	0.25	0.16	0.14	0.10

If $A = \{a, b, c, e\}$, $B = \{c, d, e, f\}$ be two events defined on Ω. Find

i) $P(A \cup B)$

ii) $P(A \cap B)$

iii) P(A)

iv) P(B/A)

b) Define Hypergeometric distribution and find its mean.

c) Determine k such that the following function is a p.m.f.:

$P(X = x) = k\,(x^2 + 2x + 1)$, x : 0, 1, 2, 3

$= 0$, otherwise

Also find $P(X = 1 \mid X \leq 2)$

d) Events A, B, C forms a partition of a sample space Ω. If 2P(A) = P(B) = 3 P(C), Find $P(A \cup C)$.

e) The p.m.f. of r.v. X is given by $P[X = x] = \begin{cases} \frac{x}{10}, & x: 1, 2, 3, 4 \\ 0, & \text{otherwise} \end{cases}$

Find E[2 X – 3].

f) Define a discrete uniform distribution with parameter 'n', also find its variance.

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

a) A r.v (X, Y) has joint p.m.f. as follows: **[8]**

X \ Y	1	2	3
–1	0.1	0.1	0.1
0	0.1	0.2	0.1
1	0.05	0.15	0.10

Find:

i) Marginal distributions of X and Y.

ii) Conditional probability distribution of X given Y = 2.

b) Define: **[8]**

i) The joint p.m.f. of a two dimensional discrete r.v.

ii) Mathematical expectation of a function of a discrete bivariate r.v. (X, Y).

iii) r^{th} order factorial moment of a discrete r.v.

iv) Cumulant generating function of a r.v. X.

c) i) State and prove Baye's theorem. **[6]**

ii) State uniqueness property of m.g.f. **[2]**

d) i) Show that cumulant generating function of sum of two independent random variables is sum of their cumulant generating functions. **[4]**

ii) Number of road accidents on a highway during a month follows a Poisson distribution with mean 4. Find the probability that in a certain month number of accidents on the highway will be less than 2. **[4]**

Q5) Attempt <u>any one</u> of the following:

a) i) For a certain probability distribution: **[8]**

$\mu_1' = 4, \mu_2 = 3, \gamma_1 = 1 \text{ and } \beta_2 = 4$

Find the first four raw moments

ii) Let X and Y be two independent binomial variables with parameters ($n_1 = 6, p = 0.6$) and ($n_2 = 7$, P = 0.6)respectively. Find

A) P[X + Y = 6] **[3]**

B) P[X = 2 / X + Y = 9] **[5]**

b) i) The cumulative distribution function (c.d.f.) of a discrete r.v. X is given below:

X	1	2	3	4	5	6
F(x)	0.15	0.35	0.45	0.68	0.86	1

Find

A) The probability distribution of r.v.X. **[2]**

B) P[X = 5 | X ≥ 3]. **[3]**

C) The values of median and mode of the distribution. **[3]**

ii) The joint p.m.f. of (X, Y) is as given below: **[8]**

X \ Y	0	1
0	0.4	0.1
1	0.2	0.3

Find correlation coefficient between X and Y.

Total No. of Questions : 5]

SEAT No. :

P704

[Total No. of Pages : 2

[4817]-1015
F.Y. B.Sc.
GEOGRAPHY
Gg - 110 : Geomorphology - I
(New Course) (2013 Pattern) (Paper - I)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***All questions carry equal marks.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Use of Map Stencils is allowed.***

Q1) Answer the following in twenty words (Any Eight): **[16]**

a) What is Crust?

b) Explain the nature of Geomorphology.

c) What is Pangea?

d) What are 'L' Waves?

e) What is a plate boundary?

f) How are metamorphic rocks formed?

g) What is the importance of weathering?

h) What are 'U' shaped Valleys?

i) Give the Major types of Glaciers.

j) What are driekanters?

Q2) Explain the following in 150 words: (Any Four) **[16]**

a) Divisions of the Cainozoic Era.

b) Layers in the interior of the earth.

c) Pangea and its disintegration

d) Temperature and physical weathering.

e) What is swash and backwash?

f) Difference between a rapid and waterfall.

P.T.O.

Q3) Answer the following in 150 words: (Any Four): **[16]**

a) Discuss the evolution of the theory of Isostasy in brief.

b) What is a rift Valley? How is it formed?

c) Causes of earthquake.

d) Characteristics of metamorphic rocks.

e) What are Zeugens and how are they formed?

f) Discuss any two depositional landforms formed due to sea waves.

Q4) Answer the following in 300 words: (Any two) **[16]**

a) List the various branches of Physical Geography and bring out their importance.

b) What is a fault? Discuss different types of faults.

c) Classify sedimentary rocks and list their properties in detail.

d) What are Moraines? Discuss different types of Moraines.

Q5) Answser the following in 500 words: (Any one): **[16]**

Discuss the various types of volcanoes and associated land forms.

OR

What is a delta? Discuss the major four types of deltas.

Total No. of Questions : 5]

SEAT No. :

P705

[Total No. of Pages : 2

[4817]-1016
F.Y. B.Sc.
GEOGRAPHY
Gg-120: Climatology and Oceanography
(2013 Pattern) (Paper-II)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***All questions carry equal marks.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Use of stencil is allowed.***

Q1) Answer the following in twenty words (any Eight): **[16]**

a) Define hydrological cycle.

b) Give examples of High clouds.

c) What is concept of pressure gradient?

d) What is La-Nino?

e) Types of winds.

f) What is submarine relief?

g) What is fiord?

h) Define salinity.

i) Define Tsunami.

j) Give the types of ocean currents.

Q2) Explain the following in 150 words (any four): **[16]**

a) Structure of Atmosphere.

b) Effects of Global warming.

c) Vertical distribution of pressure.

d) Relief of pacific ocean.

e) Haff Nehruny coast.

f) Types of tides.

P.T.O.

Q3) Answer the following in 150 words (any four): **[16]**

a) Importance of climatology.

b) Land and sea breezes.

c) Types of clouds.

d) Importance of oceanography.

e) Emerged coast.

f) Nature of oceanography

Q4) Answer the following in 300 words (any two): **[16]**

a) Heat Budget of the Earth.

b) Describe various Local winds.

c) Formation of ocean currents in atlantic ocean.

d) Salinity of Land Locked sed.

Q5) Explain the factors affecting horizontal distribution of temperature. **[16]**

OR

Explain the factors affecting distribution of salinity.

Total No. of Questions : 5]

SEAT No. :

P706

[Total No. of Pages : 2

[4817]-1017
F.Y. B.Sc.
MICROBIOLOGY
Introduction to Microbiology
(2013 Pattern) (Paper-I)

Time : 3 Hours] *[Max. Marks : 80*

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) Attemt the following: **[16]**

a) What is a base?Give two examples.

b) Name any two diseases caused by Rickettsia?

c) Define pH.

d) Name any two capsulated bacteria.

e) Give any two functions of gas vacuoles.

f) Match the following:

i) Alexander flemming	a) Pasteurisation
ii) Louis Pasteur	b) Animal viruses
	c) Penicillin.

g) Fill in the blanks.

i) Metachromatic granules are also known as_____.

ii) Diatoms are _____.

h) State true or false:

i) DNA contains adenine, guanine, cytosine and uracil.

ii) The cell theory was proposed by Robert Hooke.

P.T.O.

Q2) Write short notes on any four. **[16]**

a) Vaccination.

b) Advantages of Biocontrol Agents.

c) Pili

d) DNA

e) Discovery of Anaerobic life

f) Plasmids.

Q3) Attempt any four of the following: **[16]**

a) Write a brief account on industrial microbiology.

b) What is normal flora? Give its importance.

c) Name the different micro-organisms used as Biofertilizers. Give their applications.

d) Enlist the general characters of Protozoa.

e) Explain in brief surgical Antisepsis.

f) Explain reproduction in fungi.

Q4) Answer any two of the following: **[16]**

a) Give the distinguishing characters of viruses. Add a note on viroids & prions.

b) Explain Redi's three jar experiment with a neat labelled diagram.

c) Give the difference between flagella of gram negative and gram positive bacteria.

d) Give structure and function of triglycerides.

Q5) Attempt any one of the following: **[16]**

a) Describe the structure and function of proteins.

b) Describe the structure and function of bacterial cell wall.

Total No. of Questions : 5]

SEAT No. :

P707

[Total No. of Pages : 2

[4817]-1018
F. Y. B.Sc
MICROBIOLOGY
Basic Techniques in Microbiology
(Paper-II) (New Course)(2013 Pattern)

Time : 3 Hours] *[Max. Marks : 80*

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) Answer the following **[16]**

a) What are stains? Give two examples of basic stains.

b) State-True or false.

i) Moist heat sterilization is more effective than dry heat sterilization._____

ii) 450 nm wavelength of uv light is used for sterilization.

c) Write any two characters of an ideal disinfectant.

d) Define - Lyophilization.

e) What is mordant? Give example.

f) Name two methods of direct microscopic count.

g) Explain role of culture collection centre.

h) What is optimum temperature?

Q2) Write short notes on any four. **[16]**

a) Synthetic media.

b) Growth phases of bacterial culture.

c) Photoautotrophs.

d) Filtration as a method of sterilization.

e) Cultivation of thermophiles.

f) Role of meat extract in bacterilogical media .

P.T.O.

Q3) Attempt any four of the following **[16]**

a) Explain diauxic growth curve.

b) What is pure culture? Write any one method of obtaining pure culture.

c) Explain Gram staining as a differential staining.

d) Describe resolving power of a compound microscope.

e) Explain the method for checking of efficiency of disinfection.

f) Give principle of monochrome staining.

Q4) Attempt any two of the following. **[16]**

a) What is synchronous culture ? Explain methods of obtaining synchronous culture.

b) What are aberrations? Explain with suitable diagram.

c) Describe standard plate count method for enumeration of bacteria.

d) What is enrichment culture technique? Explain enrichment of photosynthetic and thermophilic bacteria.

Q5) Attempt any one of the following. **[16]**

a) With suitable ray diagram describe principle and working of bright field microscope.

b) What is disinfection? Enlist various chemical disinfectants. Explain mode of action and applications of any two disinfectants.

◀▶◀▶◀▶

Total No. of Questions : 5]

SEAT No. :

P708

[Total No. of Pages : 3

[4817]-1023
F.Y. B.Sc.
ELECTRONIC SCIENCE
EL-101: Principles of Analog Electronics
(2013 New Pattern) (Paper-I)

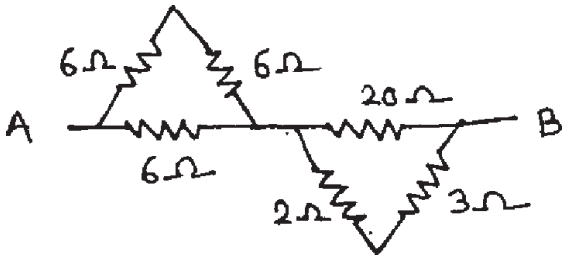
Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

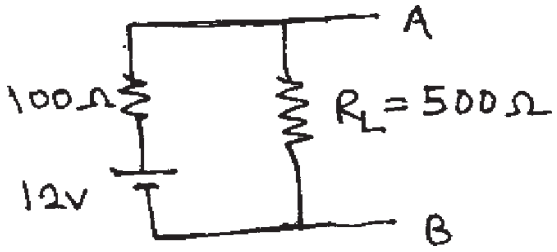
1) ***All questions are compulsory.***
2) ***Draw neat labelled diagrams & symbols wherever necessary.***
3) ***Use of log tables & calculator is allowed.***
4) ***Figures to the right indicate full marks.***

Q1) Answer the following questions in brief. **[16]**

a) Find equivalent resistance of the following circuit.



b) Obtain terminal voltage for the following voltage source.



c) Differentiate between square wave & pulse signal with the help of waveforms.

d) 'Zener diode can be called as voltage regulator', comment.

e) Draw CB & CE configurations of a transistor.

f) Define :

i) Voltage Amplification ii) Current Amplification.

P.T.O.

g) Give circuit symbols of UJT & FET (p-channel).

h) Explain the meaning of input & output offset voltage of op-aup.

Q2) Attempt <u>any four</u> of the following questions. **[16]**

a) i) Define capacitive reactance. Give necessary formula.

ii) Give construction of ferrite core inductor.

b) Explain working of RC circuit as low pass filter.

c) Describe construction & working of solar cell.

d) Draw circuit diagram to study I-V characteristics of pnp transistor in CE mode. Explain the characteristics.

e) With the help of equivalent circuit explain working of UJT.

f) Explain working of op-amp as voltage follower.

Q3) Attempt <u>any four</u> of the following questions. **[16]**

a) i) Write a short note on isolation transformer.

ii) Give two important specifications of a switch & fuse.

b) Show that in capacitive circuit current leads the voltage.

c) Obtain relation between α & β of a transistor.

d) What is clamping? Explain positive clamper.

e) Explain construction & working of n-channel FET.

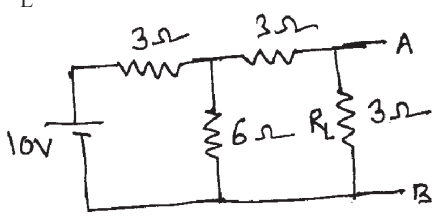
f) Give circuit diagrams of op-amp as comparator & schmitt trigger.

Q4) Attempt <u>any four</u> questions. **[16]**

a) i) Draw construction of co-axial cable.

ii) Give one application of D-type connector & RJ-45 connector.

b) Obtain Thevenine's equivalent of the following circuit and find voltage across R_L.



c) Show that efficiency of full wave rectifier is 81.2%.

d) What is load line? Draw load line for CE configuration and show different points on it.

e) Describe construction & working of p-channel depletion type MOS.

f) State ideal characteristics of op-amp.

Q5) Attempt any four of the following: **[16]**

a) i) Draw construction of general purpose e.m. relay.

ii) Write a short note on Western cadmium cell.

b) State & prove maximum power transfer theorem.

c) i) State super position theorem & Norton theorem.

ii) Draw block diagram of power supply.

d) Explain frequency response of CE amplifier and define band width.

e) i) Explain working of JFET as switch.

ii) What do you mean by transistor biasing. Draw voltage divider bais circuit.

f) Calculate gain of op-amp in inverting & noninverting mode if the value of input resistor is $10k\Omega$ & feedback resistor is $100k\Omega$.

Total No. of Questions : 5]

SEAT No. :

P709

[Total No. of Pages : 2

[4817]-1024
F. Y. B.Sc
ELECTRONIC SCIENCE
EL-102: Principles of Digital Electronics
(Paper-II) (New-2013 Pattern)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

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

Q1) Answer the following questions in brief **[16]**

a) What is weighted code? Give one example.

b) State the rules of binary addition.

c) Prove

i) $A+A\cdot B=A$ ii) $A\cdot(\overline{A}+B)=A\cdot B$

d) What is 1's and 2's complement of binary number?

e) What is fan in of a logic family?

f) Subtract$(1001)_2$ from $(1100)_2$ using 1's complement method.

g) What is function of strobe in multiplexer?

h) What is synchronous counter.

Q2) Answer any four of the following: **[16]**

a) Use only NOR gate to design AND gate and OR gate. Verify using truth table.

b) Write a note on priority encoder.

c) i) Convert Binary to Gray : 10111, 11001

ii) What is positive and negative logic?

d) Explain 2's complement method of subtraction with example

e) State and verify DeMorgan's theorem.

f) Draw the ciruit of CMOS NOR gate. Explain it's working.

P.T.O.

Q3) Answer any four of the following **[16]**

a) Perform the following conversions:

i) $(25.6)_{10}=(?)_2$ ii) $(A8.4)_{16}=(?)_{10}$

b) What is half adder? Write its truth table and explain it with neat diagram.

c) What is encoder? Explain Decimal to BCD encoder.

d) Explain clocked S-R Flip Flop with neat diagram and truth table.

e) What is multiplexer? Explain 2:1 multiplexer with proper logic diagram.

f) Explain decade counter with neat logic diagram.

Q4) Answer any four of the following. **[16]**

a) i) What is excess-3 code?

ii) State precautions to handle CMOS ICs.

b) What is shift register ? What are the applications of shift registers?

c) Minimize the expression using k-map and draw the simplified circuit.

$$Y=ABC+\bar{A}B\bar{C}+AB\bar{C}$$

d) Explain 1:4 Demultiplexer using neat logic diagram.

e) Draw the circuit diagram for three bit down counter and explain it.

f) Explain 4-bit parallel adder with neat diagram.

Q5) Answer any four of the following: **[16]**

a) Construct the logic circuit using basic logic gates for following expressions.

i) $Y=(A+\bar{B})\cdot(\bar{A}+B)$

ii) $Y=\bar{A}\bar{B}+\bar{A}B+AB$

b) What is tristate logic? State advantages of tristate logic.

c) How will you get D Flip-Flop and T Flip-Flop from JK Flip-Flop ? Draw logic diagram and truth table of each.

d) Simplify the following equation using laws of Boolean Algebra and draw the logic diagram.

$$Y=\bar{A}\bar{B}\bar{C}+\bar{A}B\bar{C}+A\bar{B}\bar{C}+AB\bar{C}$$

e) What is comparator? Explain 2- bit binary comparator with logic diagram.

f) What is seven segment decoder | driver ?

Draw and explain the circuit for seven segment decoder IC, driving common anode display.

◀▶◀▶◀▶

Total No. of Questions : 4]

SEAT No. :

P710

[Total No. of Pages : 2

[4817]-1025
F.Y. B.Sc. (Annual)
DEFENCE AND STRATEGIC STUDIES
DS - 1 : Evolution of Strategic Thought
(2013 Pattern) (Paper-I) (New Course)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

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

Q1) Answer in 20 words each (Any Ten): **[20]**

a) Define "Civil War".

b) Define "Sea Power".

c) Write any two names of strategic thinker.

d) What do you know about Machiavelli?

e) Define "Nationalism".

f) State the meaning of "Air Power".

g) Write any two causes of war.

h) Who was sun-tzu?

i) What do you mean by Geopolitics?

j) What do you know about Gustavas Adolphus?

k) By whom the well known book "On War" it was wrote?

l) Which theory it was introduced by Douhet?

m) Define "Strategy".

P.T.O.

Q2) Answer in 50 words (Any Two): **[10]**

a) Explain in brief the concept of geopolitics.

b) Write a few lines on "Guerrilla Warfase"

c) What do you know about Adamsmith?

d) Write in brief Industrial Revolution.

Q3) Answer in 150 words (Any Two): **[20]**

a) Highlight on the impact of American Civil War.

b) Write an essay on "Total War".

c) Explain the views of Mao-Tse-Tung on "Guerrilla Warfase"

d) Explain the Kautilya as a strategic thinker.

Q4) Answer in 300 words (Any Two): **[30]**

a) Evaluate the thoughts of Karl Von Clausewitz.

b) Explain the views of Prof. Mackinder on "Heartland".

c) Discuss the elements of sea power as per A.T. Mohan.

d) Discuss about geopolitical thoughts of Houshafer.

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Total No. of Questions :4]

SEAT No. :

P711

[Total No. of Pages :2

[4817]-1026
F.Y.B.Sc. (Annual)
DEFENCE & STRATEGIC STUDIES
DS-2: India's National Security
(2013 Pattern) (Paper - II)

Time : 3 Hours] *[Max. Marks :80*

Instructions to the candidates:

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

Q1) Answer in 20 words each (any ten): **[20]**

a) What is National Security?

b) Introduce *Bharat.*

c) Introduce *Mukti Vahini*.

d) What was the out come of 1962 war?

e) Write the duration of 1965 war.

f) Introduce Himalaya.

g) Introduce Red Cliff.

h) When Bangladesh was formed?

i) Write about Princely states.

j) Who was General Aurora?

k) Briefly introduce Kargil WAR.

l) What is meant by SAARC?

m) What do you mean by amphibious warfare?

P.T.O.

Q2) Answer in 50 words each (any two): **[10]**

a) Write about the India-Bhutan relation.

b) Enumerate the desirable characteristics of military posture.

c) Explain the importance of geostrategic location.

d) Explain about the importance of transportation and communication.

Q3) Answer in 150 words (any two): **[20]**

a) What are the constraints and compulsion in a democracy in controlling LIC?

b) Explain about the Civil- Military relations in India.

c) Explain about the role of Army in 1965 war.

d) Explain about the role of Science & Technology in defence preparedness.

Q4) Answer in 300 words (any two): **[30]**

a) Where India failed in dealing with Bangladesh?

b) Explain about India defence policy since 1980.

c) Can India ignore an assertive China anymore? Submit your argument.

d) Explain about India's maritime / naval policy.

EEE

Total No. of Questions : 4]

SEAT No. :

P712

[Total No. of Pages : 2

[4817]-1027
F.Y. B.Sc.
DEFENCE AND STRATEGIC STUDIES
DS-3: International Security
(2013 Pattern) (Paper-III)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

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

Q1) Answer in 20 words (Any ten): **[10x2=20]**

a) Define Arms Control

b) Define Collective security?

c) Define common security

d) Define international security

e) What do you mean by National vital values?

f) Define Nationalism

g) Define Globalization

h) What do you mean by conflict management?

i) Define international law

j) State the meaning of pacific settlement.

k) Define International Relations

l) Define equal security

m) Define Non-Alignment

P.T.O.

Q2) Answer in 50 Words (any two): **[2x5=10]**

a) Explain advantages of regionalism

b) Discuss challenges to India's national security

c) Explain basic features of Neutrality

d) Discuss merits of Balance of power.

Q3) Answer in 150 words (any two): **[2x10=20]**

a) Explain Techniques of Balance of power (BOP)

b) Discuss problems of collective security

c) Assesses the role of Non-alignments in maintaining world security

d) Discuss social achievements of U.N.O

Q4) Answer in 300 Words(any two): **[2x15=30]**

a) Discuss UN system of pacific settlement of Disputes.

b) Explain importance of peace and conflict studies

c) Discuss role of regionalism in world stability and peace

d) Write a note on the sources of International Law.

Total No. of Questions :5]

SEAT No. :

P713

[Total No. of Pages :2

[4817]-1028
F.Y.B.Sc.
ENVIRONMENTAL SCIENCE
EVS- 101: Fundamentals of Environmental Chemistry & Environmental Biology
(2013 Pattern) (New Course) (Paper - I) (Theory)

Time : 3 Hours] *[Max. Marks :80*

Instructions to the candidates:

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

Q1) Answer the following in not more than 5 lines: **[16]**

a) Enlist the segments of environment.

b) Write examples of heavy metals.

c) What are cationic detergents?

d) Define: Green chemistry.

e) State the difference between moncot and dicot.

f) Define: Environmental Biology

g) What are mesophytes? Give one example.

h) Define: Evolution.

Q2) Answer any four of the following: **[16]**

a) Explain carbon cycle with diagram.

b) Describe the characteristics of Nitrogen-Oxides Chemistry in atmosphere.

c) Explain the working and principle of pH meter.

d) Discuss climatic factors for distribution of life on Earth.

e) Describe major ecological types of India.

f) Explain classification of plants based on form.

P.T.O.

Q3) Write short notes on any four of the following: **[16]**

a) Physical properties of water.

b) Titrimetric methods.

c) Scope of Environmental Chemistry.

d) Components of systematic.

e) Continental Drift - Barriers & Bridges.

f) Ecological adaptations of Xerophytes.

Q4) Answer any two of the following: **[16]**

a) Describe in detail Behaviour of heavy metals and their compounds.

b) Explain effects of pesticide on environment & human body.

c) Describe extraction of & threats to Bioresources.

d) Write an account on microbial life in air and water.

Q5) Answer any one of the following: **[16]**

a) What are Bio- geochemical cycles? Write about Nitrogen cycle with diagram.

b) Explain in detail Bentham & Hooker system of classification.

EEE

Total No. of Questions : 5]

SEAT No. :

P714

[Total No. of Pages : 2

[4817]-1029
F. Y. B. Sc.
ENVIRONMENTAL SCIENCE
EVS-102: Fundamentals of Environmental Geosciences & Environmental Pollution
(New course) (Paper-II) (2013 Pattern)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

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

Q1) Answer the followings in not more than 5 lines : **[16]**

a) What is Rock cycle?

b) Write the major plant nutrients.

c) Mention any two properties of Atmosphere.

d) Define snow & hail.

e) Write the sources of noise pollution.

f) What is Biomagnification?

g) Define : Salinisation

h) What is Greenhouse effect?

Q2) Answer any four of the following: **[16]**

a) Explain any four rock forming minerals.

b) Define Atmospheric pressure and describe factors affecting on it.

c) Discuss the causes and effects of Landslides.

d) Explain the causes and effects of solid waste pollution.

e) Describe the sources and effects of marine pollution.

f) What are the sources of thermal pollution. Add a note on its effects on physiochemical quality of water.

P.T.O.

Q3) Write short notes on any four of the following: **[16]**

a) Continental Drift theory.

b) Hydrological cycle with diagram.

c) Soil classification with examples of each type.

d) Heavy metal pollution.

e) Auditory and non auditory effects of noise pollution.

f) Control measures of Radioactive pollution.

Q4) Answer any two of the following : **[16]**

a) Describe the factors regulating atmospheric temperature.

b) Discuss the reasons and effects of droughts.

c) Discuss the control measures of air pollution with suitable case study.

d) Give detailed classification of pollutants with respect to types and sources.

Q5) Answer any one of the following : **[16]**

a) Describe the various soil types of India with respect to their agricultural significance.

b) Explain the chemistry and control measures of ozone depletion.

Total No. of Questions :4]

SEAT No. :

P715

[Total No. of Pages : 3

[4817] - 1030

F.Y. B.Sc.

FOUNDATION COURSE (Restructuring)

(2013 Pattern)

Time : 3 Hours] *[Max. Marks :80*

Instructions to the candidates:

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

Q1) Explain the following concepts in 50 words (Any Two): **[10]**

a) Women - Empowerment
b) Culture
c) Planning commission
d) Research

Q2) Write the following short note in 100 words (Any four): **[20]**

a) Types of Research
b) Human Right
c) Religious values
d) Science
e) Society
f) Privatization

Q3) Write the answer of the following in 200 to 250 words (Any three): **[30]**

a) Explain the various types of Democracy.
b) Write the problems of Urbanization.
c) Write the characteristics of Indian culture.
d) Write the social work of Raja Rammohan Roy.

Q4) Write answer of any one of the following in 500 words. **[20]**

a) Give on account of Indian Religion.
b) Write the Merits and Demerits of Democracy.

P.T.O.

Total No. of Questions : 4]

P715

[4817] - 1030
F.Y. B.Sc.
FOUNDATION COURSE (Restructuring)
(2013 Pattern)
(मराठी रुपांतर)

वेळ : 3 तास] *[एकूण गूण : 80*

सूचना :- *1) सर्व प्रश्न सोडविणे आवश्यक आहे.*

2) उजवीकडील अंक पुर्ण गुण दर्शवितात.

3) संदर्भासाठी मूळ इंग्रजी प्रश्नपत्रीका पहावी.

प्रश्न 1) पुढील संकल्पना 50 शब्दात स्पष्ट करा (फक्त दोन) **[10]**

अ) महिला सबलीकरण

ब) संस्कृती

क) नियोजन मंडळ

ड) संशोधन

प्रश्न 2) पुढील टिपा प्रत्येकी 100 शब्दात लिहा (फक्त चार) **[20]**

अ) संशोधनाचे प्रकार

ब) मानवी हक्क

क) धार्मीक मूल्ये

ड) विज्ञान

इ) समाज

ई) खाजगीकरण

प्रश्न 3) पुढील प्रश्नांची उत्तरे 200 ते 250 शब्दात लिहा (फक्त तीन) **[30]**

अ) लोकशाहीचे विविध प्रकार स्पष्ट करा.

ब) नागरीकरणाच्या समस्या लिहा.

क) भारतीय संस्कृतीची वैशिष्ट्ये लिहा.

ड) राजा राममोहन रॉय यांचे सामाजिक कार्य लिहा.

इ) वैज्ञानिक पध्दती स्पष्ट करा.

प्रश्न 4) पुढीलपैकी एका प्रश्नाचे उत्तर 500 शब्दात लिहा. **[20]**

अ) भारतातील धर्मावर सविस्तर चर्चा करा.

ब) लोकशाहीचे फायदे व तोटे स्पष्ट करा.

Total No. of Questions : 10]

SEAT No. :

P716

[Total No. of Pages : 3

[4817]-1031
F. Y. B. Sc.(Vocational)
INDUSTRIAL CHEMISTRY-I
Surface Chemistry and Catalysis
(Paper-I) (New) (2013 Pattern)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Answers to the two sections should be written in separate answer books.***
3) ***Figures to the right indicate full marks.***
4) ***Draw neat diagrams wherever necessary.***

SECTION-I

Q1) Define and explain the following **[8]**

a) Surfactant

b) Heterogeneous catalysis.

c) Isoelectric point

d) Gel.

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

a) What is adsorption? What are the factors which affect rate of adsorption?

b) Write in brief industrial applications of catalysis.

c) Write limitations of Freundlich adsorption isotherm.

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

a) Negative catalysis

b) Adsorption indicators.

c) Zeta potential.

P.T.O.

Q4) Answer any one of the following : **[8]**

a) Describe the ion-exchange adsorption. What are the applications of ion-exchange adsorption?

b) Explain characteristics of catalytic reactions in detail.

Q5) Answer any two of the following : **[8]**

a) Write applications of

i) Chromium ii) Manganese as catalyst.

b) Differentiate between physical adsorption and chemical adsorption.

c) Describe the electrical nature of colloidal particles.

SECTION-II

Q6) Define and explain the following terms **[8]**

a) Equivalent weight

b) Specific heat

c) Heat of reaction

d) Stoichiometric coefficient.

Q7) Answer any two of the following **[8]**

a) What do you understand by evaporation? Explain with material balance.

b) Explain the term combined feed ratio.

c) Describe the method for general energy balance procedure.

Q8) Write short notes on any two of the following. **[8]**

a) Phase rule

b) Latent heat of sublimation.

c) Yield and selectivity.

Q9) Answer any one of the following **[8]**

a) State and explain Hess's Law of constant heat summation.

b) What is average molecular weight of gaseous mixture? Derive the expression for density of gasesus mixture.

Q10) Solve any two of the following **[8]**

a) Ethanol and water forms an azeotrope containing 96% by weight of ethanol. Determine the composition of azeotrope by mole.

b) At what rate in kcal/hr must heat be removed from a saturated methanol vapour (B.P. 64.7°C) to generate 100 kg/hr of methanol liquid at a temperature of 30°C?

Latent heat of condensation of methanol=263.4 kcal/kg specific heat of methano1=0.6505 kcal/kg °C.

c) A sample of coal is found to contain 63% carbon and 24% ash on weight basis. The analysis of refuse after combustion shows 7% carbon and rest ash. Calculate the percentage of original carbon unburnt in the refuse.

Total No. of Questions : 6]

SEAT No. :

P717

[Total No. of Pages : 2

[4817]-1032
F. Y. B. Sc.(Vocational)
BIOTECHNOLOGY-I
Biochemistry and Microbiology
(Paper-I) (2013 Pattern)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

1) ***Answers to the two sections should be wirtten in separate answer books.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***All questions are compulsory.***

SECTION-I

[Biochemistry]

Q1) Answer the following in short **[8]**

a) What are monosaccharides? Give examples.

b) Mention the components of DNA nucleotide.

c) Define enzymes. Give example.

d) Name any two structural proteins.

Q2) Attempt any four of the following **[16]**

a) Write a note on glycolysis.

b) Enumerate various functions of carbohydrates.

c) What are lipoproteins? Give their classification.

d) Describe the structure of t-RNA.

e) Give classification of amino.acids.

Q3) Answer any two of the following **[16]**

a) Explain various types of enzymes with suitable examples.

b) Describe double helical structure of DNA.

c) Represent a sequence of TCA cycle. Give its energetics and features.

P.T.O.

SECTION-II

(Microbiology)

Q4) Answer the following in short **[8]**

a) Mention dyes used in EMB Agar medium.

b) State contributions of Louise Pasteur in microbiology.

c) Name any two capsule producing microbes.

d) What are phototrops? Give one example.

Q5) Attempt any four of the following **[16]**

a) Gram staining is a differential staining! Explain.

b) Describe moist heat sterilization technique.

c) Discuss Tyndall's experiment.

d) Explain the principle and method of endospore staining.

e) Describe crowded plate technique used for isolation of antibiotic producers.

Q6) Answer any Two of the following **[16]**

a) Give comparative account of cell walls of gram positive and gram negative bacteria.

b) Explain any two differential media with respect to composition and applications.

c) Describe various steps involved in the tests for coliforms.

◀▶◀▶◀▶

Total No. of Questions : 5]

SEAT No. :

P1265

[Total No. of Pages : 2

[4817]-1033
F. Y. B. Sc. (Vocational)
PHOTOGRAPHY AND AUDIO-VISUAL PRODUCTION
Basic Photography and Appreciation of Media
(Paper - I) (2013 Pattern)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

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

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

a) Explain the importance of 'white balance' in digital photography.

b) Calculate two equivalent exposures of f 8@1/60 sec for ISO 200.

c) Draw a diagram and explain the difference between a converging and a diverging beam of light.

d) What is diffraction of light?

e) Mention the drawbacks of a pinhole image.

f) Define the focal length of a concave lens.

g) Explain how photography is useful in science.

h) What is the use of the viewfinder in a DSLR camera?

Q2) Answer ANY FOUR of the following: **[16]**

a) Discuss the advantages of a focal plane shutter.

b) Define the term shutter speed. Explain how are slow and fast shutter speeds useful in photography.

c) You decide to be a professional photographer. What skills you should learn?

d) Draw suitable diagrams and explain the rule of golden points. How is it useful in photographic composition?

e) Draw a suitable diagram and discuss a box camera. What are its merits and demerits?

P.T.O.

Q3) Answer ANY FOUR of the following: **[16]**

a) Discuss the importance of light and colour in photography.

b) Draw a diagram and explain the difference between the specular reflection and the diffused reflection. How are they useful in photography?

c) Give two examples each of a 'hard news' and a 'soft news'.

d) Define f number. Write down the f number scale. Discuss the use of small f numbers and large f numbers.

e) Draw a diagram and explain the chromatic aberration of a lens. How is it reduced?

Q4) Answer ANY TWO of the following: **[16]**

a) Discuss the role of photography in communication.

b) Discuss the ethical norms a photographer should observe.

c) Draw a sketch of the Sunrise. Discuss the rules of composition you have used in this sketch.

Q5) Answer ANY TWO of the following: **[16]**

a) Draw a neat and labeled diagram of a DSLR camera and explain its parts. Discuss the functions of each part you label in the diagram.

b) Discuss how you would compare a painting and a photograph.

c) Discuss the importance of a photographer in society.

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Total No. of Questions : 5]

SEAT No. :

P718

[Total No. of Pages : 2

[4817]-1034
F.Y.B.Sc.[Vocational]
ELECTRONIC EQUIPMENT MAINTENANCE
Maintenance Concepts, Instruments & Appliances
(Paper-I) (2013 Pattern) (New Course)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

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

Q1) Attempt all of the following: **[16]**

a) What is mean time to fail?

b) How to convert PMMC movement into DC voltmeter?

c) What is the difference in megger and ohmmeter?

d) Enlist different parts of single trace CRT.

e) What is precision and accuracy of an instrument?

f) What are different sections of pulse generator?

g) What is basic difference between online UPS & offline UPS?

h) What are different parts of hearing aid?

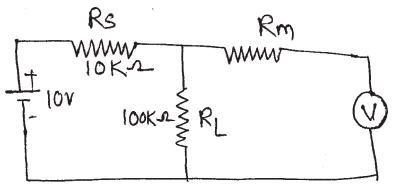
Q2) Attempt any two of the following: **[16]**

a) Explain the working of AC voltmeter.

b) Explain the working of digital voltmeter.

P.T.O.

c) What is loading effect? Two meters, one with sensitivity of 20,000 Ω / V and another with 1000 Ω / V read the voltage across R_L in the circuit of following figure on 10V range of the meter. Calculate load effect for both meters?



Q3) Attempt any <u>four</u> of the following. **[16]**

a) Explain the working of AF signal generator with it's block diagram.

b) Explain the working of linear power supply.

c) Write a short note on telephone instrument.

d) What is fuzzy logic? Draw block diagram of automatic washing machine & explain in short.

e) What are advantages of electronic ignition system? Explain the working of it with suitable block diagram.

Q4) Attempt any <u>two</u> of the following. **[16]**

a) Explain the working of analog multimeter.

b) Write a short note on digital storage Oscilloscope.

c) Explain the working of RF signal generator.

Q5) Attempt any <u>two</u> of the following. **[16]**

a) What are the advantages of digital instrument over analog instruments?

b) What is frequency of operation of microwave oven? Explain the working of magnetron.

c) With the help of block diagram, explain the working of digital clock.

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Total No. of Questions : 5]

SEAT No. :

P719

[Total No. of Pages : 2

[4817]-1035
F.Y. B.Sc. (Vocational)
INDUSTRIAL MICROBIOLOGY
Microorganisms and Systems for Fermentation Processes
(2013 Pattern) (Paper-I) (Theory)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

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

Q1) Answer each sub-question in one or two lines (Fill in the blanks): **[16]**

a) Name two industrially important bacteria & their product.

b) Precision.

c) What is process flow diagram?

d) What is patent?

e) What are non-aseptic fermentation?

f) What is GRAS?

g) Give example of obsolescence of methods in industrial microbiology.

h) What is quality assurance?

Q2) Attempt Any Four of the following: **[16]**

a) Explain the process of isolation of industrially important microorganism from environment.

b) Sketch the process of model construction, verification and application.

c) Discuss different meanings of word fermentation.

d) How least square analysis applied in finding goodness of fit of data?

P.T.O.

e) Which are characteristics important in microbes used for industrial fermentations?

f) Describe the Actinomycetes important in industrial microbiology.

Q3) Write short note on Any Four of the following: **[16]**

a) Stoichiometry.

b) Error types.

c) Classification of physical variables.

d) Components of modeling.

e) Downstream process.

f) Culture collections.

Q4) Answer Any Two of the following: **[16]**

a) Following are the 10 measurement carried out on bacterial cell length. Calculate the represent mean, standard deviation and variance.

Length in micrometer: 3.32, 3.6, 3.49, 3.25, 3.33, 3.38, 3.27, 3.1, 3.45 & 3.29.

b) Enlist and explain the characteristics important in microbes used in industrial microbiology.

c) Explain the process of development of pharmaceutical product.

d) Describe the measurement of temperature & pressure quantity.

Q5) Answer Any One of the following: **[16]**

a) Describe the WHO's classification of microorganism on the basis of hazards and containment level followed.

b) Describe the linear and non-linear models of data analysis.

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Total No. of Questions : 5]

SEAT No. :

P720

[Total No. of Pages : 2

[4817]-1036

F.Y. B.Sc. (Vocational)

COMPUTER HARDWARE AND NETWORK ADMINISTRATION

Essentials of Computer

(2013 Pattern) (Paper-I) (78710)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

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

Q1) Attempt the following: **[16]**

a) Explain the working of MOUSE.

b) What is BIOS?

c) Explain the working of Cam recorder.

d) Write short notes on LCD.

e) Define microprocessor.

f) List different output devices of computer.

g) What is bluetooth?

h) What is SMPS?

Q2) Attempt Any Four: **[16]**

a) Write short notes on HDD.

b) Explain primary memory.

c) Explain the working of inkjet printer.

d) Explain CPU with block diagram.

P.T.O.

e) Write short notes on note book, tablet.

f) Explain front and rare panel of CPU.

Q3) Attempt Any Four: **[16]**

a) What is BUS structure of computer?

b) Explain the working of scanner.

c) Write short notes on CD-ROM.

d) Explain control unit of computer.

e) Explain motherboard.

f) Explain the working of DOT matrix printer.

Q4) Attempt Any Two: **[16]**

a) Explain different types of RAM.

b) Write short notes on on-line & off-line UPS.

c) Explain the following:

i) Keyboard ii) Digitizer

Q5) Attempt Any Two: **[16]**

a) Define Interrupts in computer.

b) Explain the different types of softwares.

c) Write short notes on:

i) Device controller.

ii) Touch screen.

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Total No. of Questions : 5]

SEAT No. :

P721

[Total No. of Pages : 2

[4817]-1037
F.Y.B.Sc.(Vocational)
SEED TECHNOLOGY-I
Morphology, Plant Breeding and Testing for Cultivar Genuineness
(Paper-I) (2013 Pattern) (New)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

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

Q1) Answer in two lines (any eight): **[16]**

a) Enlist the parts of a typical flower.

b) Give an example of berry type of fruit.

c) Define sexual reproduction.

d) What do you mean by selection activity in plant breeding?

e) Define plant introduction.

f) What is a seed?

g) Enlist the types of mutation.

h) What is grow out test?

i) Define anther culture.

Q2) Attempt any four of the following: **[16]**

a) Comment on okra flower in detail.

b) Describe any one method of artificial vegetative propagation.

c) Write about the contrivances of cross pollination.

d) What is plant breeding? Comment on the objectives of plant breeding.

e) Highlight the achievements of mutation breeding.

P.T.O.

Q3) Write notes on any four of the following. **[16]**

a) Development of male gametophyte.

b) Development of megaspore.

c) Types of endosperm.

d) Plant introduction.

e) Peroxidase test.

Q4) Attempt any two of the following. **[16]**

a) Define fertilization. Comment on the process of double fertilization in angiosperms.

b) Describe capsule and legume type of fruits with suitable examples and diagrams.

c) Define hybridisation. Write the procedure of hybridisation.

Q5) Write the diagnostic characters, floral formula and floral diagram of families Malvaceae and Poaceae. **[16]**

OR

Define mass selection. Write procedure, advantages, disadvantages and achievements of mass selection.

Total No. of Questions :10]

SEAT No. :

P722

[Total No. of Pages :3

[4817]-1038
F.Y.B.Sc. (Vocational)
INDUSTRIAL CHEMISTRY - II
Material and Energy Balance
(2013 Pattern) (Paper - II)

Time : 3 Hours] *[Max. Marks :80*

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate books.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***All questions carry equal marks.***
5) ***Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.***
6) ***All questions are compulsory.***

SECTION - I

Q1) Answer the following: **[8]**

a) Define octane number.

b) Give advantages of water gas.

c) What is an allotrope? Give examples.

d) Give classification of gaseous fuels.

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

a) Write a short note on producer gas.

b) Give analysis of coal by proximate method.

c) Give an account of composition of petroleum.

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

a) What is calorific value? Give the method for determination of calorific value.

b) Give a comparative account of thermal and catalytic cracking.

c) Write a short note on bio-gas.

P.T.O.

Q4) Attempt any one of the following: **[8]**

a) Give classification of coal. Also list advantages and disadvantages of solid fuel.

b) What is industrial fuel? Give it's selection and properties and discuss methods of processing fuel.

Q5) Attempt any one of the following: **[8]**

a) Give an account of:

i) Analysis of fuel gases

ii) LPG

b) Give the characteristics, composition and uses of:

i) Aviation gasoline

ii) Coal tar

SECTION - II

Q6) Answer the following: **[8]**

a) What is an alloy? Give suitable examples.

b) Give properties and uses of iron.

c) Define calcination.

d) Define pyrometallurgy.

Q7) Attempt any two of the following: **[8]**

a) Define zeolites. Enlist types of zeolites.

b) What is silica? Give different types.

c) Write a short note on Buckminster fullerene.

Q8) Attempt any two of the following: **[8]**

a) Explain froth - floatation process for extraction of copper.

b) Write a note on Dow - type electrolytic cell.

c) How is purification of bauxite done by the Bayer's process.

Q9) Answer any one of the following: **[8]**

a) List and describe in detail different steps in the extraction of a metal from it's ore.

b) Discuss physico - chemical principles of Roasting.

Q10) Answer any one of the following: **[8]**

a) What is refining? Discuss different processes of refining.

b) Write a note on carbothermal process of magnesia and give properties and uses of magnesium.

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Total No. of Questions :6]

SEAT No. :

P723

[Total No. of Pages :3

[4817]-1039
F.Y.B.Sc. (Vocational)
BIOTECHNOLOGY - II
Biophysics and Instrumentation, Mathematics, Statistics and Computer for Biologists
(2013 Pattern) (Paper - II)

Time : 3 Hours] *[Max. Marks :80*

Instructions to the candidates:

1) ***Answers to the two sections should be written in separte answer books.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***All questions are compulsory.***

SECTION - I

(Biophysics and Instrumentation)

Q1) Answer the following in short: **[8]**

a) State the Beer's law.

b) Define chromatography.

c) What is rf? Give its formula.

d) Give importance of sodium dodocyl sulphate (SDS).

Q2) Attempt any four of the following: **[16]**

a) Give importance of fluorescence microscopy in Biology.

b) Write a note on Turbidometer.

c) Mention applications of Ion - exchange chromatography.

d) Enlist components of visible spectrophotometer.

e) Explain the concept of density gradient centrifugation.

P.T.O.

Q3) Answer any two of the following: **[16]**

a) Give an account of thin layer chromatography with respect to principle, technique, and applications.

b) Describe liquid scintillation counting technique.

c) Explain the working of UV - visible spectrophotometer. Add a note on its applications.

SECTION - II

(Mathematics, Statistics and Computer for Biologists)

Q4) Answer the following questions in short: **[8]**

a) Find $\frac{dy}{dx}$, if $y = (x^4 - 3x + 4)^{-5/2}$.

b) Write a note on generations of computers.

c) The average number of misprints per page of a book is 1.5. Assuming the distribution of number of misprints to be Poisson, find the probability that the book is free from misprint.

d) Draw the simple bar diagram for the following data:

Countries	China	India	Newzealand	UK	Germany	Sweeden
Birth rate	40	33	30	20	16	10

Q5) Answer any four of the following: **[16]**

a) Evaluate $\int e^{7x} x^7 dx$

b) If $f(x) = \begin{cases} \frac{x-4}{\sqrt{x}-2} & \text{if } x \neq 4 \\ 5 & \text{if } x = 4 \end{cases}$, find $\lim_{x \to 4} f(x)$. Is $\lim_{x \to 4} f(x) = f(4)$?

c) Define an internet. Write an account on biological database.

d) Draw a histogram for the following data:

Plant height (cms)	0 - 6	6 - 12	12 - 18	18 - 24	24 - 30	30 - 36
Number of varieties (*f*)	4	8	15	20	12	6

e) Explain the organization of computer in detail with neat labelled diagram.

Q6) Answer any two of the following: **[16]**

a) i) Find limit of the sequence $\left\{\left(\frac{5}{7}\right)^n - 3\right\}_{n=0}^{\infty}$.

ii) Discuss the convergence of the series $\sum_{n=0}^{\infty} \frac{n\sqrt{n}+1}{n^{7/2}+7n^{1/2}+9}$.

b) i) If $y = \frac{\log\left(\sqrt{3x+5}\right)}{e^{(2\cos x+1)}}$, find $\frac{dy}{dx}$ at $x = 0$.

ii) There are 5 novels and 4 biographies. In how many ways can 4 novels and 2 biographies be arranged on a shelf?

c) What is experimental design? Describe various steps involved in experimental design.

d) Arrange given data in ascending order and calculate mean, mode, median and standard deviation: 20, 18, 24, 25, 20, 18, 30, 31, 17, 16, 15, 18.

EEE

Total No. of Questions : 5]

SEAT No. :

P1266

[Total No. of Pages : 2

[4817]-1040

F. Y. B. Sc. (Vocational)

PHOTOGRAPHY AND AUDIO-VISUAL PRODUCTION

Introduction to Mass Communication and Media Scene in India

(Paper-II) (2013 Pattern)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

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

Q1) Attempt any two of the following: **[16]**

a) Illustrate the different barriers in communication.

b) Explain the salient features of mass communication.

c) You are asked to interview the Katrina Kaif on the release of her new film. What questions would you ask her?

Q2) Attempt any four of the following: **[16]**

a) Explain the role of censorship in media.

b) Write a short note on Aristotle's model of communication.

c) Explain the importance of language in communication.

d) Write a short note on the impact of films on the audience.

e) Illustrate the three stages in interpersonal communication.

Q3) Attempt any four of the following: **[16]**

a) Explain with suitable examples the definition of 'communication'.

b) Explain the meaning of 'inverted pyramid' in the context of news writing.

P.T.O.

c) Differentiate between one -to-one and many-to-one communication.

d) Explain what are fiction and non-fiction serials in television with examples?

e) Write a short note on the growth of radio in recent times.

Q4) Attempt any two of the following: **[16]**

a) Draw the block diagram of the Shannon and Weaver model. Explain the function of each of blocks.

b) Write a news report of about 100 words on a series of blast occurred on JM Road, Pune.

c) What are the merits and demerits of television as a medium of mass communication?

Q5) Attempt any two of the following: **[16]**

a) With examples state the impact of communication on audience.

b) Write short notes on– (i) News (ii) Reality shows on television.

c) How would you make a layout of the following news items – (1) Rains in Pune below average (2) CM to visit drought-hit areas (3) Accident on e-way kills 5 (4) Sitar maestro critically ill (5) Clerk caught in the anti-corruption net(6) City mayor to visit France.

Total No. of Questions :5]

SEAT No. :

P724

[Total No. of Pages :2

[4817]-1041
F.Y.B.Sc. (Vocational)
ELECTRONIC EQUIPMENT AND MAINTENANCE
Electronic Components, Circuit and Equipment Assembly
(2013 Pattern) (New) (Paper - II)

Time : 3 Hours] *[Max. Marks :80*

Instructions to the candidates:

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

Q1) Attempt the followings: **[16]**

a) What is strip earthing?

b) Differentiate active components with passive components.

c) Explain difference between MCB and ELCB.

d) What is LCD?

e) Why cold solder joint occurs during soldering?

f) How do we test solder joint?

g) Advantages of color convensions in cables.

h) Differentiate data sheet with user manual.

Q2) Attempt any <u>four</u> of the following: **[16]**

a) Explain JIS and JEDEC of transistor marking standards.

b) Explain thermistors and varistors in details.

c) What is SMD? Enlist SMD packages.

d) Give colour code of inductor along with example.

e) What are circuit boards? Explain any one indetail.

P.T.O.

Q3) Attempt any four of the following: **[16]**

a) Explain difference between sheilding and grounding.

b) What is resistor? Explain any one type in detail.

c) Write testing procedures for semiconductor devices.

d) Explain importance of service manual.

e) Explain chargeable and nonchargeable batteries with examples.

Q4) Attempt any two of the following: **[16]**

a) Draw wiring diagram of 2 bulb, 1 tube, 1 fan and fuse.

b) What are common faults detected in resistors and capacitors.

c) Explain any four servicing tools with neat diagrams.

Q5) Attempt any two of the following: **[16]**

a) Explain soldering iron and soldering gun with diagrams.

b) Explain various tools used for desoldering.

c) What are circuit breakers? Explain different types and compare technically.

EEE

Total No. of Questions :5]

SEAT No. :

P725

[Total No. of Pages :2

[4817]-1042
F.Y.B.Sc. (Vocational)
INDUSTRIAL MICROBIOLOGY
Industrial Process and Products
(2013 Pattern) (Paper - II) (Theory)

Time : 3 Hours] *[Max. Marks :80*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***All questions carry equal marks.***
3) ***Figures to the right indicate full marks.***
4) ***Neat diagrams must be drawn wherever necessary.***
5) ***Use of logarithmic tables, slide rule, mollier charts, electronic pocket calculator and steam tables is allowed.***
6) ***Assume suitable data, if necessary.***

Q1) Answer any eight of the following: **[16]**

a) Justify, Amenability to genetic manipulation is an ideal characteristic of an industrially important strain.

b) Justify, Genetic stability is an important criteria of on industrial strain.

c) Concept of utility for a patent application.

d) Describe in brief the use of enzymes in leather manufacturing.

e) Give two examples of antifoam agents.

f) Enlist the organisms capable of deteriorating metals.

g) Give two examples of fungi classified as GRAS.

h) Why enablement is a critical criterion of patent?

i) Concept of bioemulsans.

j) Enlist the bacterial vaccines.

P.T.O.

Q2) Answer any four of the following: **[16]**

a) Enlist the critical tests for a CEO of a new biotechnology startup and discuss their importance.

b) Enlist the basic requirements necessary for determining cost estimates.

c) In brief describe the role of micro organisms in production of food additives.

d) Write in brief about inducers and elicitors being used in raw material.

e) Describe the process of shikonin production.

f) Justify, 'Exit route is an important component of a business plan for any startup biotech company'

Q3) Write a short note on any four of the following: **[16]**

a) Exit route for a startup company.

b) Competitive advantage.

c) Vitamin and growth factors.

d) Variable operating cost.

e) Due diligence.

f) Biodeterioration of cosmetics and pharmaceuticals.

Q4) Answer any two of the following: **[16]**

a) Write in details about food and beverage fermentation.

b) With the help of suitable example, discuss the hierarchical structure for management in biotechnology industry.

c) Discuss the various types of government support for new biotechnology companies.

Q5) Answer any one of the following: **[16]**

a) Discuss in details the various heads under with the cost estimates are generated for the proposed production process.

b) Discuss in details the carbon sources available for biotech industries.

EEE

Total No. of Questions :5]

SEAT No. :

P726

[Total No. of Pages :2

[4817]-1043
F.Y.B.Sc. (Vocational)
COMPUTER HARDWARE AND NETWORK ADMINISTRATION
Computer Organisation (Hardware & Software Aspects)
(2013 Pattern) (Paper - II) (78720)

Time : 3 Hours] *[Max. Marks :80*

Instructions to the candidates:

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

Q1) Attempt the following: **[16]**

a) What is POST?

b) Define HDMI?

c) Define Firmware

d) What is BIOS?

e) Define USB?

f) Write notes on i-series microprocessor.

g) What is compiler?

h) What is Assembler?

Q2) Attempt any four: **[16]**

a) Write short notes on control panel of window.

b) Explain any two data transfer instructions of 8086.

c) Define math - coprocessor.

d) Explain Tri-state buffer.

e) Define RS-232.

f) Write short notes on bluetooth devices.

P.T.O.

Q3) Attempt any four: **[16]**

a) Explain any two logical instructions of 8086.

b) Write short notes on Wi-Fi system.

c) What is Multimedia?

d) Explain different types of application software.

e) Explain MAN.

f) Explain the difference between simulator and emulator.

Q4) Attempt any two: **[16]**

a) What is flow chart? Explain with example.

b) Write short notes on ANDROID operating system.

c) Explain the following:

i) System software

ii) Arithmatical instructions of 8086

Q5) Attempt any two: **[16]**

a) Explain Network operating system.

b) Explain architecture of 8086 with block diagram.

c) Write short notes on:

i) LAN

ii) Flag register of 8086

EEE

Total No. of Questions :5]

SEAT No. :

P727

[Total No. of Pages :2

[4817]-1044
F.Y.B.Sc. (Vocational)
SEED TECHNOLOGY
Seed Physiology and Seed Production -II
(New 2013 Pattern) (Paper - II)

Time : 3 Hours] *[Max. Marks :80*

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: **[16]**

a) Define seed germination.

b) Enlist different factors affecting seed dormancy.

c) Define seed viability.

d) What are artificial seeds?

e) Define roughing.

f) What are breeders seeds?

g) Enlist various methods of irrigation.

h) Enlist biotic and abiotic causes of crop diseases.

Q2) Attempt any Four of the following: **[16]**

a) Comment on state seed corporation and its objectives.

b) Give composition of seed storage constituents.

c) Comment on identification of entries for release of a variety.

d) Explain various factors causing seed dormancy.

e) Comment on cultural practices and plant protection in seed production.

f) Comment on short term and long term storage.

P.T.O.

Q3) Write notes on any Four of the follwing: **[16]**

a) Seed deterioration.

b) Importance of seed vigour.

c) Artificial seeds.

d) Methods of sowing.

e) Types of nursery beds.

f) Losses due to excessive irrigation.

Q4) Attempt any Two of the following: **[16]**

a) Give an account of biological and physiological changes during seed germination.

b) Define seed vigour. Explain various factors affecting seed vigour.

c) Explain various biotic and abiotic factors involved in crop disease development.

d) Describe various steps involved in maintenance of genetic purity of seed.

Q5) Define seed dormancy. Explain various methods to break seed dormancy.**[16]**

OR

Give causal organism, symptoms, disease cycle and control measures for tikka disease of groundnut.

EEE