Total No. of Questions : 5]

SEAT No. :

P220

[Total No. of Pages : 4

[4717] - 101
F.Y.B.Sc.
MATHEMATICS
Algebra and Geometry
(2008 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.***

Q1) Attempt each of the following. **[16]**

a) Let R be a relation on set A = {1, 3, 5, 7, 9}. Define R such that xRy if and only if $x < y$. Write R as a set of ordered pairs.

b) Let $f : X \to R$ be function defined by $f(x) = x^2 - x - 2$, where

X = { 0, –1, 2, 5, 11}. Find the range of function f.

c) If p is prime and $a^2 \equiv b^2 \pmod{p}$ then show that $p|(a+b)$ or $p|(a-b)$.

d) Find greatest common divisor of $f(x) = x^4 - x^3 - 2x + 2$ and $g(x) = x^3 + x - 2$.

e) Find the angle through which axes should be rotated to remove xy term in the equation $7x^2 - 6\sqrt{3}xy + 13y^2 - 2x - 16 = 0$.

f) If α, β, γ are the direction angles of a line then find the value of $\cos 2\alpha + \cos 2\beta + \cos 2\gamma$.

g) Find the equation of the plane passing through (2, –1, 0) and direction ratios of normal to the plane are 1, 3, –4.

h) Define rank of the matrix.

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

a) Prove that any two equivalence classes are either disjoint or identical.

P.T.O.

b) If $f : A \to B$ is an invertible function then show that $f o f^{-1} = I_B$ and $f^{-1} o f = I_A$, where I_A and I_B are identity functions on A and B respectively.

c) Find greatest common divisor of 143 and 227. Also find integers x, y such that $(143, 227) = 143x + 227y$.

d) Prepare multiplication table for Z_6. Also find multiplicative inverse of element in Z_6 if exist.

e) Define ~ on R × R , the set of all points in XY - plane as for (x,y), (a,b) in R × R $(x,y) \sim (a,b)$ if and only if $x+b = y+a$. Show that ~ is an equivalence relation.

f) If two of the roots of the equation $x^3 - x^2 - 8x + 12 = 0$ are equal, then find all the roots.

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

a) If a and b are any two integers with $b \neq 0$ then prove that there exists unique integers q and r such that $a = bq + r$, where $0 \leq r < |b|$.

b) Prove that $\left|\frac{a-b}{1-a\bar{b}}\right| = 1$ if and only if either $|a| = 1$ or $|b| = 1$, $a, b \in C$.

c) i) Let $f(x)$ be a polynomial of degree $n \geq 1$. If $f(x)$ is divided by $(x - \alpha)$ where α is constant, then show that $f(\alpha)$ is the remainder.

ii) By using De Moivre's theorem prove that $\sin^5\theta = \frac{1}{16}[\sin 5\theta - 5\sin 3\theta + 10 \sin\theta]$

d) i) State Fermat's theorem. Hence find the remainder when 5^{40} is divided by 7.

ii) Define Euler's ϕ – function and find the value of $\frac{\phi(16) + \phi(8)}{\phi(6)}$.

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

a) Shift the origin to a suitable point so that the equation $x^2 - 6x - 4y - 1 = 0$ will be in the form $x^2 = 4by$. State the value of b.

b) Show that every equation of first degree in x,y,z $ax + by + cz + d = 0$ represents a plane.

c) Obtain the equation of a sphere containing the circle $x^2 + y^2 + z^2 + 10y - 4z - 8 = 0$, $x + y + z - 3 = 0$ and passing through $(1,1,-1)$.

d) Test the following equations for consistency and if consistent solve them

$$2x + y - z = 1$$

$$x - 2y + 3z = 6$$

$$x - y + 2z = 9$$

e) Find the equation of the plane containing the line of intersection of the planes $4x + 3y + 2z + 2 = 0$ and $3x + 2y + 2z + 1 = 0$ whose distance from origin is $\frac{1}{\sqrt{2}}$.

f) If l,m,n and l',m',n' are direction cosines of two lines then prove that $\cos\theta = ll' + mm' + nn'$.

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

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

b) i) Find the condition under which the plane $lx + my + nz = p$ is a tangent plane to the sphere $x^2 + y^2 + z^2 = a^2$. Also find co-ordinates of point of contact.

ii) Find symmetric form of the equation of line $x + y + z + 1 = 0$,

$4x + y - 2z + 2 = 0$.

c) i) Find the point of intersection of line $\frac{x+1}{1} = \frac{y+3}{3} = \frac{z-2}{-2}$ with plane $3x + 4y + 5z = 5$.

ii) Find the equation of sphere passing through points (0,0,0), (0,3,0), (1,0,0) and (0,0,2).

d) For what values of λ, the equations

$$x + y + z = 1$$

$$x + 2y + 4z = \lambda$$

$$x + 4y + 10z = \lambda^2$$

have a solution and solve it in each case.

Total No. of Questions : 5]

SEAT No. :

P221

[Total No. of Pages : 4

[4717] - 102
F.Y.B.Sc.
MATHEMATICS
Calculus
(2008 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 each of the following: **[16]**

a) Solve : $|x-2| < |x|$

b) Find the smallest positive integer K satisfying $\left|\frac{2n}{n+3}-2\right| < \frac{1}{5}$.

c) Show that $\sum_{n=0}^{\infty} \cos n\pi$ is divergent.

d) Prove that $\lim_{x\to 0}\left(x.\sin\frac{1}{x}\right)=0$.

e) Discuss the continuity of the function $f(x)$ at $x = 2$, where

$$f(x)=\frac{|x-2|}{x-2} \quad if \ x\neq 2$$
$$= 0 \qquad if \ x=2$$

.

f) Evaluate $\lim_{x\to 0}\frac{a^x-1}{b^x-1}$.

g) Using definition find the derivative of the function $f(x)=\frac{1}{x}$, for $x\in R,\ x\neq 0$.

h) State Taylor's theorem with Lagranges form of remainder.

P.T.O.

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

a) If x and y are two real numbers then prove that $|x + y| \leq |x| + |y|$.

b) If $\langle x_n \rangle, \langle y_n \rangle$ and $\langle z_n \rangle$ are three sequences of real numbers such that $x_n \leq y_n \leq z_n,\ \forall n \in \mathrm{N}$ and $\lim_{n\to\infty} x_n = l$, $\lim_{n\to\infty} z_n = l$ then prove that $\lim_{n\to\infty} y_n = l$.

c) Show that the sequences $\langle x_n \rangle$ of real numbers, whose n^{th} term is defined by $x_n = \frac{1}{n+1} + \frac{1}{n+2} + \frac{1}{n+3} + ----+ \frac{1}{n+n},\ \forall n \in \mathrm{N}$ is convergent.

d) If a series $\sum_{n=1}^{\infty} x_n$ is convergent then show that $\lim_{n\to\infty} x_n = 0$.

e) Examine the convergence of the series $\sum_{n=1}^{\infty} \frac{n+5}{n(n+1)\sqrt{n+2}}$

f) Evaluate $\lim_{x\to 0} \frac{e^{\frac{1}{x}} - 1}{e^{\frac{1}{x}} + 1}$

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

a) Define Cauchy's sequence. Prove that every Cauchy sequence of real numbers is convergent.

b) i) Find supremum and infimum of the set $\mathrm{S} = \left\{ 1 + \frac{(-1)^n}{n} \middle/ n \in \mathrm{N} \right\}$, if they exist.

ii) If the limit of a function f as $x \to \mathrm{C}$ exists, then prove that the function f is bounded in a deleted neighbourhood of C.

c) i) Determine the set:

$\mathrm{A} = \{ x \mid x^2 + x > 2 \}$

ii) Using $\in -\delta$ definition of limit prove that $\lim_{x\to 1} \frac{x}{1+x} = \frac{1}{2}$.

d) i) Discuss the convergence of the series $\sum_{n=1}^{\infty} \frac{1}{\sqrt{n^2+1}}$.

ii) Show that the sequence $\langle x_n \rangle$ defined by $x_1 = 1$ and $x_{n+1} = \sqrt{2 + x_n}, \forall n \in \mathrm{N}$ is convergent.

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

a) State and prove Lagrange's mean value theorem.

b) Discuss the continuity of the function $f(x)$ at $x = 4$ if the function is defined by :

$$f(x) = \frac{x^2}{4} - 4, \quad \text{if } 0 < x < 4$$
$$= 0, \quad \text{if } x = 4$$
$$= 4 - \frac{64}{x^2}, \quad \text{if } x > 4$$

c) Verify Rolle's theorem for the function $f(x) = \frac{\sin x}{e^x}$ on $[0, \pi]$.

d) Separate the intervals in which the polynomial function $f(x) = x^3 + 8x^2 + 5x - 2$ is increasing or decreasing.

e) Let $f : [a,b] \to \mathrm{R}$ be continuous function on $[a,b]$. If a real number k satisfies $f(a) < k < f(b)$ then prove that there exists $c \in (a,b)$ such that $f(c) = k$.

f) Show that $e^{\sin x} = 1 + x + \frac{1}{2}x^2 - \frac{1}{8}x^4 +$ -------

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

a) i) Find the values of α,β, if the function $f(x)$ is continuous on $(-3,5)$ where $f(x) = x + \alpha$, $-3 < x < 1$

$= 3x + 2$, $1 \le x < 3$

$= \beta + x$, $3 \le x < 5$

ii) If in the Cauchy's mean value theorem $f(x) = \sqrt{x}$ and $g(x) = \frac{1}{\sqrt{x}}$, show that c is the geometric mean between a and b.

b) i) If $y = \cos(ax + b)$ then prove that $y_n = a^n \cos\left(ax + b + \frac{n\pi}{2}\right)$

ii) If $y = e^{\tan^{-1}x}$ then prove that:

$(1 + x^2)\, y_{n+2} + (2nx + 2x - 1)\, y_{n+1} + n(n+1)\, y_n = 0$

c) i) Discuss the continuity of the function $f(x)$ at $x = 1$ and $x = 2$ where

$$f(x) = x^2 + 2,\ 0 \le x < 1$$
$$= 4x - 1,\ 1 \le x \le 2$$
$$= x^2 - 1,\ 2 < x \le 4$$

ii) If $y = \frac{x+1}{x^2-4}$ then find y_n.

d) i) Find the real number at which f is discontinuous, where $f(x) = \frac{x^2 + x + 1}{x^2 - 4}$, $x \in$ R.

ii) Evaluate $\lim_{x \to 1} x^{\frac{1}{1-x}}$.

Total No. of Questions : 5]

SEAT No. :

P222

[Total No. of Pages : 3

[4717] - 103
F.Y.B.Sc.
PHYSICS - I
Mechanics, Heat and Thermodynamics
(Old 2008 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 : **[16]**

a) Define average velocity. Give its SI unit and dimensions.

b) State Newton's first law of motion. Define inertia of body.

c) Find the work done in moving a particle along a vector $\vec{r} = 3\vec{i} - \vec{j} + 4\vec{k}$ meter, if the applied force is $\vec{F} = \vec{i} + 3\vec{j} + 5k$ newton.

d) Give two important applications of Jaerger's method for determination of surface tension.

e) State Boyle's law.

f) Give two important statements of second law of thermodynamics.

g) Find the coefficient of performance of of Carnot's refrigerator working between the 500°K and 300°K.

h) State the advantages of mercury thermometer.

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

a) What is instantaneous acceleration? Explain the instantaneous acceleration using X - t graph in one dimensional motion.

P.T.O.

b) State and explain Newton's second law of motion.

c) Define surface tension. Discuss various applications of surface tension.

d) A 10kg object experiences a horizontal force which causes it to accelerate at 10 m/s^2, moving it a distance of 30 m horizontally. How much work is done by the force?

e) A 8kg mass is hanging at the end of a string. Find the tension in the string if acceleration of the mass is $6m/s^2$ in the upward direction. (Given $g = 9.8\ m/s^2$).

f) A water tank kept on the top of a building has a tap at 5 m below the free surface of water. Assuming steady flow. Calculate the speed of water coming out of tap. (Given $g = 9.8\ m/s^2$).

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

a) Prove that, slope of adiabatic curve through a point in P-V diagram is γ times the slope of the isothermal curve through the same point.

b) What is Carnot's cycle? Explain it with suitable diagram.

c) Explain Diesel cycle with an indicator diagram.

d) Calculate the change in entropy, when 1 mole of an ideal gas is allowed to expands from a volume of 1 litre to a volume of 10 litres at 27^oC. (Given R = 2 SI unit).

e) Van-der-Waal's constants are : $a = 0.364\ Nm^4\ mole^{-2}$, $b = 4.28 \times 10^{-5}\ m^3\ mole^{-1}$. Calculate critical volume and critical temperature of the gas.

($R = 8.3J/mole/^oK$).

f) Determine what temperature on the centigrade scale is represented by the same number on the Fahrenheit scale?

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

a) State Bernoulli's theorem. Using Bernoulli's theorem, prove that

$p + \frac{1}{2}\rho V^2 + \rho gh$ = constant. Every symbols has usual meaning.

b) i) Explain kinetic energy and potential energy of a body with suitable examples.

ii) A car accelerates from rest to a speed of 42 m/s in 8 seconds. As the acceleration of car is constant. Determine the acceleration of the car and also find the distance travels in the first 8 seconds.

c) i) State work energy theorem. Obtain an expression for the work done by a constant force.

ii) Water has a surface tension of 0.5N/m. In a 4mm diameter vertical tube, if the liquid rises 6mm above the liquid outside the tube. Calculate the angle of contact. (Given density of water = 10^3 kg/m^3, g = 9.8 m/s^2).

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

a) Describe Andrew's experiment on carbon dioxide. Discuss the results obtained by Andrew.

b) i) What is Boyle's temperature? Obtain the relation between Boyle's temperature and critical temperature of gas.

ii) Calculate the work done during an isothermal expansion of 4 moles of an ideal gas from a volume of 4 litres to 16 litres at 0^oC.

c) i) Explain construction and working of gas filled thermometer.

ii) The expansion ratio and compression ratio are 6 and 12 respectively. If the value of $\gamma = 1.4$ for the working substance in a Diesel engine then determine its efficiency.

Total No. of Questions : 5]

SEAT No. :

P223

[Total No. of Pages : 3

[4717] - 104
F.Y.B.Sc.
PHYSICS - II
Emerging Physics, Electricity and Magnetism
(Old Course) (2008 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 log table and calculator is allowed.***
4) ***Neat diagram must be drawn wherever necessary.***

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

a) Define spontaneous and stimulated emission.

b) What do you mean by dark age and middle age in the history of science.

c) What do you mean by EEG.

d) The resistance of metal wire is 8Ω at 0^oC and 8.4Ω at 100^oC. Calculate the temperature coefficient of resistance α.

e) Define magnetic induction.

f) Define electric flux.

g) What do you mean by electric lines of force?

h) Calculate the electric potential due to a point charge $3 \times 10^{-8}C$ at a point which is at a distance of 30 cm from it.

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

a) Explain population inversion process in lasers.

b) State and explain Nernst equation.

P.T.O.

c) Discuss the idea of biomimicry.

d) The detector of pyrometer receives the radiant energy of 22 J per unit time from a hot body. The emissivity is 5.6×10^{-3}. Find the temperature of hot body.

[Given : $\sigma = 5.72 \times 10^{-8}$ w/m^2 k^4].

e) The He-Ne laser system is capable of lasing at several different IR wavelengths. One of the wavelength is 1.25 μm. Determine the energy difference between the upper and lower levels for this wavelength.

f) Find the cardiac output for a person having heart rate of 90 beats /min and stroke volume 80 ml per beat.

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

a) Using Gauss's law, obtain an expression for electric intensity near the surface of metallic conductor.

b) What is magnetic flux? Hence explain Gauss's law for magnetism.

c) Discuss different properties of electric lines of force.

d) What resistance must be connected in series with an inductor of 6 mH so that the circuit has a time constant of 2×10^{-3} s?

e) Calculate the potential and electric field due to dipole of moment 2×10^{-10}C-m at a distance of 1 meter from it on its perpendicular bisector.

f) An aluminum wire of diameter 0.4cm carries current of 25A. Find the magnetic field at the surface of the wire.

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

a) Write notes on contribution of Einstein and Newton.

b) i) The energy difference between two laser levels for a particular laser is 0.120 eV. Determine the frequency and wavelength of radiation.

ii) Explain the principle and advantages of thermocouple.

c) i) If a nanoparticle with drift velocity 2×10^3 m/s experiences a scattering after 3 pico second, what will be the mean free path of that particle.

ii) Define nanotechnology. State few applications of nanomaterials in various disciplines.

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

a) Derive an expression for Gauss's law in dielectrics.

b) i) Draw neat diagrams of magnetic field lines of bar magnet and solenoid.

ii) A solenoid of length 100cm, is wound uniformly with 10000 turns of wire. It carries current of 4A. What is the value of

(1) Magnetic field on the axis of solenoid at the centre.

(2) Magnetic field on the axis at an end.

c) i) Explain ferromagnetic and ferrimagnetic materials.

ii) A cell of 1.5V is connected across an inductor of 3 mH in series with 2Ω resistor. What is the rate of growth of current immediately affer the circuit is switched on?

Total No. of Questions : 5]

SEAT No. :

P224

[Total No. of Pages : 3

[4717] - 105
F.Y.B.Sc.
CHEMISTRY - I
Physical and Inorganic Chemistry
(Old Course) (2008 Pattern) (Paper - I) (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.***
4) ***Use of log table and calculator is allowed.***

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

a) State Ritz-combination principle.

b) Explain Brownian Movement.

c) Explain the various types of catalysis with examples.

d) Define (i) surface tension (ii) vapour pressure

e) Give the limitations of first law of thermodynamics.

f) What is atomic overlap? Give factors affecting it.

g) Define co-ordinate bond with suitable example.

h) Convert 0.25 moles of H_2SO_4 in grams.

[Given Atomic Weight of H =1 , S = 32, O = 16]

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

i) State any two rules of derivative.

ii) Find the equation of line having slope 2 and passing through a given point (1,5).

iii) Find the equation of line passing through points (–1,–1) and (2,6).

P.T.O.

iv) Find $\frac{dy}{dx}$; if $y = (x^3 - 4)(x + 2)$.

v) If $y = (x^3 - 3x) \log x$; find $\frac{dy}{dx}$.

vi) $\int 2x^3 \, dx = ?$

vii) $\int x^{1/4} \, dx = ?$

viii) Find the pH of a solution which contains $[H^+] = 5.4 \times 10^{-9}$ moles/ litre.

b) Give the difference between true solution and colloidal solution. **[4]**

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

i) 170 gm of ammonia changes its temperature from 27°C to 127°C at a constant pressure. Find the entropy change of the gas. (Given Atomic Weight of H = 1, N = 14, Cp = 8.77 cal deg^{-1} $mole^{-1}$).

ii) Calculate the pressure exerted by one mole of carbon dioxide at 127°C when it occupies a volume of 0.5 litre. (Given a = 3.66 atm l^2 $mole^{-2}$, b = 0.0428 l $mole^{-1}$, R = 0.082 lit atm k^{-1} $mole^{-1}$).

Q3) a) Attempt any three of the following : **[12]**

i) What are cathod rays? Give its properties.

ii) Derive an expression for entropy change in chemical reaction.

iii) Explain the method of determination of vapour pressure of liquid.

iv) What is catalyst? State general characteristics of catalytic reaction.

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

i) Calculate the magnitude of energy of the photon associated with light of wavelength 6057.8 Å.

ii) Calculate the radius of second Bhor's orbit of hydrogen atom

(Given m = 9.11×10^{-28}g, h = 6.626×10^{-27} erg.s, e = 4.8×10^{-10} e.s.u., π = 3.142).

Q4) a) Attempt any three of the following : **[12]**

i) Describe any one method for the purification of colloids.

ii) Explain the set of four quantum numbers.

iii) Explain positive and negative catalysis with suitable examples.

iv) Explain the general properties of colloids.

v) Describe Milikans oil drop method for determination of charge of the electron.

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

i) What is hydrogen bond? What are the essential conditions to form hydrogen bond.

ii) What is tetrahedral hybridisation? Explain formation of CH_4 molecule on the basis of hybridisation.

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

i) Mention the various isotopes of hydrogen. Explain physical properties of deuterium.

ii) Explain formation of N_2 molecule on the basis of overlap of atomic orbitals.

iii) Calculate the molarity of solution which contain 10 gms of K_2CO_3 per 1000ml of water

(Given Molecular Weight of K_2CO_3 = 138)

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

i) Give postulates of Pauling's-slater theory.

ii) 10 ml solution of NaOH containing 2 gms of alkali per litre is exactly neutralised by 15 ml of solution of H_2SO_4 and 30 ml of HCl solution separately? Calculate the strength of the acid in gms per litre.

iii) Give the assumptions of VSEPR theory.

Total No. of Questions : 5]

SEAT No. :

P225

[Total No. of Pages : 4

[4717] - 106
F.Y.B.Sc.
CHEMISTRY -II
Organic and Inorganic Chemistry
(Old Course) (Paper-II) (2008 Pattern)(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 questions: **[16]**

a) Explain the following terms.

i) Chiral centre ii) Dextro rotatary compounds.

b) Draw the zig zag structures of the following compounds.

i) 2-methyl pentane ii) Phenyl alanine

c) Explain intermolecular hydrogen bonding with suitable examples.

d) Carbon tetrachloride does not show dipole moment. Explain.

e) Explain: benzene is aromatic compound.

f) Write names and symbols of Group IA elements of s- block of the periodic table.

g) What is the oxidation number of

i) Cl in $HClO_4$ ii) Mn in MnO_4^-

h) Draw the structures of the following.

i) $XeOF_4$ ii) XeO_4

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

i) Distingwish between inductive and resonance effects with suitable examples.

ii) What are phenols? What is the action of following reagents on phenol.

1. Br_2/water 2. conc. H_2SO_4/25°C

iii) Discuss the conformational isomerism in ethane with energy profile diagram.

P.T.O.

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

i) What are ethers? How are they classified? How will you prepare diethyl ether by Williamson's synthesis?

ii) What is Friedel Craft's alkylation? How is it carried out by using defferent alkylating reagents?

iii) What are alkanes? How will you prepare n-butane from

1) Ethyl Chloride 2) 1-butene

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

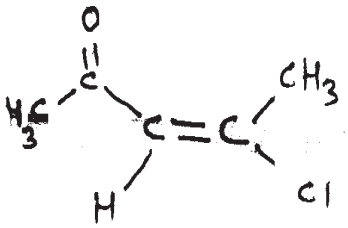
i) What are alcohols? How will you prepare ethyl alcohol from.

1) Ethylene 2) Acetaldehyde

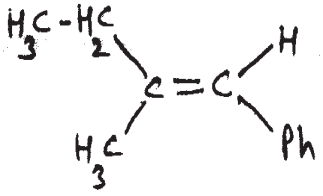
ii) What is hybridisation? Discuss formation of ethylene molecule using the concept of hybridisation.

iii) Assign E or Z configuration of the following compounds.

I)



II)



iv) What are alkynes? How will you prepare acetylene from

1) Calcium Carbide 2) Methane

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

i) What is steric effect? Explain with suitable example.

ii) What are alkyl halides? How are they classified? How will you prepare propyl bromide from

1) Propene 2) 1 - Propanol

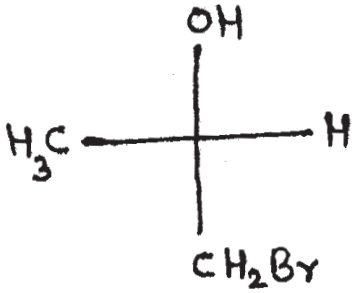
iii) Write notes on:

1) Dehydrohalogenation 2) Markovnikoff's rule.

Q4) a) Attempt <u>any three</u> of the following: **[6]**

i) Draw all possible isomers of the compound having molecular formula C_3H_6O.

ii) Assign R and S configuration of the following compound.



iii) Define the following terms.

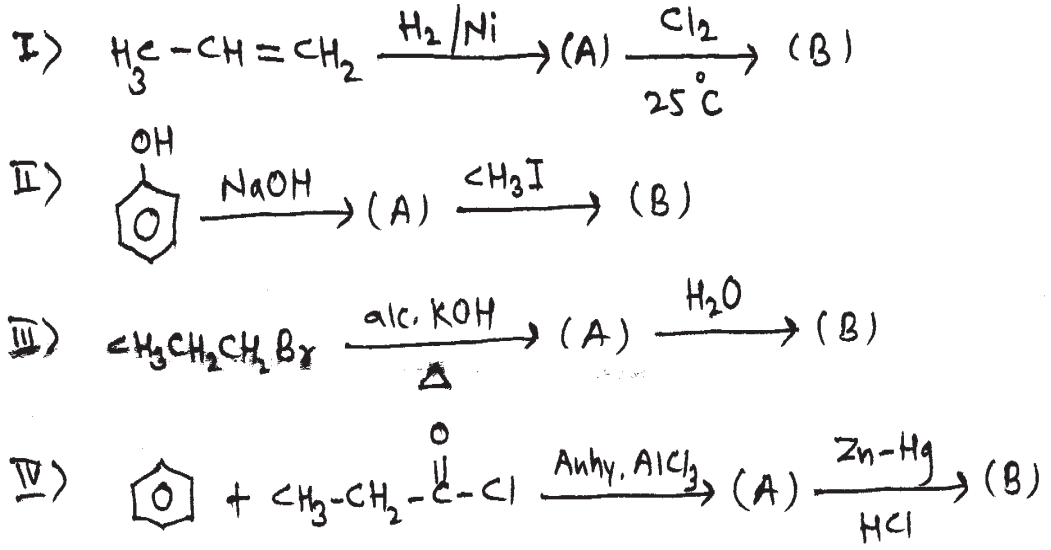
1) Bond Energy 2) Bond Length.

iv) Draw the structures of the following.

1) 1,2-dibromo-2-methyl propane

2) 2,5-dimethyl hexane

b) Identify the products A and B and rewrite the reactions. (any two) **[4]**



c) Attempt <u>any one</u> of the following: **[6]**

i) Explain different blocks in the periodic table.

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

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

i) Define ionization energy. Discuss the trends of it across the periods and within the groups in the periodic table.

ii) Explain different applications of alkaline earth metals and their compounds.

iii) Calculate the screening constant of the valence electron in sodium (Z=11).

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

i) Discuss the bonding and shape of

1) XeF_4 2) XeO_2F_2

ii) Give the rules to find oxidation number.

iii) Draw the shapes of s, p and d-orbitals.

□□□□

Total No. of Questions : 5]

SEAT No. :

P226

[Total No. of Pages : 2

[4717] - 107
F.Y.B.Sc.
BOTANY-I
Plant Diversity
(Paper-I) (Theory) (2008 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) Attempt the following: **[16]**

a) Define Algae.

b) What is plasmodium?

c) What is phycobiont?

d) Write any two characters of Hepaticopsida.

e) What is heterospory.

f) Mention any two examples of Gymnosperms.

g) Give any two characters of Dicotyledons.

h) What is plant diversity?

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

a) Describe the five kingdom system of classification.

b) Describe cell structure in myxomycetes.

c) Describe internal structure of Riccia thallus.

d) Describe male gametophyte in Selaginella.

e) Give any four characters of Gymnosperms.

f) Describe dicot root anatomy.

P.T.O.

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

a) Mycelium of Cystopus (Albugo)

b) Fruticose lichen.

c) Antheridium of Riccia.

d) Rhizoids of Riccia.

e) Papilionaceous corolla.

f) Sorosis.

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

a) Describe male and female reproductive structures in Cystopus (Albugo).

b) Describe the external structure of sporophyte in Selaginella.

c) Describe the structure of male cones in Gymnosperms.

d) State the concept and need of conservation of plant diversity.

Q5) What are algae? Discuss different methods of reproduction in algae. **[16]**

OR

Define Flower. Discuss various floral whorls of typical flower.

□□□□

Total No. of Questions : 5]

SEAT No. :

P227

[Total No. of Pages : 2

[4717] - 108
F.Y.B.Sc.
BOTANY
Plant Resources- Management and Utilization
(Paper-II) (2008 Pattern) (Theory)

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

Instructions to the candidates:

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

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

a) Enlist the names of two food plant.

b) Give the methods of irrigation.

c) Define floriculture.

d) What is weed.

e) Give principles of flower arrangement.

f) What is biocontrol?

g) Give the concept of phytoremediation.

h) Give any two examples of tannin yielding plant.

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

a) Describe the criteria used for seed selection.

b) Explain any two types of greenhouse.

c) Describe the need of weed management.

d) Explain any two types of social flower arrangement.

e) Give the advantages of phytoremediation.

f) Give the sources and uses of fuel.

P.T.O.

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

a) Ketchup

b) Bioenergy

c) Corm

d) Pyrethrin

e) Concept of bioprospecting.

f) Sources and uses of pigments.

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

a) What is budding? Describe any one method of budding.

b) Explain in brief the orientation and site selection of green house.

c) Describe the sources and uses of Indiara.

d) Explain sea weeds as a potential resource of fodder.

Q5) What is maturity indices? Describe the artificial Ripening of fruits. **[16]**

OR

Give the botanical name. Part used and uses of Henna and Amla.

□□□□

Total No. of Questions : 6]

SEAT No. :

P228

[Total No. of Pages : 3

[4717] - 109
F.Y.B.Sc.
ZOOLOGY
ZY-101: Non-chordates and Chordates
(Paper-I) (2008 Pattern)(Theory)

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 indicate full marks.***

SECTION-I

(Non- Chordates)

Q1) Define /Explain (Any ten): **[10]**

a) Pearl.

b) Gemmules.

c) Nomen clature.

d) Binary Fission.

e) Cytopyge.

f) Aquaculture.

g) Order.

h) Cell biology

i) Phylum.

j) Bilateral Symmetry.

k) Monera.

l) Pellicle.

Q2) Write short notes on (Any Three): **[15]**

a) Conjugation in Paramoecium.

b) General Characteristics of cestoda.

c) Batesian mimicry.

d) Regeneration in planaria.

e) Useful species of Earthworm for vermiculture.

P.T.O.

Q3) Attempt the following: **[15]**

a) Give general characters of protista.

b) Mention the general characteristics of calcarea.

c) What is bioluminescence? Give its significance.

OR

Mention the distinguishing characters and classification of phylum cridaria. Give the characteristics of each class with suitable examples. **[15]**

SECTION-II

(Chordates)

Q4) Define/ Explain (Any Ten): **[10]**

a) Urochordata.

b) Agnatha.

c) Isingglass.

d) Gametic migration of fishes.

e) Egg laying mammals.

f) Aplexus.

g) Fish Flour.

h) Comou flage.

i) Croa king sound.

j) Retina.

k) Tangoreceptors.

l) Cutaneous respiration.

Q5) Write short notes on: (Any Three) **[15]**

a) Distinctive features of cephalochordata.

b) Habits & habitat of petromyzon.

c) Anadronious migration of fishes.

d) Aerial adoptations in birds.

e) Marsupial mammals.

Q6) Attempt the following: **[15]**

a) Describe the divesity of Placental mammals in aquatics habitat.

b) State five general characters of verlebrata.

c) Sketch and label female reproductive system of frog.

OR

Describe the digestive system of frog. Add a note on physiology of digestion. **[15]**

□□□□

Total No. of Questions : 6]

SEAT No. :

P229

[Total No. of Pages : 3

[4717] - 110
F.Y.B.Sc.
ZOOLOGY
ZY-102: Genetics and Parasitology
(41520) (Paper-II) (2008 Pattern)(Theory)

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.***

SECTION-I
(Genetics)

Q1) Define /Explain (Any ten): **[10]**

a) Monohybrid cross

b) Codominance

c) Heterozygous

d) Parthenogenesis

e) Hyper trichosis

f) Allels

g) Erythroblastosis

h) Gene therapy

i) Agluttination

j) Rh factor

k) Colourblindness

l) Epistasis.

Q2) Write short notes on (Any Three): **[15]**

a) Turner's syndrome

b) Law of dominance

c) Inversion

d) Inhibitory factor(13:3)

e) Alkaptonuria

P.T.O.

Q3) Attempt the following: **[15]**

a) Describe transgenic animals.

b) A man with blood group 'A' whose father was with blood group 'O'; marries a woman having blood group 'AB'. Which blood groups can be expected in their children?

c) What is sex determination? Explain xx-xy method of sex determination?

OR

Q3) Define chromosome. Explain the morphology of the chromosome and classify the chromosomes on the basis of centromeric position. **[15]**

SECTION-II

(Parasitology)

Q4) Define/ Explain (Any Ten): **[10]**

a) Endoparasite

b) Taeniasis

c) Host

d) Vector

e) Rabies

f) Sporogony

g) Commensalism

h) Obligatory parasites

i) Mits

j) Mutualium

k) Intestinal blockade

l) Helminthology

Q5) Write short notes on: (Any Three) **[15]**

a) Bird flu

b) Pathogenicity of head louse

c) Control measures of Ascaris (Ascaris Lumbricoides)

d) Life cycle of itch mite

e) Anthrex in man

Q6) Attempt the following: **[15]**

a) Pathogenicity of Malarial parasite (Plasmodium Vivax)

b) Explain structural host specificity with suitable examples.

c) Define host, describe any two types of hosts with suitable examples.

OR

Q6) Give an account of life cycle of Entamoeba Histolytica and its pathogenicity.

□□□□

Total No. of Questions : 5]

SEAT No. :

P230

[Total No. of Pages : 2

[4717] - 111
F.Y.B.Sc.
GEOLOGY
Mineralogy & Petrology
(Paper-I) (Old Course-2008 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) ***Neat labelled diagrams must be drawn wherever necessary.***

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

a) Define Petrology.

b) What is marble?

c) What are volcanic igneous rocks?

d) What is lustre of mineral?

e) What are ore minerals?

f) What is anisotropism?

g) Define crystallography.

h) What is conglomerate?

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

a) Enlist various silicate structures & explain Nesosilicate structure.

b) Define Hardness. What is Mohs' Scale of hardness?

c) Give an account of minerals used in paint industry.

d) Write about magnetic property of minerals.

e) Write notes on :-

i) Gneissose structure ii) Maculose structure

f) Describe:-

i) Lacolith ii) Lopolith

P.T.O.

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

a) Define metallic bonds in crystals.

b) Explain 'rock- cycle'.

c) Explain properties of relief and twinkling in optical mineralogy.

d) Explain porphyritic texture with neat labelled diagram.

e) Explain determination of Specific Gravity of minerals using heavy liquids.

f) Describe elements of symmetry and axes in Cubic System, Type-Galena.

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

a) Describe various optical properties in B.C.N.

b) Explain cleavage & fracture in minerals with examples.

c) Explain inosilicate & phyllosilicate structures.

d) Give classification of igneous rocks based on:-

i) Colour Index ii) Mode of occurrence

Q5) Explain with neat labelled diagrams different primary sedimentary structures. **[16]**

OR

a) Define mineral: Describe various branches of mineralogy. **[8]**

b) Describe covalent & ionic bonding in minerals. **[8]**

□□□□

Total No. of Questions : 5]

SEAT No. :

P231

[Total No. of Pages : 2

[4717] - 112
F.Y.B.Sc.
GEOLOGY
General Geology and Palaeontology
(Paper-II) (2008 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) ***Figures to the right indicate full marks.***

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

a) Draw a neat labelled diagram of Ammonord.

b) Define Geology & Palaeontology.

c) Define physical weathering.

d) Define Imprints.

e) Mention all major tectonic plates of the earth.

f) Define sand dune.

g) Define Mantle and core.

h) Describe the condition necessary for fossillisation.

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

a) Describe sea arch and yardangs.

b) Give systematic tabular classification of phanerozoic Eon.

c) Explain the concept of plate tectonic theory.

d) Write a note on applications of fossils in Geology.

e) Explain any four types of hinges in Lamellibranch shell.

f) Describe the apical disc in echinoid.

P.T.O.

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

a) Explain Nebular hypothesis.

b) Explain fold & Residual Mountains.

c) Write a note on principles and construction of seismograph.

d) Describe hard part morphology of gastropod shell.

e) Describe Any Four modes of presesvation of fossils.

f) Describe central & fissure type of volcanoes.

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

a) Describe Earthquake and explain various causes of it.

b) Describe fundamental branches of Geology.

c) Differentiate between regular and irregular echinods.

d) Describe hard part morphology of brachiopoda shell.

Q5) Describe erosional and depositional Land forms formed by the action of river water. **[16]**

OR

a) Describe the hard part morphology of Nautilus shell. **[8]**

b) Describe the hard part morphology of a trilobite. **[8]**

□□□□

Total No. of Questions : 5]

SEAT No. :

P232

[Total No. of Pages : 4

[4717] - 113
F.Y.B.Sc.
STATISTICS /STATISTICAL TECHNIQUES
Descriptive Statistics
(Paper-I) (2008 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) ***Use of Statistical tables and calculator is allowed.***
4) ***Symbols have their usual meanings.***
5) ***Graph papers will be supplied on request.***

Q1) a) Choose correct alternative for the following: **[4×1=4]**

i) Sampling is:

a) Not always useful.

b) Not always possible.

c) Has number of advantages over census.

d) The census.

ii) In order to construct a frequency polygon for equal class intervals along X axis and Y axis respectively.

a) Lower limits and less than cummulative frequency.

b) Upper limits and less than cummulative frequency.

c) Class intervals and frequency.

d) Mid points and frequency.

are plotted.

iii) If $Q_1+Q_3=2Q_2$ then distribution is

a) Positively skewed.

b) Negatively skewed.

c) Symmetric.

d) Moderately skewed.

P.T.O.

iv) If cov (X,Y)= 2.5 then cov (-X,-Y) equal to

a) -2.5 b) 2.5

c) 0 d) 5.0

b) State whether the following statements are true or false: **[4×1=4]**

i) Second order raw moment is always non negative.

ii) If correlation coefficient for certain bivariate data is zero then two regression lines are parallel.

iii) Median can be located using ogive curve.

iv) Coefficient of variation is relative measure of dispersion.

c) If arithmetic mean and geometric mean of two observations are 6.5 and 6 respectively, find harmonic mean. **[2]**

d) If for two attributes A and B; N=200, (A)=40, (B)=50 and (AB)=10, comment on association between two attributes. Justify your answer. **[2]**

e) State any two requisites of a good measure of central tendency. **[2]**

f) If U=(X-*a*)/*h* then show that $\bar{U} = (\bar{X} - a)/h$. **[2]**

Q2) Attempt any four of the following; **[4×4=16]**

a) For a bivariate data (X,Y); $\bar{X} = 2, \bar{Y} = 3, byx = 0.48$ & *bxy* = 0.84, find regression line of Y on X and coefficient of variation Y if $\sigma_x^2 = 5.6.$

b) Explain the following terms:

i) Population, ii) Sample,

iii) SRS, iv) Stratified sampling.

c) Prove that Bowley's coefficient of skewness always lies between -1 and +1.

d) Define "mode". State the formula of mode for continuous frequency distribution state any two demerits of mode.

e) Draw box-plot and hence comment for the following data; min=20, Q_1=40, Q_2=55, Q_3=90, Max=100.

f) Show that variance is invariant of change of origin.

Q3) Attempt any four of the following: **[4×4=16]**

a) Compute Fisher's price index number for the following data:

	Base year		Current year	
Commodity	Price	Quantity	Price	Quantity
A	25	5	30	6
B	60	2	100	3
C	100	1	120	2
D	30	4	40	5

b) The mean weight of 150 students is 60 kg. The mean weight of boys is 70 kg with standard deviation of 10 kg. For girls mean weight is 55 kg with standard deviation 15kg. Find combined standard deviation.

c) For the attributes A,B; show that $Q_{AB} = Q_{\alpha\beta}$.

d) Show that cov(hX+a, k Y+b)= hk cov(X,Y).

e) The mean and variance of a distribution are 30 and 64 respectively and its Pearson's coefficient of skewness is 0.25. Find mode and median.

f) Prove that $\mu_4 \geq \mu_2^2$.

Q4) Attempt any two of the following: **[2×8=16]**

a) For bivariate data(X,Y) show that -1 $\leq$ corr(X,Y) $\leq$ 1.

b) Define the following terms with an illustration.

i) Attribute

ii) Positive class

iii) Positively associated attributes

iv) Ultimate class.

c) Derive the formula for median for a continuous frequency distribution.

d) Define " index number". Explain any two types of index numbers also explain any two problems in construction of index numbers.

Q5) a) Attempt any two of the following: **[2×8=16]**

i) In an examination 140 students passed which is 70% of total students appeared for the exam. 96 girls passed in examination which is 80% of total girls appeared for the exam.

Comment on association between two attributes. **[4]**

ii) If attributes A and B are independent then show that attributes A and B are also independent. **[4]**

b) In case of no ties, with usual notation derive the formula of Spearman's rank correlation coefficient. **[8]**

c) i) For symmetric distribution show that. $\mu_3' = (3\mu_2 + \mu_1'^2)\mu_1'$ **[4]**

ii) Define "kurtosis". Explain any two types of kurtosis. **[4]**

d) For a set of 10 pairs of (x_i, y_i); $\sum x_i = 522, \sum y_i = 1417,$

$\sum x_i^2 = 28348, \ \sum y_i^2 = 202493, \sum x_i y_i = 75166$

find two regression lines, estimate Y for X = 42 and comment on correlation between two variables. **[8]**

□□□□

Total No. of Questions : 5]

SEAT No. :

P233

[Total No. of Pages : 4

[4717] - 114
F.Y.B.Sc.
STATISTICS/STATISTICAL TECHNIQUES
Discrete Probability and Probability Distributions
(2008 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) a) Choose the correct alternative for the following: **[1 each]**

i) Let $X \sim p(g)$, standard deviation of X is

A) 2 B) 3

C) 1 D) 9

ii) The p.m.f. of a discrete r.v. X is given by

X	–3	–2	0	1	2
P(x)	0.15	0.15	0.25	0.35	0.1

What is P(–2 < X < 2)?

A) 0.55 B) 0.5

C) 0.6 D) 0.3

iii) If X and Y are two r.v's, then Corr (5X+4, 2Y+6) is

A) 7 Corr (X,Y) B) 10 Corr (X,Y)

C) Corr (X,Y) D) 20 Corr (X,Y)

iv) What is the probability of drawing a face card from a pack of well shuffled cards.

A) 12/52 B) 16/26

C) 17/52 D) 4/13

P.T.O.

b) State whether the following statements are True or False: **[1 each]**

i) Mode of binomial distribution is unique.

ii) SRSWR is used in hypergeometric distribution.

iii) Central moments are invariant to the change origin.

iv) A and Ω from partition of Ω.

c) Define mutual independence of 3 events of A, B and C. **[2]**

d) State the additive property of Poisson variates. **[2]**

e) Define two-dimensional discrete random variable. **[2]**

f) Define factorial moment of a univariate probability distribution. **[2]**

Q2) Attempt any four of the following: **[4×4 = 16]**

a) Find the probability of drawing an ace, a king and a queen in this order without replacement from a pack of 52 playing cards.

b) State and prove addition theorem of probability.

c) A committee of 5 persons is to be formed out of 6 Engineers and 4 doctors, find the probability that the committee consists of

i) 3 Engineers

ii) Only one Engineer

d) State axioms of probability. Also verify that all these axioms hold good for $P(A|B)$, for 2 events A and B defined on Ω.

e) Following are the marginal p.m.f's of X and Y

X	1	2	3
P(x)	0.2	0.3	0.5

Y	2	3	5
P(y)	0.1	0.5	0.4

Assuming X and Y to be independent, obtain joint p.m.f. of (X,Y).

f) A radar system has a probability of 0.1 of detecting a certain target during a single scan. Find the probability that the target will be detected at least twice in 8 scans.

Q3) Attempt any four of the following: **[4×4 = 16]**

a) If X and Y are 2 discrete r.v.'s the prove that

Var (aX– bY) = a^2 Var (X) +b^2 Var (Y) –2ab Cov (X,Y), where a and b are real constants.

b) Let $X \sim B(n_1, p)$; $Y \sim B(n_2, p)$. If X and Y are independent, find the conditional probability distribution of X given X+Y = *n* and identify it.

c) If A and B are 2 events defined on Ω, prove with usual notation,

$$P(A) = P(A|B) \cdot P(B) + P(A|B') \cdot P(B').$$

d) Let X follows a Poisson distribution with modes 4 and 5. Find the probability that X takes either of these values.

e) Define discrete uniform distribution and find its variance.

f) For a bivariate discrete random variable

(X,Y); $\sigma_X^2 = 9, \sigma_Y^2 = 4$, $\text{Cov}(X,Y) = 4$, find $\text{Corr}\left(\frac{3X-5}{2}, 10 - \frac{Y}{4}\right)$.

Q4) Attempt <u>any two</u> of the following: **[8×2 = 16]**

a) i) A discrete r.v. X has the p.m.f. **[3]**

$$P(x) = \frac{x^2+1}{34}, \; x = 1,2,3,4.$$

Obtain its mean.

ii) Define hypergeometric distribution and obtain its mean. **[5]**

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

ii) Prove that $P(A \cap B) = P(B)\, P(A|B)$ for any two events A & B defined on Ω. **[2]**

c) i) Let X~B(5,0.3), Y~B(3,0.3) and are independent. Obtain P(X+Y<4) and P(Y = 2–X). **[4]**

ii) Let (X,Y) be a discrete r.v. with p.m.f. **[4]**

$$P(x,y) = \frac{2x+3y}{72}, \; x = 0,1,2$$
$$y = 1,2,3.$$

Obtain marginal p.m.f. of Y.

d) Let X and Y are 2 independent discrete uniform random variables with parameter '*n*'. Obtain the probability distribution of X+Y, also state Var (X+Y). **[8]**

Q5) Attempt <u>any two</u> of the following: **[8×2 = 16]**

a) The joint p.m.f. of (X,Y) is

X / Y	0	1	2
1	0.1	0.2	0.1
2	0.1	0.3	0.2

i) Obtain conditional p.m.f. of X given Y = 2. **[4]**

ii) $E\left(X \middle| Y = 2\right)$ **[2]**

iii) $Var\left(X \middle| Y = 2\right)$ **[2]**

b) i) If $A_1, A_2, \ldots\ldots A_n$ are '*n*' events, then prove that

$$P\left(\bigcup_{i=1}^{n} A_i\right) \leq \sum_{i=1}^{n} P\left(A_i\right).$$ **[6]**

ii) Two cards are drawn at random from a box which contain 4 cards numbered 1,3,5,8. Write the probability distribution of sum of the nos. on 2 cards. **[2]**

c) Define a cumulative distribution function of a discrete random variable. State all its properties. **[8]**

d) Suppose A and B are two events defined on Ω with $P\left(A\right) = \frac{2}{3}$, $P(B) = \frac{3}{5}$.

Show that

i) $\frac{4}{15} \leq P\left(A \cap B\right) \leq \frac{3}{5}$ **[4]**

ii) $P\left(A \cup B\right) \geq \frac{2}{3}$ **[4]**

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Total No. of Questions : 5]

SEAT No. :

P234

[Total No. of Pages : 2

[4717] - 115
F.Y.B.Sc.
GEOGRAPHY - I
Gg-110: Physical Geography
(Old) (2008 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) ***Drawn neat diagrams and sketches wherever necessary.***
4) ***Use of Map stencil is allowed.***

Q1) Answer the following questions in two or four sentences.

a) Define Geomorphology.

b) What is Guttenburg discontinuity?

c) Define Geosyncline.

d) Define Mass movement.

e) What is orogenic Movement?

f) Define Extinct Volcanoes.

g) Define Delta.

h) Define Beach.

Q2) Explain the following in brief (Any Four).

a) Branches of physical Geography.

b) Effects of earthquake.

c) Mechanical Weathering.

d) Blow out.

e) Flood plains and levees.

f) Window and Excavated Arch.

P.T.O.

Q3) Answer the following (Any Four)

a) Nature of Geomorphology.

b) Characteristics of sedimentary rocks.

c) Describe factors affecting Mass Movement.

d) Block Mountain.

e) Formation of Loess.

f) Sea cliffs and Wave cut platform.

Q4) Answer the following (Any Two).

a) Explain Holme's convection current theory.

b) Explain types of Igneous rocks and give their characteristics.

c) Explain Davisian cycle of erosion.

d) Describe landforms associated with erosional work of glaciers.

Q5) Explain structure and composition of interior of the earth.

OR

Describe various landforms associated with erosional work of wind.

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Total No. of Questions : 5]

SEAT No. :

P235

[Total No. of Pages : 2

[4717] - 116
F.Y.B.Sc.
GEOGRAPHY - II
Gg-120: Geography of Atmosphere and Hydrosphere
(Old 2008 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) ***Draw neat diagrams and sketches wherever necessary.***
4) ***Use of Map stencils is allowed.***

Q1) Answer the following questions in two to four sentences.

a) Define Weather.

b) What is Global Warming?

c) What is pressure gradient?

d) Define cyclone.

e) What do you mean by fronts?

f) Define salinity.

g) What is dead sea?

h) What is high tides?

Q2) Explain the following (Any Four).

a) Ozonosphere.

b) Lapse Rate.

c) Trade Winds.

d) Continental Shelf.

P.T.O.

e) Halff Nehrung Coast.

f) Salinity of Dead Sea.

Q3) Answer the following (Any Four)

a) Importance of Climatology in modern time.

b) Heat budget of the earth.

c) Types of Humidity.

d) Emergence of coasts.

e) Components of sea waves.

f) Causes of tides.

Q4) Attempt the following (Any Two).

a) What is monsoon? Explain the origin of Monsoon.

b) Forms of Precipitation.

c) Explain Equilibrium theory of tides.

d) Explain causes of Salinity.

Q5) Explain the structure of the Atmosphere with neat diagram.

OR

Define Oceanography. Explain nature and scope of Oceanography.

☼ ☼ ☼

Total No. of Questions : 5]

SEAT No. :

P236

[Total No. of Pages : 2

[4717] - 117
F.Y.B.Sc.
MICROBIOLOGY
Introduction to Microbiology
(Old Course - 2008 Pattern) (Paper - I)

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

Instructions to the candidates:

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

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

a) Name any two chemical bonds present in biomolecules.

b) Give two examples of spore forming bacteria.

c) Define p^k.

d) ——— is causative agent of typhoid.

e) State true or false.

i) Antony Van Leeuwenhoek was first to observe cells under microscope.

ii) Joseph lister was associated with abiogenesis.

f) Enlist roles of bacteria.

g) What are different human diseases caused by viruses?

h) Match the following and rewrite

i) Bacteria	1) Eukaryotic cell
ii) Fungi	2) Prokaryotic cell
	3) None of the above

P.T.O.

Q2) Write short notes on ANY FOUR. **[16]**

a) PHB.

b) Polio virus.

c) Buffer.

d) Role of staphylococcus in human health.

e) River's postulates.

f) Antony Von Leeuwoenhoek.

Q3) Attempt ANY FOUR of the following. **[16]**

a) Explain anaerobic life and significance of fermentation.

b) Write down morphological and characteristic features of viruses.

c) Explain chemical reactions occuring in bacterial cell.

d) Write general structure of metachromatic granules and also mention importance of it.

e) Describe general characters and diseases caused by rickettsia.

f) Write role of Bacillus in human health.

Q4) Attempt ANY TWO of the following. **[16]**

a) Describe Historical development in field of immunology.

b) Write general characters of saccharomyces and describe life cycle of it.

c) Describe structure and function of cell membrane.

d) Describe following terms.

i) Fimbriae

ii) Pili

Q5) Attempt ANY ONE of the following. **[16]**

a) Describe in detail contributions of Louis Pasteur in field of Microbiology.

b) Write structure and function of carbohydrate with suitable example.

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Total No. of Questions : 5]

SEAT No. :

P237

[Total No. of Pages : 2

[4717] - 118
F.Y.B.Sc.
MICROBIOLOGY
Basic Techniques in Microbiology
(Old Course - 2008 Pattern) (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 indicates full marks.***

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

a) Define-Generation time.

b) What are mesophiles? Give two examples.

c) Name any two examples of microbicidal heavy metals.

d) What is the pressure, temperature and time for sterilization in an autoclave?

e) State true or false.

i) Basic stains can be used for negative staining.

ii) Blood agar is an enrichment medium.

f) Name the ingradients in Macconkey's medium that makes it selective and differential.

g) What is synchronous culture?

h) What are fluorochromes? Give one example.

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

a) Oil immersion objective.

b) Acid fast staining.

c) Mordqnt.

P.T.O.

d) Use of ethylene oxide.

e) Dark field condenser.

f) Cryopreservation.

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

a) Explain safty precautions required in a Microbiology laboratory.

b) Describe different growth phases in a microbial batch culture.

c) Explain the principle used to demonstrate the presence of capsule.

d) What are aberrations in lenses? How to minimize them?

e) Comment on the mechanism of action of halogens as disinfecting agents.

f) What is diauxic growth curve? Explain with suitable example.

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

a) With a ray diagram, explain the principle of phase contrast microscope.

b) Describe any two methods for enumeration of microorganisms.

c) What is differential staining? Explain Gram staining method with its significance.

d) What is disinfection? Write the characteristics of an ideal disinfectant.

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

a) What is sterilization? Explain the use of heat for sterilization.

b) What are extremophiles? Explain the methods for their cultivation.

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Total No. of Questions : 5]

SEAT No. :

P238

[Total No. of Pages : 3

[4717] - 121
F.Y.B.Sc.
ELECTRONICS
EL1.T1: Principles of Analog Electronics
(Old) (2008 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 table & calculator is allowed.***
4) ***Figures to the right indicate full marks.***

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

a) Draw circuit symbol for LDR & Preset.

b) Find value of capacitor marked as 103.

c) State any two types of inductors with their circuit symbols.

d) Define ideal voltage source & give its circuit symbol.

e) State superposition theorem.

f) Give one application of Zener diode & LED.

g) Explain in brief -

i) PIV of diode

ii) TUF of rectifier

h) 'Op - amp is basically a differential Amplifier', comment.

Q2) Attempt any four questions. **[16]**

a) i) Write a short note on step up Transformer.

ii) Give construction of general purpose e.m. relay.

b) Draw waveforms of sine, square, triangular & sawtooth waves.

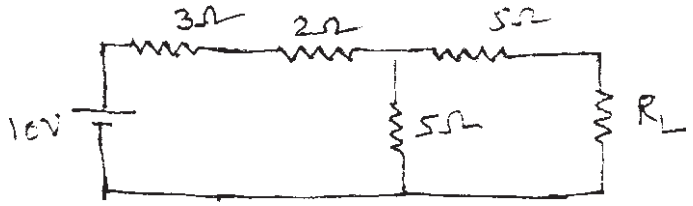
P.T.O.

c) Explain construction & working of p.n. junction diode.

d) Obtain an expression for charging voltage of a capacitor in a RC circuit with square wave input.

e) With the help of neat circuit diagram explain working of full wave rectifier.

f) Obtain Thevenine's equivalent of the following circuit.



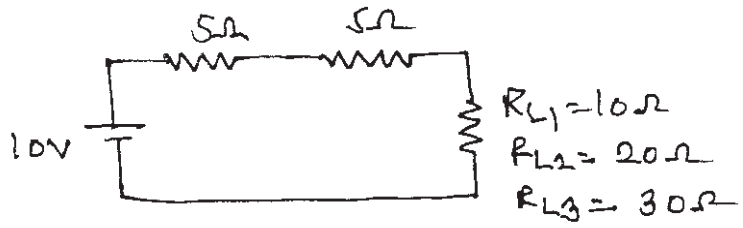
Q3) Attempt <u>any four</u> questions. **[16]**

a) i) Draw circuit symbols of SPDT switch & fuse.

ii) Give chemical reaction involved in a lead acid accumulator.

b) Show that in LC circuit current leads applied voltage.

c) Verify maximum power Transfer theorem for the following.



d) Draw circuit diag to study I.V characteristics of p-n-p transistor & explain it.

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

f) Describe half wave voltage doubler circuit.

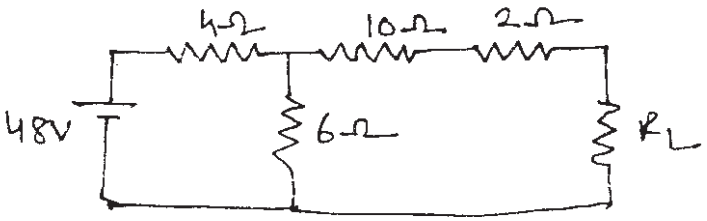
Q4) Attempt any four questions. **[16]**

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

ii) Give full form of PTH & DSB PCB.

b) In a series LCR circuit if L = 0.1 mh, C = 0.01 μf R= 100k find the value of resonant frequency.

c) Find Norton equivalent of the following.



d) Describe working of n-channel MOSFET. (enhancement type).

e) What are clipper circuits? Explain positive biased clipper circuit.

f) Write a short note on opto coupler.

Q5) Attempt any four questions. **[16]**

a) Show that RC product has dimensions of time.

b) The arms of π network has values $R_a = R_b = R_c = 20\,\Omega$ find equivalent T network.

c) Write a short note on Triac.

d) With the help of equivalent circuit, explain working of SCR.

e) Draw practical circuit of CE amplifier & explain function of each component.

f) Explain use of op - amp as a substractor.

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Total No. of Questions : 5]

SEAT No. :

P239

[Total No. of Pages : 3

[4717] - 122
F.Y.B.Sc.
ELECTRONIC SCIENCE
EL1-T2: Principles of Digital Electronics
(Old 2008 Pattern) (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) ***Use of calculator and log table is allowed.***
4) ***Figures to the right indicates full marks.***

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

a) What is radix used in case of Decimal and Octal number systems?

b) Draw symbol and write truth table of EXOR gate.

c) What is SOP and POS?

d) Write 2's complement of binary number: 101101.

e) Define multiplexer and de-multiplexer.

f) What is sequential circuit?

g) State different types of logic families.

h) Explain RAM and ROM.

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

a) Prove that $\overline{A+B} = \overline{A} \cdot \overline{B}$.

b) Define Full adder. Draw its logic diagram & write truth table.

c) Draw logic symbols of NAND gate and NOT gates. Write their logic expressions and truth table.

d) Explain working of JK FF.

P.T.O.

e) With neat block diagram explain concept of 2:1 MUX.

f) Convert following decimal number into binary and hexadecimal:

i) $(29)_{10}$ and

ii) $(52)_{10}$.

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

a) Draw logic diagram of 3 bit UP counter.

b) Simplify the following boolean equation using K-map:

$$Y = \bar{A}BCD + ABCD + AB\bar{C}D + \bar{A}BC\bar{D}$$

c) Perform the subtraction using 2's complement method. $(38)_{10} - (19)_{10}$.

d) Explain BCD to 7 segment decoder with diagram.

e) Draw logic diagram and symbol of T FF.

f) i) What is propagation delay of flip flop?

ii) Define the terms: Memory capacity and memory organization.

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

a) What is comparator? Draw logic diagram of 2 bit comparator.

b) Explain Decimal to BCD encoder using truth table.

c) Explain PIPO shift register using neat logic diagram.

d) Distinguish between synchronous and Asynchronous counters.

e) Explain action of Two input TTL NAND gate circuit.

f) Explain in brief memory organization of 16 bit cell.

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

a) Explain working of NOR gate using RTL logic circuit.

b) With suitable circuit diagram explain CMOS Inverter.

c) What is shift register? Explain different ways of 4 bit shift register.

d) What is k-map. Explain 3 bit k-map simplication method.

e) i) Write 1's complement of 4 bit binary numbers

1) 1010 &

2) 0110

ii) Draw circuit diagram of two input OR gate using diode logic system.

f) i) Give examples of sequential circuits. (any two).

ii) Draw an arrangement of LEDs in common cathode seven segment Display system.

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Total No. of Questions : 4]

SEAT No. :

P240

[Total No. of Pages : 2

[4717] - 123
F.Y.B.Sc. (Annual)
DEFENCE AND STRATEGIC STUDIES
DS-1: War and Warfare
(Old 2008 Pattern) (Paper - I)

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

Instructions to the candidates:

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

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

a) Define International Terrorism.

b) What was the outcome of 1965 Indo-Pak war?

c) What is D-Day?

d) What is H-Hour?

e) What do you mean by ABC Weapons?

f) What is Insurgency?

g) Define Warfare.

h) What is Red Corridor?

i) How will you distinguish rebel and revolutionary?

j) Define National Security.

k) Relate threats and its abetments.

l) What is Drug Trafficking?

m) Introduce 1971 WAR.

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

a) How religious conviction has warranted the war?

b) Write the notion of War.

P.T.O.

c) How bolt from the blue is the decisive principle of war? Justify.

d) What is Naxalism?

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

a) Explain about the main causes of war between India and China.

b) Explain about the basic characteristics of LIC.

c) Explain about the stages of Guerilla Warfare.

d) Explain about the Tactics of Chemical warfare.

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

a) Discuss all the theory of war.

b) Explain about the Principles of War.

c) Explain about the importance and use of information warfare.

d) Explain about the means and methods of Economic Warfare.

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Total No. of Questions : 4]

SEAT No. :

P241

[Total No. of Pages : 2

[4717] - 124
F.Y.B.Sc. (Annual)
DEFENCE AND STRATEGIC STUDIES
DS-2: Defence Mechanism and Military Career in India
(Old 2008 Pattern) (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.***

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

a) Define National security.

b) Write any two powers of the President as a supreme commander of the Armed Forces.

c) Write any two functions of Ministry of Defence.

d) What do you mean by Civil defence.

e) Write two limitations of Army medical Corps.

f) What do you mean by career in armed forces.

g) What are the types of battle ships in Indian Navy.

h) Define Intelligence.

i) Define Territorial Army.

j) Write any two functions of Armored Corps.

k) Write any two functions of Homeland security.

l) Write any two functions of Coast Guards.

m) Write any two functions of B.S.F.

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

a) Explain characteristics of Army medical corps.

b) Explain role of Artillery.

P.T.O.

c) Discuss impact of Modern War.

d) Explain role of administrative services during peace.

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

a) Role of Ministry of defence.

b) Explain limitations of Infantry.

c) Discuss role of Air-power during peace time.

d) Explain role of Signal Corps during War.

Q4) Write in 300 words each (any two). **[30]**

a) Explain second line of defence in India.

b) Explain role of Navy in India's national economy.

c) Discuss career options in Military Intelligence services.

d) Write a note on role of C.R.P.F in national security.

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Total No. of Questions : 4]

SEAT No. :

P242

[Total No. of Pages : 2

[4717] - 125
F.Y.B.Sc. (Annual)
DEFENCE AND STRATEGIC STUDIES
DS-III: Evolution of Defence Science and Technology
(Old Course 2008 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). **[20]**

a) What do you mean by catapult?

b) How you would like to define Science?

c) What do you know about Nepolean Bonaparte?

d) Who invented the Aircraft?

e) State any two names of small Arms.

f) What do you understand by L.I.C?

g) State the meaning of energy resources.

h) What do you mean by ‘‘Nuclear Doctrine’’?

i) What was the duration of World War second?

j) State any two names of new military technology.

k) What do you know about Blitezkriege Tactics?

l) State the long form of S.L.B.M.

m) Define “Duel Technology”.

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

a) Write in brief “Submarine”.

b) Explain the concept of ‘‘Totalwar’’.

P.T.O.

c) How distinguish between Raw material & Natural Resources.

d) Explain in brief "The first use of Nuclear Weapons".

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

a) Write a note on "Indian Missiles".

b) Explain any one example of L.I.C. in Indian Context.

c) Explain in brief the emergence of General Staff.

d) Highlight on the first use of tank during World War - I.

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

a) Write a note on World War - I with special reference to the era of Total wars.

b) Highlight on Military reforms introduces by Gustavas Adolphus.

c) Explain the relationship between energy security and national security.

d) What were the implications of science & technology on contemporary warfare.

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Total No. of Questions : 5]

SEAT No. :

P243

[Total No. of Pages : 2

[4717] - 126
F.Y.B.Sc.
ENVIRONMENTAL SCIENCE - I
ENV - 101: Life sciences - Basic Biology and Natural Resources
(2008 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 indicates full marks.***

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

a) What is missing link?

b) Define Biology.

c) Give any two characteristics of birds.

d) Name any two eras.

e) Write any two examples of fossil fuel.

f) What is potential resource?

g) What are atomic energy minerals?

h) Give the global distribution of water.

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

a) What is mass extinction? Discuss any three causes of it.

b) Describe the evolution of life on earth.

c) Describe role of microbes in soil.

d) What are the effects of drought on environment.

e) Discuss the finite nature of resources.

f) Describe the process of insect preservation.

P.T.O.

Q3) Write short note on <u>any four</u> of the following. **[16]**

a) Equipments for herberium collection.

b) Xerophytic adaptations.

c) Rules of nomenclature.

d) Flood-a natural disaster.

e) Microbes and diseases.

f) Forest types of India.

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

a) Discuss the various world Food problem. How is agriculture a resource? Explain.

b) Discuss any four methods used for identification of species.

c) Explain in details importance of continental drift in present day life distribution.

d) How coal originates? Discuss various uses of coal.

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

a) What are hydrophytes? Classify hydrophytes on the basis of their relation to water and air. Add note on morphological adaptations in hydrophytes.

OR

b) Discuss various non-conventional sources of energy used by mankind. Add note on their environmental significances.

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Total No. of Questions : 5]

SEAT No. :

P244

[Total No. of Pages : 2

[4717] - 127
F.Y.B.Sc.
ENVIRONMENTAL SCIENCE - II
ENV - 102: Earth Sciences : Environmental Chemistry and Basic Geoscience
(2008 Pattern) (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 indicates full marks.***

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

a) Which instruments are used to measure the atmospheric temperature and pressure.

b) What is metamorphic rock? Give one example.

c) What is Green House Effect?

d) Give any 4 micro nutrients essential for plant growth.

e) Which discontinuity separates crust from mantle and mantle from core?

f) What is laps rate? Give its types.

g) What is stratopause?

h) Give any two halogenated compounds.

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

a) Describe the changes in water properties by addition of solute.

b) Describe various types of carsinogenic compounds & their effects on human health.

c) Give an account of problems due to DDT.

d) Explain with example significance of macro& micro nutrients of soil.

P.T.O.

e) Draw neat labelled diagram of water cycle and add note on its components.

f) Explain the components of lithosphere.

Q3) Write short notes on <u>any four</u> of the following. **[16]**

a) Chemical potential and chemical equilibria.

b) Surfactants.

c) Global warming.

d) Soil profile.

e) Atmospheric stability.

f) Rock cycle.

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

a) Discuss the physical properties of water. Add note on hydrogen bonding.

b) Describe the physical & chemical properties of Hg and its compounds. Explain the effect of Hg on humans.

c) Explain with suitable diagram thermal structure of atmosphere.

d) What is geological evolution? Add note on plate tectonics.

Q5) What are soil formation process? Give account of weathering & add note on physical & chemical properties of soil. **[16]**

OR

Give some basic chemical reactions including any four gases present in the atmosphere.

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Total No. of Questions : 10]

SEAT No. :

P245

[Total No. of Pages : 3

[4717] - 129
F.Y.B.Sc. (Vocational)
INDUSTRIAL CHEMISTRY - I
(2008 Pattern) (Paper - I)

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

Instructions to the candidates:

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

SECTION - I

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

a) What are surfactants?

b) Define catalyst.

c) What is isoelectric point?

d) Explain autocatalysis.

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

a) Differentiate between physical and chemical adsorption.

b) Describe the phenomenon of electrophoresis.

c) Describe the various kinetic properties of colloidal solutions.

P.T.O.

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

a) Discuss the role of

i) temperature and

ii) pressure on extent of adsorption

b) "Enzyme catalysis is highly specific and selective". Explain.

c) Describe electrical dispersion method for preparation of sol.

Q4) Answer <u>any one</u> of the following: **[8]**

a) Describe the mechanism of acid-base catalysis using suitable mechanism.

b) What do you understand by an adsorption isotherm? Derive and explain Langmuir adsorption isotherm.

Q5) Write notes on <u>any two</u> of the following: **[8]**

a) Colloidal dispersion

b) Aerosol

c) Promotors

SECTION - II

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

a) Molarity

b) Isobaric process

c) Equivalent weight

d) Fundamental quantities

Q7) Answer <u>any two</u> of the following: **[8]**

a) State and explain Roult's Law.

b) Explain material balance involved in drying operation.

c) Explain the effect of temperature on heat of reaction.

Q8) Write short notes on <u>any two</u> of the following: **[8]**

a) Purge ratio

b) Adiabatic process

c) Henry's Law.

Q9) Answer <u>any one</u> of the following: **[8]**

a) Describe various steps involved in material balance for a chemical reaction.

b) State and explain phase rule. How it is applied to one component system.

Q10) Solve <u>any two</u> of the following: **[8]**

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

b) 5kg of Oxygen in a closed container of volume $1m^3$ is heated without exceeding a pressure of 7 atmospheres. Calculate the maximum temperature of gas attained.

c) Calculate enthalpy change for the following reaction in which 60 gmole CO_2 is produced at 25°C.

$2C_4H_{10}(g) + 13O_2(g) \rightarrow 8CO_2(g) + 10H_2O(l)$

Given:

Component	ΔH_f^o kcal/g mole
C_4H_{10} (g)	–30.14
CO_2 (g)	–94.051
H_2O	–68.315

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Total No. of Questions : 6]

SEAT No. :

P246

[Total No. of Pages : 2

[4717] - 130
F.Y.B.Sc. (Vocational)
BIOTECHNOLOGY
Bio - chemistry, Bio - physics and Instrumentation - I
(2008 Pattern) (Paper - I)

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

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Draw neat and labelled diagrams wherever necessary.***
3) ***Use separate answer books for section I and section II.***

SECTION - I (Biochemistry)

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

a) What are saturated fatty acids? Give two examples.

b) What is a buffer?

c) Define nucleoside.

d) Write the function of Golgi apparatus.

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

a) Write the functions of lipids.

b) Describe glycolysis.

c) Explain the structure of amino acid.

d) How enzyme activity gets affected by pH?

e) Write a note on isoenzymes.

P.T.O.

Q3) Answer any two. **[16]**

a) Describe the structure of DNA.

b) Classify carbohydrates in detail giving examples.

c) Comment upon the secondary structure of proteins.

SECTION - II Biophysics and Instrumentation

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

a) State Lambert and Beer's law.

b) What is ultracentrifugation?

c) Define nephalomerty.

d) What is resolution power of a microscope?

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

a) Write a short note on paper chromatography.

b) Explain the working of spectrophotometer.

c) What is a turbidometer? How is it useful?

d) Describe calomel electrode with the help of diagram.

e) Explain Dark field microscopy.

Q6) Answer any two. **[16]**

a) Describe the principle, working and uses of SEM.

b) What is affinity chromatography? Give its applications.

c) Discuss the role of radio isotopes in biological sciences.

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Total No. of Questions : 5]

SEAT No. :

P585

[Total No. of Pages : 2

[4717] - 131
F.Y.B.Sc. (Vocational)
PHOTOGRAPHY AND AUDIO-VISUAL PRODUCTION
Basic Photography & Appreciation of Media
(2008 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 and labeled diagrams wherever necessary.***

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

a) What does ISO stand for?

b) Define the term 'sync-speed'.

c) Write down two equivalent exposures for f 4 @ 1/125 sec for ISO 200.

d) What is the importance of the mirror in a DSLR camera?

e) Explain the term 'depth of field'.

f) Give one advantage and one disadvantage of a pin-hole camera.

g) What is the difference between refraction and diffraction of light?

h) Which camera will give a better image? 10 Mega pixels or 15 Mega pixels? Why?

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

a) Draw suitable diagrams and explain the rule of thirds.

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

c) Give examples and differentiate between hard news and soft news.

d) Define shutter speed. Write down the shutter speed scale. What are slow shutter speeds and what are fast shutter speeds?

e) Draw a suitable diagram and explain the pin-hole image. What are the merits and demerits of this image?

P.T.O.

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

a) Differentiate between a 'news' and a 'photo news'.

b) Draw a diagram and explain the chromatic aberration. How is it reduced?

c) Discuss the advantages of a focal plane shutter.

d) Draw a diagram and explain the 'total internal reflection'. How is it used in photography?

e) Explain who is professional photographer.

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

a) Discuss the importance of photographic image in print media.

b) How would you analyze photography as a medium of mass communication?

c) Discuss various genres of photography.

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

a) Describe different parts of a DSLR camera and their functions.

b) Draw suitable diagrams and discuss any four elements of composition.

c) Discuss the importance of a photographer in society.

Total No. of Questions : 5]

SEAT No. :

P247

[Total No. of Pages : 2

[4717] - 132
F.Y.B.Sc. (Vocational)
ELECTRONIC EQUIPMENT AND MAINTENANCE
Test and Measuring Instruments and Consumer Products
(Old 2008 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) Attempt all of the following. **[16]**

a) What is sensitivity and precision of measuring instrument?

b) What is use of delay line in CRO?

c) What are applications of function generator?

d) What are different parts of electric iron?

e) What is difference in linear power supply and switch mode power supply?

f) What is application of wein bridge?

g) What are different parts of digital clock?

h) What is autoranging? Give any two applications.

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

a) What are different types of errors caused in measuring instruments?

b) Explain the working of FET input voltmeter.

P.T.O.

c) Explain the working of AF signal generator.

d) Explain the working of electronic ignition system.

e) Explain the working of offline UPS.

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

a) What is loading effect? Explain.

b) Explain the working of Hey bridge.

c) Explain the working of linear power supply .

d) Write a short note on Electronic object counter.

e) Explain the working of circuit breaker.

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

a) Explain the working of electric geyser.

b) Explain the working of digital storage oscilloscope.

c) What are advantages of digital instruments over analog instrument?

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

a) Enlist the front panel controls of dual trace CRO.

b) What are measurement techniques to be followed while testing instrument?

c) Explain the working of digital clock in detail.

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Total No. of Questions : 10]

SEAT No. :

P248

[Total No. of Pages : 3

[4717] - 133
F.Y.B.Sc.
INDUSTRIAL MICROBIOLOGY
Instrumentation and Materials and Design
(Vocational Course) (Theory) (Paper - I) (2008 Pattern)

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

Instructions to the candidates:

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

SECTION - I

(Instrumentation)

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

a) List any two chromatography methods applied in biology.

b) State Beers - Lambert's law.

c) Define atomic number and atomic mass.

d) Define sensitivity of an instrument with spectrophotometer as an example.

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

a) What is 'spiking' of a sample during an estimation process? Explain why it is done.

b) Describe ultra centrifuge technique.

c) Describe the methods of pH and Eh measurements.

P.T.O.

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

a) Describe the principle of adsorption chromatography.

b) Describe the technique of nephlometry.

c) State the Stoke's law applied for centrifugation. Explain how 'g' is not necessarily directly proportional to 'rpm' of a machine.

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

a) What is cation exchanger? Give details with example.

b) Explain the detection limits and sensitivity in instrumentation.

c) Draw a block diagram of a UV - visible range spectrophotometer. Explain its working.

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

a) Write standard Operating Procedure for the operation of a pH meter.

b) Describe the technique of spectrofluorimetry.

SECTION - II

(Materials and Design)

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

a) Explain the properties of stainless steel that make it compatible for use in bioprocesses.

b) Explain the effect of oligodynamic action of metals on bioprocesses.

c) Differentiate between thermoset plastics and thermoplastics.

d) What is glass?

Q7) Answer <u>any two</u> of the following: **[8]**

a) Define Bioleaching and explain its effect on bioprocesses.

b) What is polypropylene? Explain the properties of polypropylene that make it compatible for use in bioprocesses.

c) What is an Orthographic projection? Draw an object to show this projection.

Q8) Answer <u>any two</u> of the following: **[8]**

a) Write a short note on 'Blow Molding Technique'.

b) What is a 'Thermoplastics'? Give its use in industry.

c) Describe the applications of butyl rubber.

Q9) Answer <u>any two</u> of the following: **[8]**

a) Describe die making for plastic molding.

b) Illustrate the use of two types of lines used in engineering drawings.

c) Describe the metal toxicity.

Q10) Answer <u>any one</u> of the following: **[8]**

a) Define microbial corrosion? Explain how microorganisms influence the corrosion process in different ways.

b) Draw any object to mark following line types and explain applications of these line types.

i) Visible

ii) Hidden

iii) Center

iv) Break line

v) Cutting plane

Total No. of Questions : 5]

SEAT No. :

P249

[Total No. of Pages : 2

[4717] - 134
F.Y.B.Sc. (Vocational)
COMPUTER HARDWARE AND NETWORK ADMINISTRATION
Essentials of Computers
(48710) (Paper - I) (2008 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 the following: **[16]**

a) What is RAM?

b) Write full form of MICR, SIMM, ALU.

c) Define UPS.

d) What is DMA?

e) What is BIOS?

f) Define Computer.

g) Define Hardware.

h) Define Software.

Q2) Attempt any four: **[16]**

a) Explain Device Controller.

b) What is HDD?

c) Explain Working of Mouse.

d) Define add-on cards.

e) Explain Motherboard.

f) Write notes on generation of Computer.

P.T.O.

Q3) Attempt any four: **[16]**

a) Write notes on DOT matrix printer.

b) What is Scanner?

c) Explain the difference between Primary and Secondary memory.

d) What is Plotter?

e) Explain touch screen panel.

f) Explain iRAM.

Q4) Attempt any two: **[16]**

a) Explain the clock in computer.

b) Explain different types of interrupts in computer.

c) Explain front and rare panels of computer with block diagram.

Q5) Attempt any two: **[16]**

a) Explain Control Unit of Computer.

b) Explain different memories in Computer.

c) Define:

i) Compact Disk.

ii) USB.

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Total No. of Questions : 5]

SEAT No. :

P250

[Total No. of Pages : 2

[4717] - 135
F.Y.B.Sc. (Vocational)
SEED TECHNOLOGY
Morphology, Seed Development and Testing for Cultivar Genuineness and Plant Breading for Crops Improvement
(48910) (Paper - I) (Old - 2008 Pattern)

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

Instructions to the candidates:

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

Q1) Attempt the following: **[8 × 2 = 16]**

a) Give any two agencies of allogamy.

b) Define a Fruit.

c) What is polyembryony?

d) Enlist any two types of indehiscent Fruits.

e) What is plant breeding?

f) Give any two merits of pureline selection.

g) What do you mean by breeding for disease resistance?

h) Define selfing.

Q2) Attempt any four of the following: **[4 × 4 = 16]**

a) Sketch, Label and describe the T.S. of typical anther.

b) Give the distinguishing characters of Family Liliaceae.

c) Explain growout test in cotton.

d) What is a clone and give the characters of clone?

e) Describe the development of double cross hybrid.

f) Describe any two modes of natural vegetative propagation.

P.T.O.

Q3) Write notes on any Four of the following: **[4 × 4 = 16]**

a) Parts of a typical Flower.

b) Diagnostic characters of Family Malvaceae.

c) Criteria for harvesting of Fruits and Seeds.

d) Classification of Mutation.

e) Characters of mass selection.

f) Somaclonal variation.

Q4) Attempt any two of the following: **[2 × 8 = 16]**

a) Describe the development of dicot embryo.

b) What is megasporium? Describe the development of megaspore.

c) State and explain Law of independent assortment.

d) What is introduction? Give the objectives and types of introduction.

Q5) What is Fertilization? Explain the process of Fertilization in angiosperms. **[16]**

OR

What is hybridization? Explain its technique in self pollinated crops.

Total No. of Questions : 10]

SEAT No. :

P251

[Total No. of Pages : 3

[4717] - 136
F.Y.B.Sc.
INDUSTRIAL CHEMISTRY - II
(Vocational) (Paper - II) (2008 Pattern)

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) Give two advantages of fuel gases.

b) What is oil gas?

c) Define the terms flash point and fire point.

d) Define catalytic cracking.

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

a) Write a note on aviation gasoline.

b) Give any one process of synthesis of oil-gas.

c) Explain the chemical constitution of Coal.

P.T.O.

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

a) Describe the synthesis of bio-gas. What are the limitations of bio-gas?

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

c) Explain the classification of fuels.

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

a) Discuss the theories of origin of petroleum.

b) What is coal-tar? Give the major products obtained in refining of coal-tar and it's uses.

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

a) Discuss the process of analysis of coal in detail.

b) What is reforming? Explain the process giving suitable examples.

SECTION - II

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

a) Define Pulverisation.

b) Give two uses of activated charcoal.

c) Give the structural formula of talc.

d) What is electrometallurgy? Give example.

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

a) What is an ore? Classify different types of ores.

b) Write a short note on asbestos.

c) Discuss in brief kinetics of roasting.

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

a) What is metallurgy? Give the divisions of metallurgy.

b) Discuss extraction of iron by Pyrometallurgy.

c) What are silicates? Discuss the structure and properties of different silicates.

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

a) What is concentration of ore? Give different techniques of ore-dressing.

b) Discuss physico-chemical principles involved in the extraction of metals from their oxide ores.

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

a) Give a detailed account of different allotropes of carbon.

b) What is meant by Reduction? Give the different types of reduction processes.

Total No. of Questions : 6]

SEAT No. :

P252

[Total No. of Pages : 3

[4717] - 137
F.Y.B.Sc.
BIOTECHNOLOGY
Microbiology, Biostatistics, Biomathematics and Computers for Biologists (Vocational) (Paper - II) (2008 Pattern)

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

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Draw neat and labelled diagrams wherever necessary.***
3) ***Use separate answer books for section I and section II.***

SECTION - I

(Microbiology)

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

a) Differentiate between obligate aerobes and obligate anaerobes.

b) Define pasteurization.

c) Enlist the different types of media.

d) What are pathogens? Give two examples of pathogenic bacteria.

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

a) Describe the technique of Gram staining.

b) Write a note on spread plate technique.

c) Compare mutualism and ammensalism giving examples.

d) What is sterilization? How moist heat is used for sterilization?

e) Explain the five kingdom system of classification.

P.T.O.

Q3) Answer any two: **[16]**

a) Describe the differential media with examples.

b) Describe the technique of Replica Plating.

c) Give the methods of cultivation of thermophiles and acidophiles in laboratory.

SECTION - II

(Mathematics, Statistics and Computer for Biologists)

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

a) If $f(x) = 2^x$, find $\frac{df}{dx}$.

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

c) What do you mean by sample and sampling?

d) Define website.

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

a) Evaluate $\int_0^{\pi} e^{(3+2\sin x)} \cos x dx$.

b) If $2 \sin^2 \theta = 3\cos\theta$, then find the value of θ.

c) If $f(x) = \begin{cases} 3x+1 & ;\text{for } x > 0 \\ x^2+1 & ;\text{for } x \leq 0 \end{cases}$. Find $\lim_{x \to 0} f(x)$. Is $\lim_{x \to 0} f(x) = f(0)$?

d) Write a note on Poisson distribution.

e) What is regression? Explain linear regression with suitable example.

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

a) i) Find the limit of the sequence $\left\{\frac{2\sqrt{n}+5}{n^3+2n^2+2\sqrt{n}+1}\right\}_{n=0}^{\infty}$.

ii) Discuss the convergence of the series $\sum_{n=1}^{\infty}\left[\frac{7^n+5^n}{7^n-5^n}\right]$.

b) i) Evaluate $\int_0^{\frac{\pi}{2}} x^2 \sin x dx$.

ii) If $y=\log\left(\frac{1+x^2}{1-x^2}\right)$, find $\frac{dy}{dx}$.

c) What is an experiment? Explain an ideal experimental design.

d) Describe the test for goodness of fit with suitable example.

Total No. of Questions : 5]

SEAT No. :

P586

[Total No. of Pages : 2

[4717] - 138
F.Y.B.Sc. (Vocational)
PHOTOGRAPHY AND AUDIO-VISUAL PRODUCTION
Introduction to Mass Communication & Media Scene in India
(2008 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 and labeled diagrams wherever necessary.***

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

a) What are the primary parameters of communication? Give examples and explain the importance of the primary parameters.

b) Draw the block diagram of Shanon and Weaver model of communication and explain each block.

c) Write a news report of about 100 words on a murder in Kothrud. You can imagine the details and write.

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

a) Explain Lasswell's model of communication.

b) Explain the meaning of inter-personal communication.

c) Write a short note in 'inverted pyramid'.

d) Explain with examples the meaning of mass culture.

e) What is the difference between group communication and mass communication?

P.T.O.

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

a) Define communication and explain the terms used in the definition.

b) Explain with examples the importance of 5W and 1H questions in the context of news writing.

c) Explain the different sources of money for running a media house.

d) Explain the meaning of one-on-one communication.

e) Explain the importance of language in communication.

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

a) Explain how communication impacts the audience.

b) Explain the Bharatshastra model of communication. How is it different from the western models?

c) Design a newspaper with the following news items:

i) Mayor unveils the statue of Chhatrapati Shivaji.

ii) Accident on the E-way; Two killed.

iii) Light and Sound show begins at Shaniwarwada.

iv) "India will be the next super power": PM.

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

a) Explain the different menu items for a news-related website.

b) Illustrate with examples the different barriers in communication.

c) Write the questions you would ask for the following interviews:

i) A young politician who is standing for elections for the first time.

ii) A newly appointed captain of the Indian cricket team.

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Total No. of Questions : 5]

SEAT No. :

P253

[Total No. of Pages : 2

[4717] - 139
F.Y.B.Sc. (Vocational)
ELECTRONIC EQUIPMENT AND MAINTENANCE
Maintenance Concepts and Assembly Methods
(Paper - II) (Old) (2008 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 diagrams wherever necessary.***

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

a) State different losses in transformer.

b) Explain the factors on which capacitance of a capacitor depends.

c) Explain the factors on which Inductance of a Inductor depends.

d) Explain different faults that occur in capacitors.

e) Explain MTBF.

f) Explain the Importance of datasheets.

g) Explain the Importance of Earthing.

h) Explain the Importance of flux.

Q2) Attempt any four: **[16]**

a) Explain the importance of service manual.

b) Explain causes and remedies of dry solder.

c) Explain common faults that occur in Resistors.

d) Explain the importance of different safety devices used for domestic purpose.

e) Enlist tools required for desoldering.

P.T.O.

Q3) Attempt any four: **[16]**

a) Explain advantages of ultrasonic techniques.

b) Write a short note on different types of transformers.

c) Explain the function of Electronic Ballast in tubelight.

d) Write a note on different types of Resistances and its use.

e) Explain different causes of failures of a Instrument.

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

a) Explain different methods of Earthing.

b) With the help of a neat diagram explain the working of a fan and Regulator.

c) With the help of a neat diagram explain the working of a M.C.B.

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

a) Explain Electric Shock? What precautions should be taken to avoid Electric Shock.

b) Write a note on precautions during soldering and desoldering.

c) Write a note on soldering material.

Total No. of Questions : 10]

SEAT No. :

P254

[Total No. of Pages : 4

[4717] - 140
F.Y.B.Sc. (Vocational)
INDUSTRIAL MICROBIOLOGY
Microbial Diversity and Cultural Methods and Mathematics and Statistics for Biologists
(Theory) (Paper - II) (2008 Pattern)

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

Instructions to the candidates:

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

SECTION - I

(Microbial Diversity and Cultural Methods)

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

a) Enlist two methods of Preservation of fungi.

b) Define Autotrophs and give two examples.

c) Give two microbial applications of AT Cc.

d) Define oligophiles and give their two important distinguishing characters.

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

a) Describe method used for selectively cultivating enteric bacteria.

b) Describe Primary objectives of Culture collection.

c) What are extremozymes? Give their importance in industrial applications.

P.T.O.

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

a) List important culture collections and describe any one from India.

b) Write the source, Properties and application of Taq Polymerase.

c) Diagrammatically explain the process of lyophilization.

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

a) Describe natural habit of Methanogenis with examples.

b) Define enrichment media and explain its utility with examples.

c) What is SCP? Give its industrial importance.

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

a) Describe basic types of culture media and explain the utility of dehydrated media with examples.

b) With the help of suitable examples discuss extremophiles.

SECTION - II

(Mathematics and Statistics for Biologists)

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

a) Define median and variance.

b) If a line has a constant slope M, what will be the slope of a line perpendicular to it?

c) Define 'range' giving example.

d) Describe in brief: Pearson's coefficient of correlation.

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

a) Explain the importance and limitations of Hardy-Weinberg equilibrium in population genetics studies.

b) Give detailed concepts of Hypothesis, Null Hypothesis, Type I error and Type II error in statistics.

c) Write a note on probability distribution.

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

a) Explain the terms:

i) Mean

ii) Mode

iii) Median

iv) Standard error

b) Test whether prevalence of carriers of filaria is associated with sex.

Sex	No. of Carriers	No. of non-carriers
Male	78	412
Female	57	553

c) Give a prerequisites and methodology of a scientific inquiry.

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

a) Explain importance of sampling in hypothesis testing.

b) Write a short note on Poisson distribution giving examples.

c) Explain the importance of Type I error in hypothesis testing.

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

a) If two bacterial cultures start growing at the same time with identical number of cells and one of them has a doubling time of one hour and the other has a doubling time of 30 minutes, after how much time the population of the first growing organism will be 1000 times that of the slow grower.

b) Explain degree of freedom and confidence limit giving appropriate examples.

c) Ten plants have been assessed in Seasam for plant height (cm) and number of branches per plant. From the given data find out whether there is any correlation between the variables?

Plant height (cm)	Branches per plant
10	12
15	16
20	20
22	25
30	35
35	40
40	45
45	50
50	52
55	60

Total No. of Questions : 5]

SEAT No. :

P255

[Total No. of Pages : 2

[4717] - 141
F.Y.B.Sc. (Vocational)
COMPUTER HARDWARE AND NETWORK ADMINISTRATION
Computer Organisation
(2008 Pattern) (Paper - II) (48720)

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) Define:
   i) Assembler
   ii) Compiler
b) What is LAN?
c) What is Algorithm?
d) Define USB.
e) What is network operating system?
f) What is Debugger?
g) Explain device driver.
h) Define:
   i) POST
   ii) BIOS

Q2) Attempt any four: **[16]**

a) Explain flag register of 8086.
b) Define Math-Coprocessor.
c) Explain evolution of microprocessor.
d) Compare Hardware, Software and Firmware.
e) Explain data transfer instructions of 8086.
f) Explain the advantages of window operating system.

P.T.O.

Q3) Attempt any four: **[16]**

a) Explain different network topologies.

b) Define Tri state buffer.

c) Explain segment registers of 8086.

d) Explain control panel of window operating system.

e) Compare Simulator and Emulator.

f) Explain any two arithmetical instructions of 8086.

Q4) Attempt any two: **[16]**

a) Explain flow chart with example.

b) Explain 8086 microprocessor with it's architecture.

c) Define:

i) Internet

ii) Multimedia

Q5) Attempt any two: **[16]**

a) Explain operating system and it's main functions.

b) Explain logical system architecture of computer.

c) Define:

i) System Software

ii) Application Software

Total No. of Questions : 5]

SEAT No. :

P256

[Total No. of Pages : 2

[4717] - 142
F.Y.B.Sc. (Vocational)
SEED TECHNOLOGY
Seed Physiology and Seed Production
(Old 2008 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) What are germination stimulators?

b) Define seed deterioration.

c) What are recalcitrant seeds?

d) Comment on cultural practices.

e) What are off types?

f) Comment on land preparation.

g) What are breeder's seeds?

h) Comment on basal dose.

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

a) Describe various factors affecting seed dormancy.

b) Give chemical composition seed.

c) Explain seed village concept.

d) Distinguish between seed and grain.

e) Explain seedling abnormalities and its causes.

f) Describe the sources and methods of irrigation.

P.T.O.

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

a) Seed Pelleting.

b) Artificial Seeds.

c) Soil Types.

d) Previous Crop effect.

e) Seed agency.

f) Care of immediately transplanted plants.

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

a) Define seed vigour. Explain various factors affecting seed vigour.

b) Define seed dormancy. Explain various causes of seed dormancy.

c) What is land preparation? Add a note on land preparation for cauliflower.

d) Describe various sources of irrigation.

Q5) Define seed germination. Explain various factors affecting seed germination. **[16]**

OR

Explain systems and methods of production of nucleus, breeders foundation and certified seeds.