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SEAT No. :

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[4817]-1

F.Y. B.Sc.

MATHEMATICS

Algebra and Geometry

(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 all the subquestions:

[16]

- a) Define power set of a set. Write down power set of $X = \{a, b, c\}$.
- b) Let $f: \mathbb{R} \rightarrow \mathbb{R}$ and $g: \mathbb{R} \rightarrow \mathbb{R}$ be defined by $f(x) = 3x^2 - 1$ and $g(x) = 2x + 3$. Find the formulae for $f \circ g$ and $g \circ f$.
- c) Find the remainder and quotient by using synthetic division when $4x^5 - 6x^3 + 2x^2 + 10$ is divided by $x - 3$.
- d) Define Euler's ϕ -function and hence find $\phi(8)$.
- e) Determine the nature of conic $x^2 + y^2 - 6x + 4y + 9 = 0$.
- f) Find the centre and radius of sphere
 $x^2 + y^2 + z^2 - 6x + 4z - 3 = 0$.
- g) Find the distance of the point $(2, 3, -1)$ from the plane $x + y + 2z = 1$.
- h) Is the system of following equations consistent

$$2x - 3y = 5$$

$$6x - 9y = 10$$

Justify your answer.

P.T.O.

Q2) Attempt any four of the following:

[16]

- a) Define relation \sim on \mathbb{Z} as : : for $x, y \in \mathbb{Z}$ $x \sim y$ if and only if $3x + 4y$ is divisible by 7. Show that \sim is an equivalence relation on \mathbb{Z} .
- b) Let $f: \mathbb{R} \rightarrow \mathbb{R}$ be defined by $f(x) = \frac{5x+2}{3}$. Show that f is bijective. Find formula for f^{-1} .
- c) If p is prime and a, b are integers such that $p|ab$ then prove that either $p|a$ or $p|b$.
- d) Let $a, b \in \mathbb{Z}$ and $n \in \mathbb{N}$. Then prove that $a \equiv b \pmod{n}$ if and only if a and b leave the same remainder when divided by n .
- e) Let $z_1, z_2 \in \mathbb{C}$, then prove that $\left| \frac{z_1}{z_2} \right| = \frac{|z_1|}{|z_2|}$ and $\arg \left(\frac{z_1}{z_2} \right) = \arg(z_1) - \arg(z_2)$
- f) Solve the equation $x^3 - 5x^2 - 16x + 80 = 0$, if the sum of two roots is zero.

Q3) Attempt any two of the following:

[16]

- a) i) Find the g.c.d. ' d ' of 616 and 427 and find integer m and n such that $d = 616m + 427n$.
- ii) Using Fermat's theorem find the remainder when $4^{37} + 60$ is divided by 7.
- b) i) Prepare composition table of multiplication for Z_6 . Find multiplicative inverses of elements in Z_6 , if exist.
- ii) Find the absolute value and principal argument of the complex number $z = (1 - i)^3$.
- c) State and prove De-Moivre's theorem.

- d) i) If a polynomial $f(x)$ vanishes at $\alpha_1, \alpha_2, \dots, \alpha_n$; all different, then prove that $(x - \alpha_1) \cdot (x - \alpha_2) \cdot \dots \cdot (x - \alpha_n)$ is a factor of $f(x)$.
- ii) If $a \equiv b \pmod{n}$ and $c \equiv d \pmod{n}$, then prove that $(a + c) \equiv (b + d) \pmod{n}$.

Q4) Attempt any four of the following:

[16]

- a) Derive the intercept form of the equation of plane.
- b) Find the equation of the plane which passes through the point $(2, -1, -1)$ and is parallel to the plane $x - 3y + 2z = 5$.
- c) Reduce the matrix A in row echelon form and hence state the rank of A ,

$$\text{where } A = \begin{bmatrix} 2 & 3 & 7 \\ 3 & -2 & 4 \\ 1 & -3 & -1 \end{bmatrix}.$$

- d) Solve the system of equations
- $$x + 3y - 2z = 0$$
- $$2x - y + 4z = 0$$
- $$x - 11y + 14z = 0$$
- e) Derive the condition under which the plane $lx + my + nz = p$ is tangent plane to the standard sphere $x^2 + y^2 + z^2 = a^2$. Also find the point of contact.
- f) Under the translation of axes, the expression $2x^2 - 3y^2 + 4y + 5$ is transformed into $2x'^2 - 3y'^2 + 4x' - 8y' + 3$. Find the co-ordinates of new origin w.r.t. old origin.

Q5) Attempt any two of the following:

[16]

a) i) If $\cos \alpha, \cos \beta, \cos \gamma$ are direction cosines of a line, then prove that $\cos^2 \alpha + \cos^2 \beta + \cos^2 \gamma = 1$.

ii) Find the condition that the two lines

$$\frac{x-\alpha}{l} = \frac{y-\beta}{m} = \frac{z-\gamma}{n} \text{ and } \frac{x-\alpha'}{l'} = \frac{y-\beta'}{m'} = \frac{z-\gamma'}{n'}$$

to be coplaner.

b) i) Find the angle between the line $\frac{x-1}{2} = \frac{y-2}{1} = \frac{z-3}{-2}$ and the plane $x + 2y + z - 3 = 0$

ii) Find the equation of sphere which passes through the circle $x^2 + y^2 + z^2 = 5, x + 2y + 3z = 3$ and touches the plane $3x - 4z - 34 = 0$.

c) Find for what values of λ, μ the system of equations

$$x + y + z = 6$$

$$x + 2y + 3z = 10$$

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

has

i) no solution

ii) a unique solution

iii) an infinite number of solutions

d) Reduce the equation of conic $3x^2 + 2xy + 3y^2 - 4x + 2y + 1 = 0$ to standard form.



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[4817]-10

F.Y. B.Sc.

ZOOLOGY

**ZY - 102 : Genetics and Parasitology
(41520) (2008 Pattern) (Paper-II) (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) Co dominance.
- b) Universal recipient.
- c) Law of dominance.
- d) Telocentric chromosome.
- e) Epistasis.
- f) Polygenic inheritance.
- g) Homozygous.
- h) Transgenic animals.
- i) Mutation.
- j) Paramecium.
- k) DNA fingerprinting.
- l) Lampbrush chromosome.

P.T.O.

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

- a) Rh-factor.
- b) Down's syndrome.
- c) Albinism.
- d) Supplementary factors (9:3:4).
- e) Law of segregation.

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

- a) Describe the transgenic animals.
- b) A woman with blood group 'B', whose father was with blood group 'O' marries a man with blood group 'AB'. Which blood groups will appear in their children?
- c) What is sex determination? Explain XX-XO method of sex determination?

OR

What is Eugenics? Explain various factors contributing to the positive and negative Eugenics. **[15]**

SECTION-II

(Parasitology)

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

- a) Reservoir host.
- b) Ectoparasite.
- c) Definitive host.
- d) Parasitology.
- e) Mutualism.
- f) Vaccination.

- g) Facultative parasite.
- h) Zoonosis.
- i) Schizogony.
- j) Toxoplasmosis.
- k) Paratenic host.
- l) Hypertrophy.

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

- a) Signs and symptoms of malaria.
- b) Life cycle of Head louse.
- c) Pathogenicity of itch mite.
- d) Rabies.
- e) Pathogenicity of filarial worm (Wuchereria banorofti).

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

- a) Pathogenicity of Ascaris.
- b) Explain Ecological host specificity with suitable examples.
- c) Describe five parasitic adaptations in endoparasites.

OR

Give an account of life cycle of Entamoeba hystolytica and its pathogenicity. **[15]**



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[4817]-11

F.Y. B.Sc.

GEOLOGY

Mineralogy & Petrology

(2008 Pattern) (Old Course) (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) *Neat labelled diagrams must be drawn wherever necessary.*

Q1) Answer the following questions:

[16]

- a) Define Gemmology.
- b) Define Twinkling.
- c) What is interfacial angle?
- d) What is cleavage of mineral?
- e) What is laterite?
- f) What are volcanic igneous rocks?
- g) What is schistose structure?
- h) What are arenaceous rocks?

Q2) Answer the following questions:(Any four)

[16]

- a) Explain supergene sulphide Enrichment.
- b) Define rudaceous sedimentary rocks with examples.
- c) Give an account of minerals used as refractories.
- d) What are electrical properties of minerals. Explain piezoelectricity & pyroelectricity.

P.T.O.

- e) What is metamorphism? Explain its types.
- f) Write a note on any two types of concordant intrusions of igneous rocks.

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

- a) Describe ionic bonding in crystals.
- b) What are pyrogenetic minerals.
- c) Explain properties of form and relief in optical mineralogy.
- d) Describe with suitable examples clastic texture of sedimentary rocks.
- e) Explain determination of specific gravity of mineral using specific gravity bottle.
- f) Describe poikilitic texture with diagrams.

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

- a) Describe optical properties of minerals in Between Crossed Nicols.
- b) Define mineral. Describe various branches of mineralogy.
- c) Describe following structures in igneous rocks.
 - i) Vesicular structure
 - ii) Amygdaloidal structure.
- d) What is petrology? Explain rock-cycle.

Q5) Write about crystallographic axes, elements of symmetry, definitions of various forms and indices present in Tetragonal system, Type-Zircon. **[16]**

OR

- a) Draw a neat labelled diagram of Petrological Microscope and explain its various parts. **[8]**
- b) Write notes on:- **[8]**
 - i) Bedding
 - ii) Lamination
 - iii) Symmetrical Ripple Marks
 - iv) Asymmetrical Ripple Marks



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[Total No. of Pages : 2

F.Y. B.Sc.

GEOLOGY

**General Geology and Palaeontology
(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) *Figures to the right indicate full marks.*

Q1) Answer the following questions:

[16]

- a) Define Palaeontology
- b) Define Mechanical disintegration of rock.
- c) Draw a neat labelled diagram of a gastropod shell.
- d) Define focus and Epicenter of earthquake.
- e) Mention all major tectonic plates.
- f) Define ox-bow lake.
- g) Write equatorial and polar radius.
- h) Mention any two suture Lines in Ammonoids with diagram.

Q2) Answer the following questions:(Any four)

[16]

- a) Give systematic tabular classification of phanerozoic Eon.
- b) Explain the concept of continental Drift theory.
- c) Explain with neat diagram the internal structure of the earth.
- d) Write a note on Applications of fossils.
- e) Differentiate between regular and irregular echinoids.
- f) Describe hardpart morphology of lamellibranch shell.

P.T.O.

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

- a) Explain the Big Bang theory.
- b) Describe sea Arch and ytidangs.
- c) Explain Airy's Hypothesis of isostacy.
- d) Describe any four modes of preservations of fossils.
- e) Describe hardpart morphowgy of Nautilus shell.
- f) Describe Apical disc in Echinoids.

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

- a) Explain Earthquake. Describe various causes of earthquake.
- b) Describe fundamental branches of Geology
- c) Describe hardpart morphology of corals and septas in corals.
- d) Describe forms of Gastropod shell.

Q5) What are volcanoes? Explain the structure of a typical volcano with the help of neat diagram. And add a note on the products of volcanoes. **[16]**

OR

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



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F.Y. B.Sc.

STATISTICS/STATISTICAL TECHNIQUES

**Descriptive Statistics
(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 statistical tables and calculator is allowed.*
- 4) *Symbols have their usual meanings.*
- 5) *Graph papers will be supplied on request.*

Q1) Attempt each of the following:

[4x1=4]

a) Choose correct alternative for the following:

i) If a and b are two observations ($a > 0, b > 0$) then the corresponding a.m., g.m. and h.m. satisfy the relation.

A) $a.m. = \sqrt{g.m. * h.m.}$

B) $g.m. = \sqrt{a.m. * h.m.}$

C) $h.m. = \sqrt{g.m. * a.m.}$

D) $g.m. = a.m. * h.m.$

ii) For moderately skewed distribution $\bar{x} = 160, \sigma = 50$ and $S_k = 0.06$ then the value of mode is:

A) 163

B) 170

C) 141

D) 157

iii) With three attributes the total number of ultimate class frequencies is

A) 4

B) 6

C) 8

D) 27

P.T.O.

- iv) The regression coefficients have
- A) Same algebraic signs
 - B) The opposite algebraic signs
 - C) Always positive signs
 - D) Always negative signs
- b) State whether the following statements are true or false: **[4x1=4]**
- i) A variable taking all possible values in a certain range is called discrete variable.
 - ii) Skewness is the lack of symmetry.
 - iii) Two regression coefficients are always reciprocals of each other.
 - iv) Positive classes are denoted by combination of greek letters.
- c) If $\sigma_x^2 = 78$ and $z = 2x+3$, find σ_z^2 . **[2]**
- d) Define the term attribute with an example. **[2]**
- e) Express second and third central moments in terms of raw moments. **[2]**
- f) Find median for the following observations:
7, 19, 18, 3, 2, 6, 5, 11, 14, 17 **[2]**

Q2) Attempt any four of the following: **[4x4=16]**

- a) For a bivariate data we have $\bar{x} = 53, \bar{y} = 28, b_{yx} = -1.5, b_{xy} = -0.2$. Find correlation coefficient between X and Y, estimate Y when X=60
- b) From the following data prepare stem and leaf chart:
12, 34, 28, 43, 16, 28, 30, 22, 29, 37, 15, 19, 06, 47, 49, 16, 27, 28, 33, 11.
- c) Define median and state formula for continuous frequency distribution. Also state any two merits of median.
- d) Compute geometric mean for the following data:
12, 35, 24, 26.
- e) Explain stratified random sampling with an illustration.
- f) Show that variance is invariant to the change of origin.

Q3) Attempt any four of the following:

[4x4=16]

- a) Given the following frequencies:
(AB)=13, (Aβ)=20, (αB)=15, (αβ)=25. Obtain the remaining frequencies.
- b) Compute Laspeyre's and Paasche's price index numbers for the following data:

Commodities	p_0	q_0	p_1	q_1
A	6	15	5	17
B	8	12	7	14
C	11	6	12	5
D	10	5	11	4

- c) The mean weight of 150 students is 60 kg. The mean weight of boys is 70kg. For girls mean weight is 55kg. find number of boys.
- d) Show that $\beta_2 \geq 1$.
- e) Explain the following terms with an illustration.
- Inclusive method of classification
 - Exclusive method of classification.
- f) For a frequency distribution, Bowley's coefficient of skewness is 0.6. The sum of first and third quartile is 100 and median is 38 find the two quartiles.

Q4) Attempt any two of the following

[2x8=16]

- a) Explain the following terms:
- Ultimate class frequency.
 - Positive attribute
 - Negative attribute.
 - Independence of two attributes.
 - Dissociation of two attributes.
 - Positive association of two attributes.
- b) What is a scatter diagram and explain various types of correlation using scatter diagram.

- c) The mean and standard deviation of 20 observations are 10 and 2 respectively. Later on it was found that observation 12 was misread as 8. Calculate correct a.m. and S.D.
- d) i) Is the following information consistent? Justify your answer.
 $\mu'_1 = 2, \mu'_2 = 20, \mu'_3 = 40, \mu'_4 = 50.$
- ii) Show that $\text{cov}(aX+b, cY+d) = ac \cdot \text{cov}(X, Y)$

Q5) Attempt any two of the following: **[2x8=16]**

- a) Explain the procedure of fitting the regression line of Y on X for a bivariate data.
- b) i) With usual notations prove that $b_{yx} \cdot b_{xy} = r^2$
- ii) Given that $r=0.4, \sum(x-\bar{x})(y-\bar{y})=108, \sum(x-\bar{x})^2=900, \sigma_y=3$, find number of pairs of observations.
- c) Define Spearman's rank correlation coefficient assuming no ties and derive an expression for it.
- d) i) Show that Bowley's coefficient of skewness lies between -1 and +1.
- ii) Compute coefficient of association for the following data:
 $(AB)=256, (A\beta)=48, (\alpha B)=768, (\alpha\beta)=144$. And comment on it.



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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 correct alternative for the following:

[4 × 1 = 4]

- i) If A and B are two mutually exclusive events defined on Ω , then $P(A \cup B)$ is equal to _____.
A) $P(A) + P(B) - P(A \cap B)$ B) $P(A) \cdot P(B)$
C) $P(A) + P(B)$ D) 0
- ii) If $X \sim B(n_1, p)$, $Y \sim B(n_2, p)$ and X and Y are independent, then the distribution of $X + Y$ is _____.
A) $B(n_1 + n_2, 2p)$ B) $B(n_1 + n_2, p)$
C) $B(n_1 + n_2, q)$ D) $B(n_1 + n_2, 2q)$
- iii) If $A \subset B$, then $P(A/B)$ is equal to:
A) $P(A)$ B) $P(A) / P(B)$
C) $P(B) / P(A)$ D) 1
- iv) Let X has p.m.f. $P(X = x) = kx$, $x = 1, 2, 3$. The value of k is
A) 1/5 B) 1/4
C) 1/3 D) 1/6

P.T.O.

- b) State whether following statements are true or false: [4 × 1 = 4]
- i) Hypergeometric distribution is an approximation to binomial distribution.
 - ii) If X and Y are independent Poisson random variables then X - Y is also a Poisson random variable.
 - iii) Variance of a random variable is never negative.
 - iv) If A' and B' are independent, then A and B are independent.
- c) State the additive property of Poisson distribution. [2]
- d) Explain sample space with an illustration. [2]
- e) Define mutual independence of three events. [2]
- f) Define p.m.f. of a discrete random variable. [2]

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

- a) Define cumulative distribution function and state any three properties of it.
- b) Given $P(A) = 0.3$, $P(B) = 0.4$, $P(A \cup B) = 0.6$ Find
 - i) $P(A \cap B)$
 - ii) $P(A' \cap B)$
 - iii) $P(A \cap B')$
 - iv) $P(A'/B)$
- c) Given the following distribution function of X:

X	-3	-1	0	1	2	3	4
F(x)	0.1	0.3	0.45	0.65	0.75	0.95	1.00

Find

- i) The p.m.f. of X
- ii) Median of X
- iii) $P(X = \text{odd number})$
- iv) $P(X < 0)$

- d) Define Partition of a sample space. State Baye's theorem.
- e) Let X be a discrete r.v. with following probability distribution

X	0	1	2	3
$P(X = x)$	0.1	0.3	0.4	0.2

Find

- i) $E(X)$
- ii) $\text{Var}(X)$
- f) State axioms of probability and define conditional probability of an event.

Q3) Attempt any four of the following :

[4 × 4 = 16]

- a) Define a Bernoulli distribution with parameter p , find its mean and variance.
- b) Define:
- i) Joint probability distribution of (X, Y) .
- ii) Marginal probability distribution of X .
- c) Let A, B, C be any three events defined on Ω , write expressions for the following events:
- i) At least one event occurs.
- ii) Exactly one event occurs.
- iii) All the three events occur.
- iv) None of the events occur.
- d) State and prove recurrence relation between probabilities for Binomial distribution with parameters n and p .
- e) A card is drawn at random from a well shuffled pack of 52 playing cards.

Let A, B and C be the three events as below:

A : The card is a diamond.

B : The card is a heart.

C : The card is a king.

Find : $P(A \cup B \cup C)$

f) If X is a discrete r.v. with p.m.f.

$$P(X = x) = Kx ; x = 1, 2, 3, 4, 5 \\ = 0 \quad \text{otherwise}$$

Find

- i) K
- ii) $P(X \leq 3)$
- iii) $P(2 < X \leq 5)$
- iv) $P(X = 4 / X \geq 3)$

Q4) Attempt any two of the following:

[2 × 8 = 16]

a) Let (X, Y) be a bivariate r.v. with the following joint probability distribution.

X \ Y	0	1
-1	2/25	8/25
1	3/25	12/25

- i) Compute marginal distributions of X and Y .
 - ii) Are X and Y independent?
 - iii) Obtain $E(X/Y = 1)$
 - iv) Obtain $\text{Var}(X/Y = 1)$
- b) i) If A and B are any two events defined on sample space Ω , then prove that $P(A \cup B) = P(A) + P(B) - P(A \cap B)$.
- ii) Let $X \sim P(m)$
and $P(X = 1) = 0.03, P(X = 2) = 0.2$
Find $P(X = 0)$ and $P(X = 3)$
- c) Let $X \sim B(n, p)$, obtain mean and variance of X .

d) The probability distribution of r.v.X. is given below:

X	0	1	2	3
P(X = x)	1/6	1/3	1/3	1/6

Compute:

- i) First three raw moments of X.
- ii) First three central moments of X.

Q5) Attempt any two of the following:

[2 × 8 = 16]

- a) Prove that under certain conditions to be stated, binomial distribution tends to Poisson distribution.
- b) The Joint probability distribution of (X, Y) is given below:

	Y	0	1	2
X				
-1		1/6	0	1/12
1		1/4	1/3	1/6

Find:

- i) E (X) and E(Y)
 - ii) Var (X) and Var (Y)
 - iii) Cov (X, Y)
 - iv) Correlation coefficient between X and Y.
- c) i) Define Hypergeometric distribution. Give two real life situations where it can be used.
 - ii) Out of 100 people in a certain village 40 always tell the truth and the remaining always lie. A sample of 10 persons is drawn from these people. Calculate the probability that the sample will contain:
 - 1) no liar
 - 2) 3 liars.
- d) Two fair dice are thrown. Let X denote the absolute difference between the scores and Y denote the maximum of the two scores.
 - i) Obtain the joint probability distribution of (X, Y).
 - ii) Obtain the marginal probability distributions of X and Y.



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[4817]-15

F.Y. B.Sc.

GEOGRAPHY

**Gg - 110 : Physical Geography
(2008 Pattern) (Old) (Paper-I)**

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 in 2-4 sentences:

- a) List the branches of physical Geography.
- b) What is Dyke?
- c) Define synclines.
- d) Define Earthquake.
- e) Define oxidation.
- f) What are levees?
- g) What are the pot Holes?
- h) What are Lagoons?

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

- a) Scope of Geomorphology.
- b) Effects of Earthquake.
- c) Causes of Volcanoes.
- d) Physical Weathering.
- e) Gorge.
- f) Formation of loess.

P.T.O.

Q3) Answer the following (Any Four):

- a) Explain plate. Tectonic Theory.
- b) Formation of Igneous rocks.
- c) Types of Fault.
- d) Mass Movement.
- e) Types of Delta.
- f) Sea Caves and Geo.

Q4) Attempt the following (Any Two):

- a) Explain Metamorphic rocks.
- b) Explain structure of the earth's interior.
- c) Land Forms associated with wind erosion.
- d) Land forms associated with glacier deposition.

Q5) Explain "Holme's Convectional current theory" in detail.

OR

Describe various land features associated with depositional work of sea waves.



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[4817]-16

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F.Y. B.Sc.

GEOGRAPHY

**Gg-120: Geography of Atmosphere and Hydrosphere
(2008 Pattern) (Old) (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.

[16]

- a) Define climate
- b) What is ozonosphere?
- c) What are air masses?
- d) What is El-nino?
- e) What is Ria coast?
- f) What is landlocked sea?
- g) What are compound waves?
- h) What are high tides?

Q2) Explain the following in brief (Any four):

[16]

- a) Insolation.
- b) Lapse Rate
- c) Cyclones in North hemisphere.
- d) Ocean deeps.
- e) Dalmation coast.
- f) Nature of oceanography.

P.T.O.

Q3) Answer the following (any four):

[16]

- a) Water vapour.
- b) Inversion of temperature.
- c) Anticyclone.
- d) Continental slope.
- e) Dead sea.
- f) Tsunami

Q4) Answer the following (any two):

[16]

- a) Explain, any four factors affecting the horizontal distribution of temperature
- b) Types of clouds.
- c) Explain relief of pacific ocean.
- d) Effects of ocean currents.

Q5) Explain the types of planetary winds with neat diagram.

[16]

OR

What is salinity? Explain the factors affecting the distribution of salinity.



Total No. of Questions : 5]

SEAT No. :

P393

[4817]-17

[Total No. of Pages : 2

F.Y. B.Sc.

MICROBIOLOGY

**Introduction to Microbiology
(2008 Pattern) (Old Course) (Paper-I)**

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

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

Q1) Attempt the following:

[16]

- a) Name any two scientists associated in field of microbiology.
- b) Give two examples of probiotic microbes.
- c) Define plasmid.
- d) _____ and _____ are causative agents of bacterial human disease.
- e) State true or false.
 - i) Robert Hooke was first to describe cell.
 - ii) Louis Pasteur developed the technique of pasteurization.
- f) Enlist roles of Rickettsia.
- g) What are two eukaryotic microorganisms?
- h) Match the following and rewrite.
 - i) Carbohydrate 1) Enzymes.
 - ii) Lipid 2) Cellulose
 - 3) Fats.

Q2) Write short notes on Any Four.

[16]

- a) Endospore.
- b) Role of lactobacillus in human health.
- c) Nucleic Acid.
- d) Atoms.
- e) Germ theory of fermentation.
- f) John Tyndall

P.T.O.

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

- a) Write historical development of vaccination.
- b) Describe morphology and characteristic features of protozoa.
- c) Explain function of ribosomes and difference in eukaryotics of prokaryotic cell.
- d) Write characteristic features and economic importance of Algae.
- e) Write structure and function of starch molecule.
- f) Describe Human diseases caused by viruses.

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

- a) Explain Robert Koch's postulates w.r.t. germ theory of disease.
- b) Write morphological and physiological characters of salmonella and its role in human health.
- c) Describe and compare prokaryotic and eukaryotic cell.
- d) Explain following terms.
 - i) pH
 - ii) Buffer.

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

- a) Describe and diagrammatically represent life cycle of plasmodium.
- b) Describe and compare gram positive and Gram negative cell wall of bacteria.



Total No. of Questions : 5]

SEAT No. :

P394

[4817]-18

[Total No. of Pages : 2

F.Y. B.Sc.

MICROBIOLOGY

**Basic Techniques in Microbiology
(2008 Pattern) (Old Course) (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) Draw the signs used for toxic and corrosive hazards.
- b) What are halophiles? Give example.
- c) Define numerical aperture.
- d) Write any two nitrogen sources used in microbiological media.
- e) Write the source of illumination and lenses used in Electron microscope.
- f) What are enriched media? Give example.
- g) Name the organism and stain used in Acid Fast staining.
- h) What are thermophiles? Give one example.

Q2) Write short notes on any four.

[16]

- a) Negative staining method.
- b) Fixatives
- c) Spherical aberrations.
- d) Generation time.
- e) Culture collections
- f) Lyophilization

P.T.O.

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

- a) Explain the use of filtration as a sterilization method.
- b) Comment on the disposal of microbiology laboratory waste.
- c) Give a method for an enrichment of protozoa.
- d) What is synchronous culture? Describe a method to obtain it.
- e) What is disinfection? Write the characteristics of an ideal disinfectant.
- f) Comment on the maintenance of fungal cultures.

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

- a) What is pure culture? Describe any two methods to obtain it.
- b) Describe use of heat as a sterilizing agent.
- c) With the help of a ray diagram explain principle and working of Bright field microscope.
- d) What are commonly used ingredients of media comment on different types of media.

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

- a) What is continuous culture? Explain the methods to obtain microbial continuous culture.
- b) Comment on use of chemicals as disinfecting agent. Write the mechanism and applications of any four disinfectants.



Total No. of Questions :5]

SEAT No. :

[Total No. of Pages :2

P395

[4817]-19

F.Y.B.Sc.

EXPERIMENTAL PSYCHOLOGY

General Psychology

(2008 Pattern) (Paper - I)

Time : 3 Hours]

[Max. Marks :80

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Draw the figures and diagrams wherever necessary.*
- 3) *All questions carry equal marks.*

Q1) Attempt all 8 questions in one or two sentences:

[16]

- a) Define intelligence.
- b) What is memory?
- c) What is the concept of giftedness?
- d) State the techniques of improving memory.
- e) What is humanistic perspective?
- f) Enlist the five factors of Big-five model.
- g) Define motivation.
- h) Define learning.

Q2) Answer the following questions in 6/8 sentences: (Any Four):

[16]

- a) Explain any two types of glandular system.
- b) Explain the types of conflict.
- c) Explain perceptual constancies.
- d) Discuss Thorndikes law's of learning.
- e) Explain the causes and classification of Mental Retardation.
- f) Discuss the causes of forgetting.

P.T.O.

Q3) Attempt the following questions in 6/8 sentences (Any Four): **[16]**

- a) Explain the types of Neurotransmitter.
- b) Explain the classical conditioning by parlor.
- c) Explain the types of Autonomic Nervous system.
- d) State observational learning theory of Bandura.
- e) Explain the perceptual illusion.
- f) Explain Maslow's hierarchy of needs.

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

- a) Explain in detail the types of social motives.
- b) Explain the gestalt principles of perception.
- c) Explain the concepts in measurement of intelligence.
- d) Discuss the types of memory.

Q5) Define Psychology. Explain the goals and types of psychological professionals. **[16]**

OR

What is personality? Explain the Freuds Psychoanalytic theory.

EEE

Total No. of Questions : 5]

SEAT No. :

[Total No. of Pages : 4

P378

[4817]-2
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) Determine the set $\{x \in R / |2x + 5| \leq 19\}$.
- b) Define Cauchy's sequence.
- c) Show that the series $\sum_{n=1}^{\infty} \frac{n}{n+1}$ is divergent.
- d) Find the right hand and left hand limit of $\lim_{x \rightarrow 1} \frac{|x-1|}{x-1}$.
- e) Find the real number x , at which the function $f(x)$ is not continuous, where
$$f(x) = \frac{x^2 + 2x + 1}{(x-3)(x+1)}$$
- f) Using definition of derivative, find the derivative of the function $f(x) = \sqrt{x}$, for $x \geq 0$.
- g) Evaluate: $\lim_{x \rightarrow 0} \frac{\log \sin x}{\cot x}$.
- h) If $y = \frac{1}{3x-5}$ then find y_n .

P.T.O.

Q2) Attempt Any Four of the following:

[16]

- a) For any two real numbers x, y prove that $|x + y| \leq |x| + |y|$.
- b) Show that if the sequence $\langle x_n \rangle$ is monotonic increasing and bounded then it converges to its least upper bound.
- c) Show that the sequence $\langle x_n \rangle$ defined by $x_1 = 1, x_{n+1} = \sqrt{2 + x_n}$ for $n \in \mathbb{N}$ is convergent.
- d) Examine the convergence of the series $\sum_{n=1}^{\infty} \frac{\sqrt{n}}{2n+3}$.
- e) Evaluate: $\lim_{x \rightarrow 0} \frac{\sqrt{x}-1}{x-1}$.
- f) Prove that every contractive sequence of real numbers is a Cauchy's sequence.

Q3) Attempt Any Two of the following:

[16]

- a) Show that the series $\sum_{n=1}^{\infty} \frac{1}{n^p}$ is divergent if $p \leq 1$.
- b)
 - i) Show that if $x > 0$, a real number, then for any real number y there exists a natural number n such that $nx > y$.
 - ii) Show that the limit, $\lim_{x \rightarrow 0} \frac{e^{\frac{1}{x}} - e^{-\frac{1}{x}}}{e^x + e^{-\frac{1}{x}}}$ does not exist.
- c)
 - i) Find all reals x , that satisfy $\left| \frac{x+3}{x-2} \right| < 1$.
 - ii) Show that the sequence $\langle x_n \rangle$ whose n^{th} term is defined by

$$x_n = \frac{1}{n+1} + \frac{1}{n+2} + \dots + \frac{1}{n+n} \text{ all } n \in \mathbb{N} \text{ is convergent.}$$

- d) i) Discuss the convergence of the series $\sum_{n=1}^{\infty} \frac{1}{n^2 + 4}$.
- ii) Find the greatest lower bound and least upper bound of the set $\left\{1 + \frac{(-1)^n}{n} / n \in N\right\}$ if they exist.

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

- a) Discuss the continuity of the function $f(x) = \sqrt{\frac{(x+1)}{(x-4)}}$.
- b) Show that: $|\tan^{-1} x - \tan^{-1} y| \leq |x - y|$, for all x, y real numbers.
- c) State and prove Cauchy's mean value theorem.
- d) If f is continuous at $x = c$ then show that $|f|$ is continuous at $x = c$. Is the converse true? Justify.
- e) By using Taylor's series expand e^x in ascending powers of $(x - 1)$.
- f) Verify Rolle's theorem for the function $f(x) = \frac{\sin x}{e^x}$ on $[0, \pi]$.

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

- a) State and prove Leibnitz theorem. Hence find y_4 , if $y = x^3 \cdot e^x$.
- b) i) If f is continuous at $x = c$ and g is continuous at $f(c)$ then show that the function $g \circ f$ is continuous at c .
- ii) If $y = \sin^{-1} x$ then show that $(1 - x^2)y_{n+2} - (2n + 1)xy_{n+1} - n^2 y_n = 0$.

- c) i) If $y = \sin(ax + b)$ then show that $y_n = a^n \sin\left(ax + b + \frac{n\pi}{2}\right)$.
- ii) Show that the equation $x = \cos x$ has a solution in the interval $\left[0, \frac{\pi}{2}\right]$.
- d) i) Evaluate: $\lim_{x \rightarrow 0} \left[\frac{1}{e^x - 1} - \frac{1}{x} \right]$.
- ii) Discuss the continuity of the function $f(x)$ at $x = \frac{1}{2}$ where

$$f(x) = \begin{cases} x, & 0 \leq x < \frac{1}{2} \\ 1, & x = \frac{1}{2} \\ 1 - x, & \frac{1}{2} < x < 1 \end{cases} .$$



Total No. of Questions : 5]

SEAT No. :

P396

[4817]-20

[Total No. of Pages : 2

F.Y. B.Sc.

PSYCHOLOGY

**Experimental Psychology and Psychological Testing
(2008 Pattern) (Paper-II)**

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Draw the figures and diagrams wherever necessary.*
- 3) *All questions carry equal marks.*

Q1) Attempt all 8 questions in one or two sentences

[16]

- a) Define variable
- b) Define Reaction time.
- c) What is problem?
- d) Explain the stages of creative problem solving.
- e) What is Reliability?
- f) Define Intelligence.
- g) What is projective test?
- h) Define personality.

Q2) Attempt the following questions in 6 or 8 sentences (any four).

[16]

- a) State the Relevant variable.
- b) State the importance of foreperiod in Reaction time.
- c) Describe the trial and error in problem solving.
- d) Explain standard progressive metrices test.
- e) State the application of personality.
- f) Describe the Thematic Apperception test.

P.T.O.

Q3) Answer the following questions in 6 or 8 sentences.(any four) **[16]**

- a) Discuss the Experimental and control group.
- b) Explain the stages in problem solving.
- c) Discuss the learning to solve problems.
- d) Describe the Self Report Inventory.
- e) What is measured by Intelligence test.
- f) Explain the type of Test-Retest Reliability test.

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

- a) Explain the types of Reaction time.
- b) Discuss the Independent and dependent variable.
- c) Explain the types of validity.
- d) Describe Wechsler's Intelligence scale for children.

Q5) What is psychophysics? Explain the basic concepts of psychophysics. **[16]**

OR

Define psychological test. Describe the types and uses of psychological test.



Total No. of Questions : 5]

SEAT No. :

P397

[4817]-21

[Total No. of Pages : 3

F.Y. B.Sc.

ELECTRONIC SCIENCE

**ELI-TI-Principles of Analog Electronics
(2008 Pattern) (Paper-I)**

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

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

Q1) Answer all of the following.

[16]

- a) List whether the following components are active or passive
i) Preset ii) LDR iii) Transistor iv) SCR.
- b) What is RC time constant? Give its significance.
- c) What is ideal voltage source? Draw its equivalent circuit.
- d) What is barrier potential? What is its value for Si diode.
- e) What is active device? Give at least two examples of it.
- f) Draw symbol of op-amp. Name its terminals.
- g) What is clamper? Draw circuit diagram of +ve clamper.
- h) Draw block diagram of op-amp.

Q2) Attempt any four of the following:

[16]

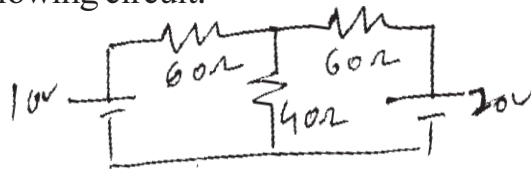
- a) Draw circuit symbols for
i) Polar capacitor ii) Transformer iii) LDR iv) SPDT
- b) What is fuse? Give different types of fuses? How to choose proper fuse?
- c) What is battery? Give its types.
- d) What is PCB? Give its types. What type of PCB is used in mobile phones and computers?
- e) What is resonance? Draw circuit diagram of LCR circuit. Draw its frequency response.
- f) What are filters? Draw the circuit diagram of RC low pass filter. What is its cutoff frequency?

P.T.O.

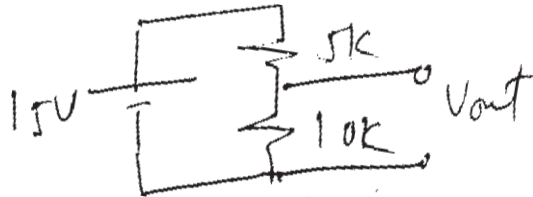
Q3 Attempt any four of the following:

[16]

- What is phasor? Draw the phasor diagram for R, L and C w.r.t. voltage.
- For RC high pass filter, $R=5.1K$, $C=0.01 \mu F$. Calculate F_c .
- What is Thevenin's theorem? How to obtain equivalent circuit using it?
- What is power? What is maximum power theorem? Draw the power response curve for different loads.
- What is superposition theorem? Using it find the current through 40Ω in following circuit.



- State KCL and KVL. Verify KVL for following ckt.



Q4) Attempt any four of the following:

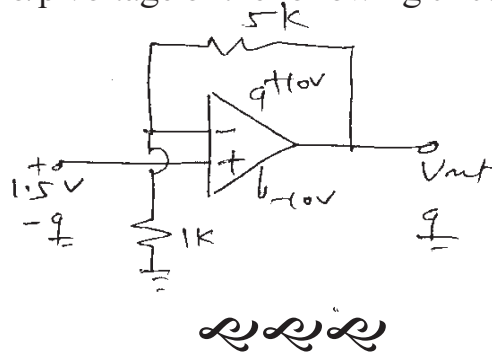
[16]

- What is LED? Draw its symbol. Which semiconductor material is used in RED LED? Give one application of it.
- What is MOSFET? Draw its characteristics. What is the advantage of using MOSFET?
- What is SCR? Draw its characteristics. Where is it used?
- For a transistor $I_B=100 \mu A$, $I_C=2mA$. Calculate α and β .
- Draw the circuit symbol of diode and zener diode. Draw their I-V characteristics.
- What is rectifier? Draw the circuit diagram of half wave rectifier. Write its applications.

Q5) Attempt any four of the following:

[16]

- What is bias? How to bias a transistor?
- What is UJT? Draw the circuit diagram of relaxation oscillator using UJT. Where this oscillator is used?
- What is signal? Draw the waveforms of different signals used in Electronic circuits.
- The T network has resistances $R_1=100 \Omega$, $R_2=200 \Omega$, $R_3=300 \Omega$. Find equivalent π network resistance values.
- What is FET? Explain FET as UVR.
- Find the o/p voltage of the following circuit.



Total No. of Questions : 5]

SEAT No. :

P398

[4817]-22

[Total No. of Pages : 2

F. Y. B.Sc

ELECTRONIC SCIENCE

**EL1-T2: Principles of Digital Electronics
(2008 Pattern)(Paper-II)**

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

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

Q1) Answer the following questions in brief

[16]

- a) Draw logic symbol, truth table of NoR gate.
- b) What is sequential circuit? Give two examples.
- c) Write the 2's complement of (0111) and (1011).
- d) Write full form of BCD and ASCII code.
- e) Draw circuit diagram of two input AND gate using diode.
- f) List any four characteristics of logic families.
- g) Draw logic diagram and symbol of R-S flipflop.
- h) Define the terms noise and noise immunity.

Q2) Answer any four of the following:

[16]

- a) Convert the following decimal numbers into binary and hexadecimal numbers. i) 28 ii) 151
- b) With neat logic diagram Explain PIPO shift register.
- c) Draw logic symbol and write truth table for T- flipflop.
- d) With suitable circuit explain the CMOS inverter.
- e) Differentiate between RAM and ROM . List the different types of ROM available.
- f) Perform the following subtraction using 2's complement method.
 $(42)_{10} - (28)_{10}$

P.T.O.

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

- a) Simplify the following equation and then draw logic diagram. $\gamma = A\bar{B}C + A\bar{B}\bar{C} + B$
- b) What is comparator? Draw the logic diagram of 2-bit comparator.
- c) With neat diagram explain the concept of 1:2 Demultiplexer using truth table.
- d) What is shift register? Explain different ways of 4-bit shift register.
- e) Explain decade counter with logic diagram.
- f) Draw the circuit diagram and explain CMOS NOR gate.

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

- a) Using basic logic gates draw the circuit for the expression. $\gamma = \bar{A}.\bar{B} + A.B$. Write it's truth table
- b) Simplify following expression using k-map $\gamma = \bar{A}\bar{B}C\bar{D} + \bar{A}BC\bar{D} + ABC\bar{D} + A\bar{B}C\bar{D}$
- c) What is decoder? Explain BCD to seven segment decoder.
- d) Explain working of J-k flipflop with logic diagram and truth table.
- e) Explain the action of two input TTL NAND gate
- f) Explain in brief the memory organization of 16 cell memory.

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

- a) Prove that $\overline{A \cdot B} = \bar{A} + \bar{B}$
- b) Define full adder. Draw it's logic diagram. Write it's truth table.
- c) With neat diagram explain the concept of 2:1 multiplexer using truth table.
- d) Explain Decimal to BCD Encoder using truth table.
- e) Explain with waveforms 3-bit up-down counter.
- f) Describe the operation of 2-input DTL NAND gate.



Total No. of Questions :4]

SEAT No. :

[Total No. of Pages :2

P399

[4817]-23

F.Y.B.Sc. (Annual)

DEFENCE & STRATEGIC STUDIES

**DS-1: War and Warfare
(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) Answer in 20 words each (any ten):

[20]

- a) What is aim of Economic Warfare?
- b) Introduce Information Warfare.
- c) Define Terrorism.
- d) What was the outcome of Chinese Aggression in 1962?
- e) Write the name of Biological germs/viruses.
- f) What is D-DAY?
- g) What is aim of Biological Warfare?
- h) Introduce INS *VIRAT*?
- i) Define violence.
- j) What was the outcome of 1999 *Kargil* war?
- k) Write the name of chemical agents.
- l) What is H-HOUR?
- m) What do you mean by Information Technology?

P.T.O.

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

- a) How the war is justified?
- b) Write the concept of the “Killing Instinct”.
- c) Write about the Function of war.
- d) What is Offensive War.

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

- a) Explain about the main causes of Terrorism.
- b) Explain about the Nature of Nuclear War.
- c) Explain about the scope of modern war.
- d) Explain about the scope of information warfare.

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

- a) Explain about the Chemical and Biological Warfare.
- b) Explain about the means and methods of Economic Warfare.
- c) Discuss about the Theory of Nuclear deterrence.
- d) Explain about the principles of War.

EEE

Total No. of Questions : 4]

SEAT No. :

P400

[4817]-24

[Total No. of Pages : 2

F.Y. B.Sc.

DEFENCE AND STRATEGIC STUDIES

**DS-2: Defence Mechanism and Military Career 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.*

Q1) Answer in 20 words each (Any ten):

[20]

- a) Define Integrated Defence
- b) Define strategic management
- c) Write any two functions of the Ministry of Defence
- d) Write any two function of the National Security council
- e) What are the functions of the supply corps
- f) Write any two responsibilities of coast Guard
- g) Write types of battle ships of Indian Navy
- h) Write any two limitations of Indian Air-Force
- i) Write any two functions of Territorial Army
- j) Write any two functions of Home Guards.
- k) Write any two functions of C.R.P.F
- l) Write any two functions of Indian Navy
- m) Army is headed by whom?

P.T.O.

Q2) Write in 50 Words each (any two): **[10]**

- a) Explain limitations of Infantry
- b) Explain role of Artillery during war
- c) Explain characteristics of Army Supply Corps
- d) Explain role of administrative services during peace.

Q3) Write in 150 Words each (any two): **[20]**

- a) Discuss organization of Indian air force
- b) Explain organization of Naval Headquarters
- c) Discuss role of Indian Navy during peace time
- d) Explain role and limitations of Air Force

Q4) Write in 300 Words each (any two): **[30]**

- a) Discuss Higher Defence organization of India
- b) Explain role of NSC in formulating defence policy of India
- c) Discuss career options in paramilitary Forces
- d) Explain role of Territorial Army in India's national defence



Total No. of Questions : 4]

SEAT No. :

P401

[4817]-25

[Total No. of Pages : 2

F.Y. B.Sc.

DEFENCE AND STRATEGIC STUDIES

**DS.No. - III : Evolution of Defence Science & Technology
(2008 Pattern) (Paper - III) (Old Course)**

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

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

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

[20]

- a) What do you mean by I.T.?
- b) Define "Strategy".
- c) State the meaning of S.L.B.M.
- d) What do you understand by Professional Army?
- e) Define "Technology".
- f) How you would like to define Air Power?
- g) What do you mean by Schliffen Plan?
- h) Which country had introduced the tank first time during World War - I?
- i) State the meaning of energy production resources with two examples.
- j) By whom the steam engine it was invented?
- k) How the World War Second it was began?
- l) Write the duration of World War - I.
- m) What do you understand by R.M.A.?

P.T.O.

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

- a) Explain in brief the concept of Modern Warfare.
- b) Write in short trench warfare during World War - I.
- c) Discuss in brief arrival of tanks & its impact on contemporary warfare.
- d) Write a few lines on 'Industrial Revolution'.

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

- a) Write an essay on "Emergence of New Technologies".
- b) Highlight on the linkages between National Security and energy security.
- c) Discuss the "first use of Nuclear Weapons & its impact".
- d) What were the implications of science & technologies on contemporary warfare?

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

- a) Write an essay on "Indias Missile Programme".
- b) Explain L.I.C. as an interval security problem of India with examples.
- c) Evaluate the role of Air Power during first World War.
- d) "GustavasAdolphus was a father of professional Army". Do you agree? Justify your answer.



Total No. of Questions :5]

SEAT No. :

P402

[4817]-26

[Total No. of Pages :2

F.Y.B.Sc.

ENVIRONMENTAL SCIENCE

**ENV- 101: Life Sciences - Basic Biology & Natural Resources
(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 the following:

[16]

- a) What is meant by Dry & Wet preservation.
- b) Name any 2 disease causing microbes.
- c) What are Hydrophytes? Give 2 examples.
- d) Name any 2 terrestrial & aquatic mammals each.
- e) What is meant by Fossil Evidences.
- f) Define conventional & Non-conventional energy resources with suitable examples.
- g) What are Fossil Fuels? Give 2 examples.
- h) Define Forest. Name any 2 forest types.

Q2) Answer any 4 of the following:

[16]

- a) Describe the various effects of flood & drought.
- b) Explain Ecological classification with suitable examples.
- c) What are wildlife resources? How are they important? Give example.
- d) Describe the method of collection & preservation of angiosperms.
- e) Enumerate the various sources of fresh water? Discuss the reasons responsible for water scarcity.
- f) Explain the artificial, Natural & Phylogenetic system of classification with suitable examples.

P.T.O.

Q3) Write short note on any 4 of the following: **[16]**

- a) Alternative energy resources.
- b) Man's increasing water requirement.
- c) Global energy need & consumption.
- d) Continental Drift.
- e) Organisation of living things.
- f) Evolution of life on Earth.

Q4) Attempt any 2 of the following: **[16]**

- a) Discuss the importance of soil & mineral resources. Add a note on the mineral resources of India.
- b) Give an account of distribution of life on Earth. Explain the factors responsible for it.
- c) What are livestock resources? How are they beneficial to man? Enlist any 8 livestock varieties. Give an account of livestock in India.
- d) Describe the characteristics of -
 - i) Plant forms - Monocot & Gymnosperm.
 - ii) Animal forms - Aves & Mammals.

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

- a) Discuss
 - i) Various mould food resources
 - ii) World food problems. What are the different types of agriculture practices. How is modern agriculture 'Good' & 'Bad'?
- b) Explain taxonomical hierarchy. Describe the 5 kingdom classification, discussing the characteristics of each kingdom.

EEE

Total No. of Questions : 5]

SEAT No. :

P403

[4817]-27

[Total No. of Pages : 2

F. Y. B.Sc

ENVIRONMENTAL SCIENCE-II

**ENV-102: Earth Sciences: Environmental Chemistry and Basic
Geosciences
(Paper-II) (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) Ozone hole
- b) What is green chemistry?
- c) What is surfactant?
- d) Give acronym of IPCC.
- e) What is Stratosphere
- f) Define lapse rate
- g) What are sedimentary rocks?
- h) Define rock cycle.

Q2) Answer any four of the following.

[16]

- a) What are biological consequences of Ozone depletion?
- b) What is meaning of green house Gas? Discuss major sources of GHG.
- c) Explain use of Food additives with suitable example.
- d) Write in brief physical and chemical properties of soil?
- e) Explain with diagram, internal structure of earth.
- f) Define mineral. Enlist any Four physical properties of mineral.

P.T.O.

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

- a) Physical properties of water.
- b) Photochemical smog.
- c) Types of detergents.
- d) Soil Formation.
- e) Chemical composition of atmosphere.
- f) Factors affecting on wind.

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

- a) Give an account of physical and chemical properties of mercury.
- b) What are gesticide? Classify them on the basis of target organism.
- c) Discuss the theory of plate tectonics.
- d) Explain with diagram vertical structure of atmosphere Add note on importance of stratosphere.

Q5) What is hydro carbon? Discuss in details sources of hydrocarbon. Add note on their environmental effects. **[16]**

OR

What is weathering? Discuss types of weathering. Add note on, role of weathering in soil formation.



Total No. of Questions : 4]

SEAT No. :

P404

[Total No. of Pages : 4

[4817]-28

F.Y. B.Sc.

**FOUNDATION COURSE (Restructuring)
(2008 Pattern)**

Time : 3 Hours]

[Maximum Marks :80

Instructions to the candidates :

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

Q1) Explain the following concepts in 50 words : (Any two)

[10]

- a) Privatization
- b) Liberty
- c) Superstition
- d) Science

Q2) Write the following short notes in 100 words : (Any four)

[20]

- a) National Integration
- b) Unemployment
- c) Population Explosion
- d) Applied science
- e) Society
- f) Pollution

P.T.O.

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

- a) Write the causes and effects of pollution.
- b) Write the Merits and demerits of caste system.
- c) Explain the state and Nation concept.
- d) Write the effects of science & technology on Agriculture.

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

- a) Give an account on Indian Democracy.
- b) Write the characteristics of Indian Society.



Total No. of Questions : 4]

P404

[4817]-28
F.Y. B.Sc.
FOUNDATION COURSE (Restructuring)
(2008 Pattern)
(मराठी रूपांतर)

वेळ : 3 तास]

[एकूण गुण : 80

- सुचना : 1) सर्व प्रश्न सोडविणे आवश्यक आहे.
2) उजवीकडील अंक पूर्ण गुण दर्शवितात.
3) संदर्भासाठी मूळ इंग्रजी प्रश्नपत्रिका पहावी.

-
- प्रश्न 1) पुढील संकल्पना 50 शब्दात स्पष्ट करा. (फक्त दोन) [10]
- अ) खाजगीकरण
ब) स्वातंत्र्य
क) अंधश्रद्धा
ड) विज्ञान
- प्रश्न 2) पुढील टिपा प्रत्येकी 100 शब्दात लिहा. (फक्त चार) [20]
- अ) राष्ट्रीय एकात्मता
ब) बेकारी
क) लोकसंख्या विस्फोट
ड) उपयोजित विज्ञान
इ) समाज
फ) प्रदुषण

प्रश्न 3) पुढील प्रश्नांची उत्तरे 200 ते 250 शब्दात लिहा. (फक्त तीन)

[30]

- अ) प्रदुषणाची कारणे व परिणाम लिहा.
- ब) जाती व्यवस्थेचे फायदे व तोटे लिहा.
- क) राज्य व राष्ट्र संकल्पना स्पष्ट करा.
- ड) शेतीवरील विज्ञान तंत्रज्ञानाचा परिणाम स्पष्ट करा.

प्रश्न 4) पुढीलपैकी एका प्रश्नांचे उत्तर 500 शब्दात लिहा.

[20]

- अ) भारतीय लोकशाहीवर सविस्तर वृत्तांत लिहा.
- ब) भारतीय समाजाची वैशिष्ट्ये स्पष्ट करा.



Total No. of Questions : 10]

SEAT No. :

P405

[4817]-29

[Total No. of Pages : 3

F.Y. B.Sc.

INDUSTRIAL CHEMISTRY

(2008 Pattern) (Paper-I)(Vocational Course)

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

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

SECTION-I

Q1) Answer the following:

[8]

- a) Define and explain catalyst.
- b) What are sols?
- c) What is the role of promoters in chemical reactions?
- d) Explain Emulsions.

Q2) Answer Any Two of the following:

[8]

- a) Describe the phenomenon of electrophoresis. How it is useful in separation of colloids?
- b) Differentiate between adsorption and absorption.
- c) Explain "autocatalysis".

Q3) Answer Any Two of the following:

[8]

- a) How rate of adsorption is affected by change in temperature? Illustrate with suitable example.
- b) Distinguish between lyophilic and lyophobic solutions.
- c) What do you understand by catalytic poisoning.

P.T.O.

Q4) Answer Any One of the following: [8]

- a) Describe the mechanism of acid catalysed reactions using suitable examples. Is it possible to catalyse such reactions under base catalysed conditions? Explain.
- b) Derive the expression for Langmuir adsorption isotherm. Explain the relevance of terms involved.

Q5) Write short notes on Any Two of the following: [8]

- a) Brownian movement.
- b) Surfactants.
- c) Chemical adsorption.

SECTION-II

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

- a) Limiting reactant.
- b) Latent heat of sublimation.
- c) Molality.
- d) Standard heat of formation.

Q7) Answer Any Two of the following: [8]

- a) Describe various forms of energy.
- b) What are the steps involved in material balance in filtration?
- c) Describe stoichiometric coefficients. How do they help in calculations of yield of the reaction?

Q8) Write short notes on Any Two of the following: [8]

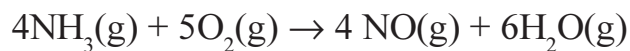
- a) Recycling operations.
- b) Material balance in crystallisation.
- c) Henry's Law.

Q9) Answer Any One of the following: [8]

- a) State and explain 'phase rule'. Apply phase rule for water-ethanol system.
- b) Describe general procedure for energy balance. How energy balance is written for closed system?

Q10) Solve Any Two of the following: [8]

- a) Calculate the standard heat of reaction for the following reaction.



Given:

Component	$\Delta_f H^\circ$ cal / gmole
$\text{NH}_3(\text{g})$	-11020
$\text{NO}(\text{g})$	21570
$\text{H}_2\text{O}(\text{g})$	-57796

- b) An aqueous solution of sodium chloride is prepared by dissolving 25 gms of sodium chloride in 100 gms of water. Find: i) Weight % ii) mole % composition of solution. (at. wt. of sodium = 23, oxygen = 16, hydrogen = 1, chlorine = 35.5).
- c) Carbon monoxide is reacted with hydrogen to produce methanol. Calculate for the reaction
 - i) stoichiometric ratio of H_2 to CO
 - ii) Kg mole of CH_3OH produced per kg mole of CO consumed
 - iii) The wt. ratio of CO to H_2 if both are fed to the reactor in stoichiometric proportions
 - iv) The quantity of CO required to produce 1000 kg of CH_3OH .



Total No. of Questions :5]

SEAT No. :

[Total No. of Pages :3

P379

[4817]-3

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 non programmable calculator is allowed.*
- 4) *Neat diagram must be drawn wherever necessary.*

Q1) Attempt all of the following:

[16]

- a) Define displacement, speed and velocity.
- b) What is inertial and non-inertial frame of reference?
- c) If 4.9 N force is applied to one end of spring and other end is fixed. It stretching the spring from its relaxed length by 12×10^{-3} m. Find the spring constant of the spring.
- d) Give any four applications of surface tension.
- e) State first law of thermodynamics.
- f) What is irreversible process? Give its example.
- g) Calculate the coefficient of performance for a reversible refrigerator which works between 0°C and 30°C .
- h) Give working principle of thermo-electric thermometer.

Q2) Attempt any four of the following::

[16]

- a) What is average velocity? Interpret average acceleration using $v - t$ diagram in one dimensional motion.
- b) State and explain Newton's third law of motion with suitable examples.
- c) Define surface tension. Explain the various factors which affect the surface tension of a liquid.

P.T.O.

- d) Find the work done by a 50 N force is pulling the surface at an angle of 50° for a distance 75 m.
- e) A hockey stick exerts a force 200 N on a 200 gm puck for 0.1 second. What is the final speed of puck?
- f) What is pressure experienced at a point on the bottom of a swimming pool 9 meter in depth? (Density of water $1.013 \times 10^3 \text{ kg/m}^3$, $g = 9.8 \text{ m/s}^2$, Atmospheric pressure, $p_{\text{atm}} = 1.01 \times 10^5 \text{ N/m}^2$)

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

- a) Derive an expression for work done during an adiabatic process.
- b) Define reversible process. Show that the entropy remains constant during a reversible cyclic change.
- c) Explain Otto cycle with an indicator diagram.
- d) A Carnot's engine whose low temperature reservoir is at 10°C and has efficiency of 50%. It is desired to increase the efficiency to 70 %. By how many degrees should the temperature of the high temperature reservoir be increased.
- e) Determine the critical temperature for helium from the following data: $a = 3.44 \text{ Jm}^3 \text{ kmole}^{-2}$, $b = 0.0234 \text{ m}^3 \text{ kmole}^{-1}$ and $R = 8.31 \text{ Jmole}^{-1} \text{ K}^{-1}$.
- f) The resistance of platinum wire at 0°C is 6 ohm and 7.2. ohm at 100°C . Calculate temperature of coefficient of resistance.

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

- a) Give the working principle of venturimeter. Explain construction and working of venturimeter. State its applications.
- b)
 - i) What is work done? Give the example of positive and negative work.
 - ii) A ball is released from rest from the top of the building, Neglecting air resistance, calculate the position and velocity of the ball after 1 second.
- c)
 - i) Define kinetic energy and potential energy of a body. Explain change in potential energy in a rigid body motion.
 - ii) The surface tension of water is 0.0728 J/m^3 . Calculate the capillary rise in a glass tube which has a radius 2 mm.
(Density of water, $\rho = 10^3 \text{ kg/m}^3$, $g = 9.8 \text{ m/s}^2$.)

Q5) Attempt any two of the following:

[16]

- a) Define critical pressure, critical volume and critical temperature. Obtain critical constants of the gas in terms of Van der Waal's constants.
- b)
 - i) Give the difference between real gases and ideal gases.
 - ii) One mole of oxygen at 0°C is compressed until the volume remains one fourth of the initial value at the same temperature. Calculate the work done.
- c)
 - i) Explain construction and working of liquid filled thermometer.
 - ii) The expansion ratio and compression ratio are 5 and 10 respectively. If the value of γ is 1.4 for the working substance in Diesel engine then determine its efficiency.

EEE

Total No. of Questions : 6]

SEAT No. :

P406

[4817]-30

[Total No. of Pages : 2

F.Y. B.Sc. (Vocational)

BIOTECHNOLOGY-I

Biochemistry, Biophysics and Instrumentation-I

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

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Draw neat and labelled diagrams wherever necessary.*
- 3) *Figures to the right indicate full marks.*
- 4) *Use separate answer books for section-I and section-II.*

SECTION-I

Q1) Answer the following questions in short:

[8]

- a) What are polysaccharides? Give two examples.
- b) Define inhibitors of enzymes.
- c) What is a nucleotide?
- d) Write the function of Golgi Apparatus.

Q2) Answer Any Four of the following:

[16]

- a) Explain the classification of amino acids.
- b) Describe Glycolysis.
- c) What are the functions of carbohydrates?
- d) Explain how substrate concentration affects the enzyme activity?
- e) Differentiate between saturated and unsaturated fatty acids.

P.T.O.

Q3) Answer Any Two of the following: [16]

- a) Describe the structure of DNA.
- b) What is TCA cycle? Explain in detail.
- c) What is the role of enzymes in industry?

SECTION-II

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

- a) What is a compound microscope?
- b) Define nephelometry.
- c) What are radioisotopes?
- d) What is density gradient?

Q5) Answer Any Four of the following: [16]

- a) Write a note on Ion-exchange chromatography.
- b) Explain dark field microscopy.
- c) Describe UV spectroscopy.
- d) Give the uses of turbidometer.
- e) Explain the Calomel electrode.

Q6) Answer Any Two of the following: [16]

- a) Describe SEM.
- b) What is centrifugation? Differentiate between centrifugation and ultracentrifugation.
- c) Enlist the different applications of affinity chromatography.



Total No. of Questions : 5]

SEAT No. :

P1253

[4817]-31

[Total No. of Pages : 2

F.Y. B.Sc.(Vocational)

PHOTOGRAPHY AND AUDIO-VISUAL PRODUCTION

Basic Photography And 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 labelled diagrams wherever necessary.*

Q1) Answer the following:

[16]

- a) Mention the drawbacks of a pinhole image.
- b) Define the f number of a camera lens.
- c) Write down two equivalent exposures for f 5.6 @ 1/60 sec for ISO 100.
- d) When is 'high ISO' useful?
- e) Explain how photography is useful in education.
- f) Give one advantage and one disadvantage of a box camera.
- g) What is diffraction of light?
- i) Explain the importance of 'white balance' in digital photography.

Q2) Answer ANY FOUR of the following:

[16]

- a) Discuss the advantages of a focal plane shutter.
- b) Draw a diagram and explain how is the spherical aberration reduced.
- c) Explain who is an amateur photographer?
- d) Draw suitable diagrams and explain the rule of thirds.
- e) Draw a suitable diagrams 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) Give two examples each of hard news and soft news.
- c) Discuss the importance of light and colour in photography.
- d) Draw a diagram and explain the 'total internal reflection'.
- e) Discuss the importance of colour in photography.

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

- a) Discuss the importance of a photographic image in a news paper.
- b) How would you analyze photography as a medium of mass communication?
- c) Photographic image is very important in the print media. Comment.

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

- a) Explain the 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. :

P407

[4817]-32

[Total No. of Pages : 2

F.Y. B.Sc. (Vocational)

ELECTRONIC EQUIPMENT MAINTENANCE

Test and Measurement Instruments and Consumer Products

(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.*
- 3) *Draw neat diagrams wherever necessary.*

Q1) Attempt All of the following:

- a) What is resolution & dynamic accuracy? [2]
- b) What is spike protector? [2]
- c) What is loading effect? [2]
- d) What is function of delay line in CRO? [2]
- e) What is function of thermostat in automatic iron? [2]
- f) What are applications of ac bridges? [2]
- g) What is service manual? [2]
- h) What is fuzzy logic? [2]

Q2) Attempt Any Four of the following:

- a) Explain the operation of distortion factor meter. [4]
- b) What is home protector? Explain. [4]
- c) Enlist advantages of digital meter over analog meter. [4]

P.T.O.

- d) Explain working of series ohmmeter. [4]
- e) Explain the working of ON line UPS. [4]

Q3) Attempt Any Four of the following:

- a) Explain the working of digital voltmeter. [4]
- b) Explain different parts of electric iron. [4]
- c) With the help of timing diagram, explain different faults in pulse. [4]
- d) Explain the working of AF signal generator. [4]
- e) What are limitations of measuring instruments? [4]

Q4) Attempt Any Two of the following:

- a) Explain the concept of autoranging. [8]
- b) i) Explain the diff. parts of single trace CRO. [4]
ii) Explain the working of single beam CRT. [4]
- c) Explain the working of electronic object counter. [8]

Q5) Attempt Any Two of the following:

- a) What is DSO? Explain its working with block diagram. [8]
- b) Explain CRO probes. [8]
- c) Explain the working of meggar. [8]



Total No. of Questions : 10]

SEAT No. :

P408

[4817]-33

[Total No. of Pages : 3

F.Y. B.Sc.

INDUSTRIAL MICROBIOLOGY

Instrumentation and Materials and Design

(2008 Pattern) (Paper-I) (Vocational Course) (Theory)

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) Give two microbial applications of centrifugation.
- b) Define Rf value.
- c) Define relative elution number.
- d) Define 'Detection limit' of an instrument with suitable example.

Q2) Answer Any Two of the following:

[8]

- a) Give applications of Gel filtration chromatography.
- b) Explain the detection limit and sensitivity in instrumentation.
- c) Describe ultra centrifuge technique.

P.T.O.

Q3) Answer Any Two of the following: [8]

- a) Describe the relation between 'rpm' and 'RCF'.
- b) Diagrammatically explain the instrument of HPLC.
- c) Differentiate between paper chromatography and thin layer chromatography.

Q4) Answer Any Two of the following: [8]

- a) How isotope dilution technique is used for calculating volume of blood in an individual.
- b) Draw the block diagram of Gas chromatography unit.
- c) Describe density gradient centrifugation.

Q5) Answer Any One of the following: [8]

- a) List components of spectrophotometer and describe the application of UV spectrum in quantitative analysis.
- b) Describe the importance of standard operating procedure for equipments and analytical instruments.

SECTION-II

(Materials and Design)

Q6) Answer the following: [8]

- a) Explain the properties of borosilicate glass test make it compatible for use in bioprocesses.
- b) Explain different applications of polytetra fluoroethylene.

- c) Differentiate between natural rubber and synthetic rubber.
- d) What is thermostable plastic?

Q7) Answer Any Two of the following: [8]

- a) Define Biobleaching and explain different mechanisms of biobleaching.
- b) Explain the implications of biofouling in bioprocesses.
- c) What is thermoset plastic? Explain its applications.

Q8) Answer Any Two of the following: [8]

- a) Write a short note on 'polypropylene'.
- b) Explain the aerobic biocorrosion process.
- c) Describe various techniques used in plastic molding.

Q9) Answer Any Two of the following: [8]

- a) Describe various curves used in drawing.
- b) Explain how oligodynamic action of metals can affect a bioprocess.
- c) Describe various types of glass and their applications.

Q10) Answer Any One of the following: [8]

- a) Draw any object to mark following line types and explain applications of these line types.
 - i) Phantom
 - ii) Hidden
 - iii) Center
 - iv) Break line
 - v) Cutting plane
- b) Define corrosion. Explain factors influencing corrosion reaction.



Total No. of Questions : 5]

SEAT No. :

P409

[4817]-34

[Total No. of Pages : 2

F.Y. B.Sc. (Vocational)

COMPUTER HARDWARE AND NETWORK ADMINISTRATION

Essentials of Computer

(48710) (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 diagram wherever necessary.*

Q1) Attempt the following:

[16]

- a) What is digitizer?
- b) Write notes on LCD panel.
- c) Write notes on computer MOUSE.
- d) What is flash memory?
- e) Write the full forms of SIMM, DIMM, MICR & CAD.
- f) Write notes on pen drive.
- g) Explain front and rear panel of computer.
- h) What is scanner?

Q2) Attempt Any Four:

[16]

- a) Explain Interrupts in computer.
- b) Write notes on Hard Disk Drive.
- c) What is plotter?
- d) Explain the working of DOT matrix printer.
- e) Explain RAM and its types in detail.
- f) Write notes on Inkjet printer.

P.T.O.

Q3) Attempt Any Four:

[16]

- a) Write notes on optical ROM.
- b) Explain the working of LASER printer.
- c) Write notes on memory mapping.
- d) What is SMPS?
- e) Explain various input and output devices of computer in detail?
- f) Write notes on motherboard.

Q4) Attempt Any Two:

[16]

- a) Explain computer system with block diagram.
- b) What is software? Explain the types of software with examples.
- c) Write notes on:
 - i) Floppy Disk.
 - ii) Touch screen.

Q5) Attempt Any Two:

[16]

- a) What is microprocessor? Explain generation of computers based on microprocessors.
- b) Write notes on magnetic tape.
- c) Define:
 - i) Device controller.
 - ii) Instruction prefetch.



Total No. of Questions : 5]

SEAT No. :

P410

[4817]-35

[Total No. of Pages : 2

**F.Y. B.Sc. (Vocational)
SEED TECHNOLOGY**

**Morphology, Seed Development and Testing for Cultivar Genuineness
(48910) (Old - 2008 Pattern) (Semester-III) (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 labelled diagrams wherever necessary.*

Q1) Attempt the following:

[8 × 2 = 16]

- a) Define a flower.
- b) What is pollination?
- c) Define a endosperm.
- d) What is a seed?
- e) Give the advantages of mass selection.
- f) What is introduction?
- g) Define plant breeding.
- h) What is a mutant?

Q2) Attempt Any Four of the following:

[4 × 4 = 16]

- a) Write the difference between seed and grain.
- b) Describe any one method of breeding for disease resistance.
- c) Describe the anatropous type of ovule.
- d) Write the scope and objective of plant breeding.
- e) Explain in brief the procedure of clonal selection.
- f) Give the advantages & limitations of hybridisation in cross pollinated crops.

P.T.O.

Q3) Write notes on Any Four of the following:

[4 × 4 = 16]

- a) Seedling examination.
- b) Development of microspore.
- c) DUS system
- d) Advantages & disadvantages of pure line selection.
- e) Tissue culture.
- f) Mutagens.

Q4) Attempt Any Two of the following:

[2 × 8 = 16]

- a) What is endosperm? Describe cellular type of endosperm.
- b) Give distinguishing characters, floral formula & floral diagram of family solanaceae.
- c) State and explain law of segregation with suitable examples.
- d) Explain Air Layering & stone grafting in detail.

Q5) Explain in detail, the development of male and female gametophytes in angiosperms. **[16]**

OR

What is hybridisation? Give the procedure for development of single cross and double cross hybrids.



Total No. of Questions :10]

SEAT No. :

[Total No. of Pages :3

P411

[4817]-36

**F.Y.B.Sc. (Vocational)
INDUSTRIAL CHEMISTRY - II
(2008 Pattern) (Paper - II)**

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) *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 disadvantages of solid fuel.
- b) What is coal tar?
- c) Give the composition of gasoline.
- d) What is anti-knocking agent?

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

- a) Write a short note on coke-oven gas.
- b) Give classification of coal according to rank.
- c) What is aviation gasoline? Give a brief account of its properties and applications.

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

- a) Write a short note on water gas.
- b) Give a brief account of fractional distillation of coal oil.
- c) How are fuel gases analysed? Describe.

P.T.O.

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

- a) Give a comparative account of proximate and ultimate analysis of coal.
- b) Give a detailed account of origin, sources and composition of petroleum.

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

- a) Give advantages and disadvantages of the following:
 - i) Liquid fuels.
 - ii) Blast furnace gas.
- b) What is calorific value? Discuss methods for determination of calorific value.

SECTION - II

Q6) Answer the following: [8]

- a) What is an alloy? Give two examples.
- b) Define amalgamation.
- c) What is froth - floatation?
- d) Give properties of iron.

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

- a) Give chemical properties of copper.
- b) What are silicates? Give their classification.
- c) Describe extraction of iron by pyrometallurgy.

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

- a) Give a brief account of allotropes of carbon.
- b) Define slags and fluxes. Give suitable examples.
- c) Discuss electrolytic refining of copper.

Q9) Attempt any one of the following: [8]

- a) Discuss the physico-chemical principles of roasting.
- b) Discuss in brief the following:
 - i) Zeolites
 - ii) Alumina

Q10) Attempt any one of the following: [8]

- a) What is refining? Discuss different methods of refining.
- b) Discuss with suitable examples the following processes:
 - i) Pulverisation
 - ii) Calcination

EEE

Total No. of Questions : 6]

SEAT No. :

P412

[4817]-37

[Total No. of Pages : 3

F.Y.B.Sc.(Vocational)

BIOTECHNOLOGY

**Microbiology and Mathematics, Statistics and Computers for Biologists
(Paper-II) (2008 Pattern) (New Course)**

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicate full marks.*
- 3) *Draw neat labelled diagrams wherever necessary.*
- 4) *Use separate answer books for section I and section II.*

SECTION-I

(Microbiology)

Q1) Answer the following:

[8]

- a) What are obligate aerobes? Give two examples.
- b) Explain commensalism.
- c) Explain extremophiles with examples.
- d) Enlist the components of Mac Conkey's agar.

Q2) Answer any four of the following.

[16]

- a) How moist heat can be used for sterilization?
- b) Describe any one method of endospore staining of bacteria.
- c) What are the various contributions laid by Louis Pasteur to microbiology?
- d) Explain the five kingdom system of classification.
- e) Write short notes on -(i) Predation ii) Amensalism

Q3) Answer any two of the following.

[16]

- a) Write the methods of cultivation of thermophiles and acidophiles in laboratory.
- b) What are the different types of media? Describe differential media with examples.
- c) What is nutrient agar? Explain the role of each ingredient in the nutrient agar.

P.T.O.

SECTION-II

(Mathematics, Statistics and Computer for Biologists)

Q4) Answer the following questions in short:

[8]

- a) What is sampling? Enlist the methods of sampling.
- b) Give applications of statistics in biology.
- c) Evaluate $\lim_{x \rightarrow 3} \frac{x^2 - 5x + 6}{x - 3}$.
- d) If $y = \sqrt{5 - 2x}$, find $\frac{dy}{dx}$ at $x = 1$.

Q5) Answer any four of the following:

[16]

- a) Calculate standard deviation from the following data series:
14, 10, 11, 12, 16, 12, 10, 13, , 16, 18, 16, 10, 12, 11, 17, 15.
- b) What is database? Write a note on DNA database.
- c) Evaluate $\int_{-1}^1 x e^{x^2} dx$
- d) If $\theta = \frac{\pi}{3}$, then find the value of $\sin\left(\theta + \frac{\pi}{2}\right)$.
- e) If $f(x) = \begin{cases} \frac{x-9}{\sqrt{x}-3}; & \text{for } x \neq 9 \\ 7 & ; \text{for } x = 9 \end{cases}$ Find $\lim_{x \rightarrow 9} f(x)$.

Q6) Answer any two of the following:

[16]

- a) Describe the test for goodness of fit with suitable example.
- b) What is design of experiments? Explain basic principles of the design of experiment.

c) i) Find limit of the sequence $\left\{ \left(\frac{1}{2} \right)^n + 1 \right\}_{n=0}^{\infty}$

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

d) i) Evaluate ${}^{50}C_2, {}^{20}P_1, \frac{{}^5C_2}{{}^{10}P_1}$, where P is permutation and C is combination.

ii) If $y = \frac{e^{2x}}{\log(\sin x + 1)}$. Find $\frac{dy}{dx}$.



Total No. of Questions : 5]

SEAT No. :

P1254

[4817]-38

[Total No. of Pages : 2

F. Y. B. Sc. (Vocational)

PHOTOGRAPHY AND AUDIO-VISUAL PRODUCTION

Introduction to Mass Communication and Media Scene in India

(Paper-II) (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 and labelled diagrams wherever necessary.*

Q1) Attempt any two of the following:

[16]

- a) Illustrate the different barriers in communication.
- b) Explain the salient features of mass communication.
- c) You are asked to interview the Katrina Kaif on the release of her new film. What questions would you ask her?

Q2) Attempt any four of the following:

[16]

- a) Explain the role of censorship in media.
- b) Write a short note on Aristotle's model of communication.
- c) Explain the importance of language in communication.
- d) Write a short note on the impact of films on the audience.
- e) Illustrate the three stages in interpersonal communication.

Q3) Attempt any four of the following:

[16]

- a) Explain with suitable examples the definition of 'communication'.
- b) Explain the meaning of 'inverted pyramid' in the context of news writing.

P.T.O.

- c) Differentiate between one -to-one and many-to-one communication.
- d) Explain what are fiction and non-fiction serials in television with examples?
- e) Write a short note on the growth of radio in recent times.

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

- a) Draw the block diagram of the Shannon and Weaver model. Explain the function of each of blocks.
- b) Write a news report of about 100 words on a series of blast occurred on JM Road, Pune.
- c) What are the merits and demerits of television as a medium of mass communication?

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

- a) With examples state the impact of communication on audience.
- b) Write short notes on– (i) News (ii) Reality shows on television.
- c) How would you make a layout of the following news items – (1) Rains in Pune below average (2) CM to visit drought-hit areas (3) Accident on e-way kills 5 (4) Sitar maestro critically ill (5) Clerk caught in the anti-corruption net(6) City mayor to visit France.



Total No. of Questions : 5]

SEAT No. :

P413

[4817]-39

[Total No. of Pages : 2

F. Y. B. Sc.(Vocational)
ELECTRONIC EQUIPMENT MAINTENANCE(EEM)
Maintenance Concepts and Assembly Methods
(Paper-II) (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) Explain the term absolute maximum rating.
- b) Explain the factors on which capacitance of a capacitor depends.
- c) Explain PTH PCB, also explain its advantages.
- d) Explain the importance of datasheets what information do you get from datasheets.
- e) Explain the importance of flux.
- f) Explain the importance of Earthing.
- g) Explain the advantages of Bread board.
- h) State different types of losses in transformer.

Q2) Attempt any four

[16]

- a) Write a note on tools used for desoldering.
- b) With the help of a neat diagram explain internal connections of Bread board.
- c) Explain the importance of service manual.
- d) Explain different stages for maintenance of instrument.
- e) Explain different precautions to be taken while handling electrical gadgets.

P.T.O.

Q3) Attempt any four of the following.

[16]

- a) Explain the difference between good and bad solder joint.
- b) Write a note on mean time between failures(MTBF).
- c) Explain the procedure for proper Earthing.
- d) Explain the factors on which MTR depends.
- e) Explain the importance of information printed on body of devices.

Q4) Attempt any two.

[16]

- a) Write a note on Electric shock and what precautions should be taken to avoid electric shock.
- b) With the help of a neat diagram Explain wiring of a fan and Regulator.
- c) Explain and draw wiring of tube light also Explain the function of a tube light.

Q5) Attempt any two

[16]

- a) With the help of a neat diagram Explain the working of a solder gun.
- b) With the help of a neat diagram explain the working of a M.C.B.
- c) Write a note on solder wire.



Total No. of Questions : 5]

SEAT No. :

[Total No. of Pages : 3

P380

[4817]-4

F.Y. B.Sc.

PHYSICS-II

Emerging Physics and Electricity and Magnetism

(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) *Draw neat diagrams and sketches wherever necessary.*

Q1) Attempt all the following:

- a) What is geocentrism? [2]
- b) List few applications of laser. [2]
- c) Define transducer. [2]
- d) Find the cardiac output for a person having heart rate of 72 beats/min and a stroke volume 65 ml/beat. [2]
- e) State Coulomb's law. Express it in vector form. [2]
- f) Define terms-Equatorial line and Axial line. [2]
- g) The maximum value of permeability of metal is 0.126 T-m/A. Find the maximum relative permeability and susceptibility. [2]
- h) What is transient current? [2]

Q2) Attempt any four of the following:

- a) Write a short note on contribution of Kepler in the development of physics. [4]
- b) If the energy difference between two laser levels is 0.117 eV. Determine the frequency and wavelength of the radiation. [4]
- c) Explain construction and working of platinum resistance thermometer. [4]
- d) Discuss important features of stimulated emission. [4]

P.T.O.

- e) Resistance temperature detector has temperature coefficient $0.0042/^{\circ}\text{C}$ and resistance $100\ \Omega$ at 0°C . Find the resistance at -160°C . [4]
- f) Explain wet chemical method to synthesize nanoparticles. [4]

Q3) Attempt any four of the following.

- a) Using Gauss's theorem, obtain an expression for the electric intensity near the surface of metallic conductor. [4]
- b) Using Biot-Savart's law, obtain an expression for magnetic field produced due to circular current loop. [4]
- c) Distinguish between diamagnetic and paramagnetic substances. [4]
- d) Calculate the potential energy of a system consisting of two point charges $3 \times 10^{-8}\ \text{C}$ and $-2 \times 10^{-8}\ \text{C}$ with separation of 60 cm. [4]
- e) The parallel-plate capacitor of plate area $0.01\ \text{m}^2$ is filled with dielectric of dielectric constant 5. Its capacitance is 2×10^{-10} farad and it has been charged to 50 volts. Find electric field intensity in the dielectric. [4]
- f) A charge of $3.0\ \mu\text{C}$ moves with speed $3.0 \times 10^6\ \text{m/s}$ along positive x-axis. The magnetic field of strength $(0.10\ \vec{j} + 0.20\ \vec{k})\ \text{J}$ exists in space. Find the magnetic force acting on the charge. [4]

Q4) Attempt any two of the following:

- a) Explain synthesis of nanoparticles using top-down approach. Discuss applications of nanomaterials. [8]
- b) i) Give the contribution of Einstein and Newton in physics. [4]
- ii) Amount of radiant energy received by the detector of pyrometer per unit time is 20J from a hot body. If emissivity is 5.6×10^{-3} , then find temperature of hot body. [4]
- c) i) The wavelength of emission is $6328\ \text{\AA}$ and coefficient of spontaneous emission is 10^6 per sec. Determine the coefficient for stimulated emission. [4]
- ii) State and explain Nernst equation. [4]

Q5) Attempt any two of the following:

- a) What is electric dipole and dipole moment? Obtain an expression for electric potential at any point due to an electric dipole. [8]
- b) i) Define line of force. Draw lines of force for [4]
- 1) An isolated charge $-q$
 - 2) Pair of opposite charge $+q$ and $-q$
 - 3) Pair of like charges $+q$ and $+q$
- ii) A coil of 20 cm radius has 15 turns and carries a current of 3 ampere. Find the magnetic field at the centre of the coil. [4]
- c) i) Define the terms-Magnetic induction (\vec{B}) and Magnetic intensity (\vec{H})
- ii) 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?



Total No. of Questions : 10]

SEAT No. :

P414

[4817]-40

[Total No. of Pages : 4

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 poket 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) Name any two selective media with their respective selectively cultured organism.
- b) List two enrichment media with their respective enriched bacteria.
- c) Name any two enrichment media for fungi.
- d) Give two microbial applications of ATCC.

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

- a) Describe in detail any two methods for cultivation of rotifers.
- b) Describe media used for cultivation of Actinomycetes and explain utility of slide culture.
- c) What are extremozymes ? Give their importance in life science research.

P.T.O.

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

- a) Define minimal media and explain its utility with examples.
- b) Describe enrichment of Actinomycetes.
- c) Enlist methods to cultivate anaerobic bacteria and explain any one culturing device.

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

- a) Write importance of ATCC.
- b) Enlist methods to cultivate aerobic bacteria and explain any one culturing device.
- c) List important culture collections and describe any one from India.

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

- a) Describe different methods of preservation of bacteria and diagrammatically explain the process of lyophilization.
- b) What is the meaning and importance of evolutionary lineage in prokaryote classification? Describe latest classification system with important examples.

SECTION-II

Mathematics and Statistics for Biologists

Q6) Answer the following. [8]

- a) Name any two measurements of central tendencies and any two measurements of dispersal.
- b) Explain skewness of distribution.
- c) Define i) median ii) standard error.
- d) Explain in brief- stratified sampling.

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

- a) Write a note on regression line and its uses.
- b) Explain the following terms.
 - i) Population and universe.
 - ii) Parameter and statistics.
- c) Explain the use and assumptions applied in ANOVA.

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

- a) If the birth rate as well as death rate of a population are constant, will the population attain equilibrium? Justify your answer.
- b) Illustrate graphically and write equations for the growth of a population in which the intrinsic birth rate is constant and death rate increases with population density.
- c) Measurements of heights (inches) of brother and sister were made in each of 15 two child families, with the following results. Calculate the correlation coefficient between the two heights.

family	1	2	3	4	5	6
brother,x	73	70	74	68	70	67
sister,y	69	67	63	66	67	64

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

- a) Write a note on central limit theorem.
- b) Write a set of equations to describe growth of a bacterial population in a batch culture with limited nutrients.
- c) Write a short note on Gaussian distribution.

Q10) Answer any two of the following.

[8]

- a) Total protein content(mg) of seeds of two plant types of Phascolus Vulgaris (kidney beans) are given Test whether mean total protein content of two plant types of P. vulgaris is significant or not.

Sample A (Control)	Sample B (Mutant)
1.8	2.3
1.9	2.4
2.0	2.5
2.1	2.5
2.2	2.7
2.3	2.8
2.4	2.9
2.5	3.0
2.6	3.1
2.6	3.2

- b) Explain the importance, assumptions and limitations of Hardy - Weinberg equilibrium in population genetics.
- c) Write a note on measurements of central tendencies giving examples.



Total No. of Questions :5]

SEAT No. :

[Total No. of Pages :2

P415

[4817]-41

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) What is compiler?
- b) Define BIOS.
- c) What is Multimedia?
- d) What is USB?
- e) Define debugger.
- f) Explain firmware.
- g) Define Interrupt.
- h) Define Editor.

Q2) Attempt any four:

[16]

- a) List different network topologies, explain any one in detail.
- b) Explain any two logical instructions of 8086.
- c) What is flow chart?
- d) Explain flag register of 8086.
- e) Write notes on math coprocessor.
- f) Write notes on Hard Disk controller.

P.T.O.

Q3) Attempt any four:

[16]

- a) Explain any two arithmetical instructions of 8086 with example.
- b) What is algorithm?
- c) Explain simulator and emulator.
- d) Write notes on network operating system.
- e) What is microprocessor? Explain evolution of microprocessor.
- f) Write notes on control panel of window operating system.

Q4) Attempt any two:

[16]

- a) Explain computer hardware & firmware with example.
- b) What is operating system? Explain main functions of operating system.
- c) Explain logical system architecture of computer with block diagram.

Q5) Attempt any two:

[16]

- a) Explain the types of software in detail.
- b) Explain architecture of 8086 and it's working registers.
- c) Write notes on:
 - i) Tristate buffer
 - ii) 80386

EEE

Total No. of Questions :5]

SEAT No. :

[Total No. of Pages :2

P416

[4817]-42

**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) Define seed.
- b) What are orthodox seeds?
- c) Define seed deterioration.
- d) Enlist different types of seed storage products.
- e) What are certified seeds?
- f) Comment on land preparation.
- g) Define seed vigour?
- h) What are off types?

Q2) Attempt any Four of the following:

[16]

- a) Comment on recalcitrant seeds.
- b) Explain different measures use to measure crop productivity.
- c) Comment on water and nutrient management in nursery.
- d) Explain, seed as a basic input in agriculture.
- e) Give an account on seed deterioration during storage.
- f) Distinguish between seed and grain.

P.T.O.

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

- a) Synthetic seeds.
- b) Seedling abnormalities and its causes.
- c) Seed vigour.
- d) Seed agency.
- e) Seed storage products constituents.
- f) Soil types.

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

- a) Define seed germination? Describe various types of seed germination.
- b) Explain various methods to break seed dormancy.
- c) Comment on physiology of seed development and maturation process.
- d) Explain role of agronomic management in high value seed production.

Q5) Give in detail account of steps involved in production of synthetic seeds. [16]

OR

Define genetic purity of seed. Explain various methods used to maintain genetic purity of seed.

EEE

Total No. of Questions : 5]

SEAT No. :

[Total No. of Pages : 3

P381

[4817]-5

F.Y. B.Sc.

CHEMISTRY-I

Physical and Inorganic Chemistry

(2008 Pattern) (Theory) (Paper-I)

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

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

Q1) Answer the following questions:

[16]

- a) Find the P^H of 1.2×10^{-3} M HCL.
- b) Define viscosity and give its unit.
- c) What is critical temperature?
- d) Explain term catalysis with example.
- e) State second law of thermodynamics in terms of entropy.
- f) Ethyl alcohol is a liquid while dimethyl ether is a gas at room temperature why?
- g) How many moles are present in 100 grams of water?
- h) Sigma bond is stronger than π bond; Explain.

Q2) a) Attempt any four of the following:

[8]

- i) If $Y=10^{-0.2218}$, Find the value of Y.
- ii) $e^x=250$, find the value of x.
- iii) Show that the lines $y=3x+9$ and $2y=6x+7$ are parallel.
- iv) Give any two rules of logarithm

P.T.O.

v) If $Y = \frac{x^2}{x+2}$ find dy/dx .

vi) Arrange the following equation in the form of $y=mx+C$ and find out slope and intercept $3y+2x-1=0$.

vii) $\int(2x^2 - 3)dx = ?$

viii) $\int_1^2 4x^3 dx = ?$

b) What is surface tension? Explain the factors affecting surface tension. [4]

c) Attempt any one of the following. [4]

i) The pressure and temperature of one mole of an ideal gas are changed simultaneously from 273k and $1.01325 \times 10^5 \text{ Nm}^{-2}$ to 373K and $5.06625 \times 10^5 \text{ Nm}^{-2}$. Calculate the change in entropy.

[Given $R=8.314 \text{ J (mole k)}^{-1}$, $C_p = \frac{5}{2} R$:J].

ii) Calculate the critical volume of a gas whose critical pressure and temperature are $77.11 \times 10^5 \text{ Nm}^{-2}$ and 417.7k respectively. [Given $R=0.08309 \times 10^5 \text{ Nm}^{-2} \text{ dm}^3 \text{ mole}^{-1} \text{ k}^{-1}$].

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

i) Give at least four properties of cathode rays.

ii) Define entropy and give its unit. Explain physical significance of entropy.

iii) What is compressibility factor? Discuss the variation of it with pressure of the gas.

iv) What is enzyme catalysis? Explain its characteristics.

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

i) Calculate the wavelength of spectral line in the lyman series when electron jumps from fourth orbit i.e. $n_1=4$.

ii) Calculate the frequency and wave number associated with the radiation of wavelength 750 nm.

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

- i) Distinguish between elastic gel and non-elastic gel.
- ii) What are the drawbacks of Rutherford's atomic model?
- iii) Explain the term negative catalysis.
- iv) What is enzyme catalysis? Explain its mechanism with example.
- v) What are quantum numbers? Give their significance.

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

- i) What is hydrogen bond? Discuss the inter and intra-hydrogen bonding with suitable example.
- ii) Explain the bonding and shape of NH_3 molecule on the basis of VSEPR theory.

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

- i) How many isotopes of hydrogen are known? Give their names and symbols.
- ii) Explain formation of O_2 molecule on the basis of the overlap of atomic orbitals.
- iii) Calculate the molarity of 200ml solution of KOH containing 2.8 grams of KOH (At. wts= k=39, o=16, H=1).

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

- i) Explain Pauling-Slater theory of covalent bond formation.
- ii) The molecular weight of a compound is 119.88 what will be the volume displaced by 0.140 g of the substance at 22°C and 750mm pressure (Aq. tension at 22°C =20mm)
- iii) Explain bonding and shape of SF_6 molecule.



Total No. of Questions :5]

SEAT No. :

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[Total No. of Pages :4

F.Y.B.Sc.

CHEMISTRY -II

Organic & Inorganic Chemistry

(2008 Pattern) (Old Course) (Paper - II) (Theory)

Time : 3 Hours]

[Max. Marks :80

Instructions to the candidates:

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

Q1) Answer the following questions:

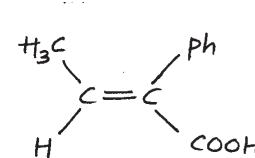
[16]

- a) Draw zig - zag structures of,
 - i) n-pentane
 - ii) Glycine
- b) Give unique properties of organic compounds.
- c) Branched alkane have lower B.P and M.P. than corresponding straight chain alkanes; Explain.
- d) Define the following terms:
 - i) Optical activity
 - ii) Enantiomer
- e) In benzene, all carbon - carbon bondlengths are identical; Explain.
- f) Draw the shape of S and P- orbitals.
- g) Define the following terms:
 - i) Oxidation
 - ii) Oxidising agent
- h) Draw the structures of following:
 - i) XeF_2
 - ii) XeO_3

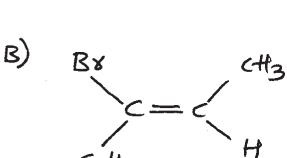
P.T.O.

- Q2) a)** Attempt any two of the following: [8]
- What is resonance effect? Explain +R and -R effect with suitable examples.
 - What are phenols? Discuss any two methods of preparation of phenols.
 - Draw the structures of conformation of n-butane by using Newman projection formula and explain their stability.
- b)** Attempt any two of the following: [8]
- What are alcohols? How are they classified? Discuss any two methods of preparation of ethanol.
 - What are aromatic compounds? Explain Huckel's rule of aromaticity with suitable examples.
 - What are alkanes? How will you prepare ethane from,
 - Ethene
 - Grignard reagent
- Q3) a)** Answer any two of the following: [8]
- What are ethers? How will you prepare ethyl methyl ether from,
 - Diazomethane
 - Ethyl bromide
 - What is hybridization? Discuss the formation of methane molecule using concept of hybridization.
 - Assign E and Z configuration of following compounds.

A)

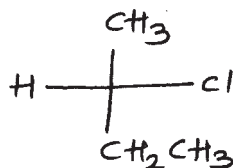


B)


 - What are alkenes? How will you prepare ethene from,
 - Ethyl bromide
 - Ethanol
- b)** Attempt any two of the following: [8]
- What is steric effect? Explain it with suitable examples.
 - What are alkyl halides? What is the action of ethyl magnesium bromide on following compounds.
 - Acetaldehyde
 - Acetone
 - Write short notes on
 - Hydrogen bonding
 - Homologous series

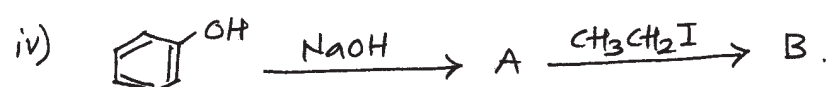
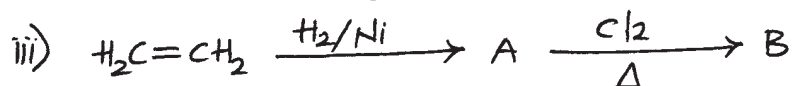
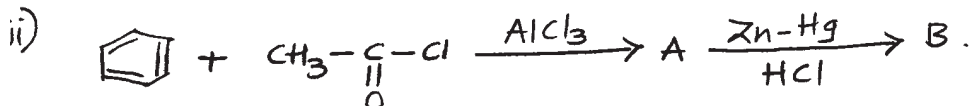
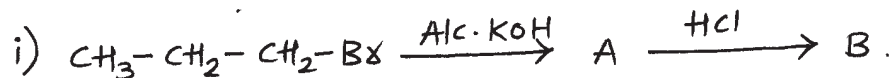
Q4) a) Attempt any three of the following: [6]

- i) Draw all possible isomers of the compound having molecular formula C_3H_6O .
- ii) Define the following terms:
 - 1) Bond length
 - 2) Specific rotation
- iii) Assign R or S configuration of the following compound.



- iv) Draw the structures of,
 - 1) 2, 3- dibromopentane
 - 2) 2, 2- dimethyl pentanol

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



c) Attempt any one of the following: [6]

- i) Draw the skelton of long form of a periodic table. Show the positions of following.
 - 1) S- block elements
 - 2) Noble gases
 - 3) Carbon
 - 4) Fluorine
- ii) Why and how lithium shows anomalous behaviour in alkali metals.

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

- i) Define ionization energy. Explain the trends of it across the periods and within the groups in the periodic table.
- ii) Give different applications of alkaline earth metals and their compounds.
- iii) What is shielding effect and shielding constant?

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

- i) Explain bonding and structure of XeO₄.
- ii) What are alkaline earth metals? Explain the trends in following properties of alkaline earth metals
 - 1) Atomic size
 - 2) Oxidation state
- iii) State the rules to find out oxidation number.

EEE

Total No. of Questions : 5]

SEAT No. :

[Total No. of Pages : 2

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[4817]-7

F.Y. B.Sc.

BOTANY

Plant Diversity

(2008 Pattern) (Paper-I) (Theory)

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

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

Q1) Attempt the following:

[16]

- a) What are annuals?
- b) What are algae?
- c) Define fungi.
- d) What are Lichens?
- e) Mention any two examples of Bryophytes.
- f) Mention any two divisions of Pteridophytes.
- g) Enlist the parts of a typical leaf.
- h) Mention types of leaves in Gymnosperms.

Q2) Attempt Any Four of the following:

[16]

- a) Give general characters of Phanerogams.
- b) Describe the thallus structure in Eumycetes.
- c) Give any four characters of Bryophytes.

P.T.O.

- d) Describe female gametophyte in Selaginella.
- e) Explain the affinities of Gymnosperms with Angiosperms.
- f) Describe the anatomy of root of Monocotyledons.

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

- a) The cell structure in Eumycotina.
- b) Crustose Lichen.
- c) Archegonium of Riccia.
- d) Sporophyte of Riccia.
- e) Bilabiate corolla.
- f) Syconus.

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

- a) Describe the sexual reproduction in Cystopus (Albugo).
- b) Describe the strobilus of Selaginella.
- c) Describe the structure of female cones in coniferales.
- d) Explain the concept of conservation of plant diversity and give its significance.

Q5) What are algae? Enlist photosynthetic pigments of algae. Add a note on life cycle patterns in Ulothrix. **[16]**

OR

What is inflorescence? Describe the various types of racemose inflorescence.



Total No. of Questions :5]

SEAT No. :

[Total No. of Pages :2

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[4817]-8

F.Y.B.Sc. (Theory)

BOTANY

Plant Resources - Management and Utilization

(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 indicate full marks.*

Q1) Attempt the following:

[16]

- a) Give the names of two medicinal plants.
- b) What is plant nursery?
- c) Define pomology.
- d) Enlist two physical methods of weed control.
- e) Give the types of social flower arrangement.
- f) Enlist the types of biocontrol.
- g) What is phyto remediation?
- h) Give any two examples of dye yielding plants.

Q2) Attempt any four of the following:

[16]

- a) Describe any two methods of seed treatment.
- b) Give the advantages of greenhouse technology.
- c) Describe sustainable uses of weeds.
- d) Explain any two methods of formal flower arrangement.
- e) Give the principles of phytoremediation.
- f) Give the sources and uses of paper.

P.T.O.

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

- a) Tannin
- b) Sucker
- c) Squash
- d) Sources of biocontrol
- e) Applications of bioprospecting
- f) Sources and uses of pigments

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

- a) What is cutting? Describe methods of stem cutting.
- b) Describe the types of greenhouse on the basis of its shape.
- c) Describe the sources and uses of Trichoderma.
- d) Explain sea weeds as a potential resources of fertilizer.

Q5) What is post harvest technology? Describe the post harvest technology for fruits. **[16]**

OR

Give the botanical name, part used and uses of Turmeric and Rose.

EEE

Total No. of Questions : 6]

SEAT No. :

[Total No. of Pages : 3

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[4817]-9

F.Y. B.Sc.

ZOOLOGY

ZY - 101 : Non-Chordates and Chordates

(2008 Pattern) (Paper-I) (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) Bioluminescence.
- b) Vermiculture.
- c) Polyp.
- d) Spicules.
- e) Binary fission.
- f) Family.
- g) Nomenclature.
- h) Food vacuoles.
- i) Species.
- j) Physiology.
- k) Entomology.
- l) Coral reefs.

P.T.O.

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

- a) Contractile vacuoles in Paramecium.
- b) General characters of opalina.
- c) Batesian mimicry.
- d) Distinguishing characters of Demospongia.
- e) General characters of Arthropoda.

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

- a) Give general character of protista.
- b) Mention the general characters of polychaeta.
- c) Describe the process of pearl formation in mollusca.

OR

Mention the distinguishing characters and classification of phylum platyhelminthes. Give the characteristics of each class with suitable examples.

[15]

SECTION-II

(Chordates)

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

- a) Cephalochordata.
- b) Fin soup.
- c) Alimentary migration of fish.
- d) Agnatha.

- e) Marsupial mammals.
- f) Hibernation.
- g) Fish glue.
- h) Nuptial pad.
- i) Sexual dimorphism.
- j) Membranous labyrinth.
- k) Croaking sound.
- l) Photoreceptors.

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

- a) Distinctive features of vertebrates.
- b) General organization of cyclostomata.
- c) Anadromous migration of fishes.
- d) Aerial adaptations in birds.
- e) Spiny ant eater (Echidna).

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

- a) Describe the diversity of placental mammals in terrestrial habitat.
- b) Give an account of urochordata.
- c) Sketch and label the 'Internal structure of frog heart'.

OR

Describe the central nervous system of frog. **[15]**

