Total No. of Questions : 4]

SEAT No. :

P506

[Total No. of Pages : 2

[4817]-301
T.Y. B.Sc.
MATHEMATICS
MT-331:Set Theory and Logic
(2008 Pattern) (Semester-III) (Paper-I) (Old Course)

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

Instructions to the candidates:

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

Q1) Attempt any FIVE of the following: **[10]**

a) State the intuitive principle of abstraction for sets.

b) If $A \subseteq B$, show that $\overline{B} \subseteq \overline{A}$.($\overline{A}$ and $\overline{B}$ denote complements of A and B respectively).

c) Show that the set of all even integers is denumerable.

d) Define: i) binding variable in quantified statement.

ii) Free variable in quantified statement.

e) For a function f: $A \to B$ and subsets C,D of A, is it true that $f(C \cap D) = f(C) \cap f(D)$? Justify your answer.

f) Write the negations of the following statements.

i) $\forall x \exists y\ (x * y = e)$

ii) $\exists e \forall x\ (x * e = x)$

Where the universe of discourse for all variables consist of all elements of a non-empty set G and $*$ denotes a binary operation on G.

g) Write the converse and contra positive of the statement, "If n is a perfect square, then $n+10$ is a perfect square".

P.T.O.

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

a) Show that $\forall x(P(x) \wedge Q(x))$ and $\forall x P(x) \wedge \forall x Q(x)$ are logically equivalent.

b) Prove that the composition of functions is an associative operation.

c) Translate the following sentence into a logical expression.
"You can access the internet from campus only if you are a computer science major or you are not a freshman".

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

a) Let $\sim$ be an equivalence relation on set X. Show that the equivalence class of x is equal to the equivalence class of y if and only if $x \sim y$.

b) Show without using truth tables that $(p \wedge q) \rightarrow (p \vee q)$ is a tautology.

c) Define order pair $<x,y>$ of elements x and y. Show that if $<x,y>=<u,v>$, then $x=u$ and $y=v$.

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

a) i) Show that the set Q of rationals is denumerable.

ii) State any two rules of inference. Give an indirect proof of "If n^2 is an odd integer, then n is an odd integer".

b) i) Show that $A \cap B=A$ if and only if $A \cup B=B$.

ii) Give a non-constructive existence proof of the fact that there are irrationals x and y such that x^y is rational.

Total No. of Questions : 4]

SEAT No. :

P507

[Total No. of Pages : 3

[4817]-302
T.Y. B.Sc.
MATHEMATICS
MT - 332 : Real Analysis
(2008 Pattern) (Semester - III) (Paper - II) (Old Course)

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

Instructions to the candidates:

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

Q1) Attempt any five of the following: **[10]**

a) Find the limit superior and the limit inferior of the sequence
1, 2, 3, 1, 2, 3, 1, 2, 3, ...

b) True or False : $\sum_{n=1}^{\infty}\frac{1-n}{1+3n}$ is divergent. Justify.

c) Let $f(x)=x^2$. Let $\sigma=\left\{0,\frac{1}{3},\frac{2}{3},1\right\}$ be a subdivision on [0, 1]. Compute $U[f,\ \sigma]$.

d) Evaluate the following limit

$$\lim_{n\to\infty}\frac{1}{n}\left[\left(\frac{1}{n}\right)^2+\left(\frac{2}{n}\right)^2+....+\left(\frac{n}{n}\right)^2\right]$$

e) Let $f_n(x)=\frac{x^n}{n}\left(0\le x\le 1\right)$. Show that $\{f_n\}_{n=1}^{\infty}$ converges uniformly to 0 on [0, 1].

f) Show that the characteristic function of a set $E\subset$ [0, 1] such that [0, 1]– E and E are both dense in [0, 1] is not Reimann Integrable.

g) Prove that the integral $\int_1^{\infty}\frac{1}{x^2}dx$ converges.

P.T.O.

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

a) If $\{S_n\}_{n=1}^{\infty}$ is a sequence of real numbers and if $\lim_{n\to\infty}\sup S_n = \lim_{n\to\infty}\inf S_n = L$, where $L \in \mathbb{R}$ then prove that $\{S_n\}_{n=1}^{\infty}$ is convergent and $\lim_{n\to\infty} S_n = L$.

b) If $\sum_{n=1}^{\infty} a_n$ is dominated by $\sum_{n=1}^{\infty} b_n$ where $\sum_{n=1}^{\infty} b_n$ converges absolutely then prove that $\sum_{n=1}^{\infty} a_n$ also converges absolutely.

c) Show that if $|x| < 1$ then $\sum_{n=1}^{\infty} n^{10,000} x^n$ converges absolutely.

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

a) Let f be a bounded function on $[a, b]$ and let σ and τ are any two subdivisions of $[a, b]$ then prove that $U[f;\sigma] \geq L[f;\tau]$.

b) If $f \in R[a, b]$ and $a < c < b$ then prove that $f \in R[a, c]$, $f \in R[c, b]$ and $\int_a^b f = \int_a^c f + \int_c^b f$.

c) Show that $\int_0^{\infty} \frac{x}{(1+x)^3}\,dx = \frac{1}{2}\int_0^{\infty} \frac{1}{(1+x)^2}\,dx$.

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

a) i) Let $\{f_n\}_{n=1}^{\infty}$ be a sequence of functions in $R[a, b]$ which converges uniformly to the function f on $[a, b]$ then prove that $f \in R$ $[a, b]$ and $\lim_{n\to\infty} \int_a^b f_n(x)\,dx = \int_a^b f(x)\,dx$.

ii) Let $f_n(x) = nx\,(1 - x^2)^n$ $(0 \leq x \leq 1)$. Show that $\{f_n\}_{n=1}^{\infty}$ does not converge uniformly on $[0, 1]$, even though $\{f_n\}_{n=1}^{\infty}$ converges pointwise.

b) i) State and prove Weierstrass M-test.

ii) Let f be a uniformly continuous real valued function on $(-\infty,\infty)$, and for each $n \in \mathrm{I}$ let

$$f_n(x) = f\left(x + \frac{1}{n}\right) \quad (-\infty < x < \infty)$$

Prove that $\{f_n\}_{n=1}^{\infty}$ converges uniformly on $(-\infty,\infty)$ to f.

Total No. of Questions : 4]

SEAT No. :

P508

[Total No. of Pages : 3

[4817]-303
T.Y.B.Sc.
MATHEMATICS
MT-333: Problem Course Based on MT-331 and MT-332
(Old Course) (2008 Pattern) (Semester-III)(Paper-III)

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

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Answer to the two sections should be written in separate answer books.***
4) ***Tie answer books of both sections together.***

SECTION-I

(Set Theory and Logic)

Q1)a) Attempt any THREE of the following. **[6]**

i) Translate into English the statement

$$\forall x \forall y\big((x>0)\cap(y<0)\rightarrow(xy<0)\big),$$

where the universe of discourse for both variables consists of all real numbers.

ii) Define cardinal number and find cardinal number of the Set $\{x \,/\, x=3n-1, n\in\mathbb{Z}+, 1\le n<2^{100}\}$

iii) Determine $\phi\cap\{\phi\}$ and $\{\phi,\{\phi\}\}-\{\phi\}$.

iv) Express the associative and commutative laws of addition of real numbers using quantifiers.

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

i) Show that *a)* $y^{\phi}=\{\phi\}$ *b)* $\phi^{x}=\phi$ *if* $X\neq\phi$

ii) Without using truth tables, show that $\neg\big(p\vee(\neg p\wedge q)\big)\equiv\neg p\wedge\neg q$

P.T.O.

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

a) Use a proof by cases to show that $|xy| = |x||y|$,

where x and y are real numbers.

b) Define a countable set. Show that if the domain of a function is countable, then its range is also countable.

c) Let $\{A_i / i \in I\}$ be the family of subsets of U.

Show that

i) $U - \bigcup_{i \in I} A_i = \bigcap_{i \in I} (U - A_i)$

ii) $U - \bigcap_{i \in I} A_i = \bigcup_{i \in I} (U - A_i)$

SECTION-II

(Real Analysis)

Q3) a) Attempt any three of the following. **[6]**

i) Discuss the convergence of the series $\sum_{n=0}^{\infty} \frac{x^n}{n}$

ii) Let χ_n be the characteristic function of the open interval $\left(0, \frac{1}{n}\right)$ and let $f_n(x) = n\,\chi_n(x)$ where $0 \le x \le 1$. Show that $\{f_n\}_{n=1}^{\infty}$ converges to 0 on [0,1].

iii) If $f(x) = \int_0^x \sqrt{t + t^6}\, dt \ (x > 0)$, find $f'(2)$

iv) Show taht $\sum_{n=1}^{\infty} \frac{1}{n^3 + x^3} \ (0 \le x \le \infty)$ is uniformly convergent

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

i) show that $\int_1^{\infty} \frac{x^{\frac{1}{2}}}{(1+x)^2}\, dx = \frac{1}{2} + \frac{\pi}{4}$

ii) Let $f_n(x) = \frac{x}{n} e^{\frac{-x}{n}}$. Does $\{f_n\}_{n=1}^{\infty}$ converge uniformly to 0 on [0,500]

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

a) Test the convergence of the series $\sum_{n=1}^{\infty} \frac{1}{(\log n)^n}$

b) If f and g are continuous on $[a,b]$ and

If g (t) ≥ 0 $(a \leq t \leq b)$ prove that there exist $c \in (a,b)$ such that

$\int_a^b f(x)g(x)dx = f(c)\int_a^b g(x)\,dx$

c) Let $\{f_n\}_{n=1}^{\infty}$ be a sequence of continuous functions on [0,1] that converges uniformly. Show that there exist M>0 such that

$|f_n(x)| \leq M (n \in I\,; 0 \leq x \leq 1).$

Total No. of Questions : 4]

SEAT No. :

P509

[Total No. of Pages : 2

[4817]-304
T.Y. B.Sc.
MATHEMATICS
MT - 334 : Group Theory
(2008 Pattern) (Semester - III) (Paper - IV) (Old Course)

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

Instructions to the candidates:

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

Q1) Attempt any five of the following: **[10]**

a) State whether the following statement is true or false. Justify.
"Every abelian group is cyclic".

b) Show that if $G=\mathbb{Z}$ with operation $a \cdot b = a - b$ then G is not a group.

c) Show that union of subgroups need not be a subgroup.

d) If $a \in G$ and $a^m = e$, prove that $O(a) | m$.

e) Prove that every subgroup of a cyclic group is normal.

f) Suppose G is a group of nonzero real numbers under usual multiplication and $\phi : G \to G$ is a map given by $\phi(x) = 2^x$. Is ϕ a homomorphism? Justify.

g) Compute $a^{-1} ba$, where $a = (1, 3, 5)(1, 2)$ and $b = (1, 5, 7, 9)$.

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

a) Prove that a nonempty subset H of the group G is a subgroup if and only if

i) $a, b \in H$ implies that $a \cdot b \in H$ and

ii) $a \in H$ implies that $a^{-1} \in H$.

b) Let G be a group and H and K be subgroups of G. Then show that HK is a subgroup of G if and only if HK = KH.

c) Let G be the set of all real 2×2 real matrices $\begin{pmatrix} a & b \\ 0 & d \end{pmatrix}$ with $ad \neq 0$. Prove that G forms a group under Matrix Multiplication.

P.T.O.

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

a) Show that a subgroup N of group G is a normal subgroup if and only if the product of two right cosets of N in G is again a right coset of N in G.

b) If G and $\overline{G}$ are groups with identities e and $\overline{e}$ respectively and ϕ is a homomorphism of G into $\overline{G}$, then prove that

i) $\phi(e) = \overline{e}$ and

ii) $\phi(x^{-1}) = \phi(x)^{-1}$ for all $x \in G$.

c) Define center of a group and prove that center of a group is always a normal subgroup.

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

a) i) If G is a group, then prove that the set of automorphisms of G, A(G) is also a group under composition of functions. **[6]**

ii) Let G be a group and H be a subgroup of G. If T is an automorphism of G, then prove that T(H) = $\{T(h) \mid h \in H\}$ is a subgroup of G. **[4]**

b) State and prove Cayley's theorem. **[10]**

Total No. of Questions : 4]

SEAT No. :

P510

[Total No. of Pages : 2

[4817]-305
T. Y. B.Sc
MATHEMATICS
MT-335: Ordinary Differential Equations
(Paper-V) (2008 Pattern)(Old Course)(Semester-III)

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

Instructions to the candidates:

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

Q1) Attempt any five of the following **[10]**

a) Solve the differential equation

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

b) Find an integrating factor of the differential equation $x^2ydx-(x^3+y^3)dy=0$.

c) Find the family of orthogonal frajectories to the curves $x+y=c$.

d) Solve the differential equation

$$y''-4y'+4y=0.$$

e) Show that the series $y=1+\frac{x}{1!}+\frac{x^2}{2!}+\frac{x^3}{3!}+.....$ satisfies the differential equation $y'-y=0$.

f) Find the singular point of differential equation $(1-x^2)y''-2xy'+p(p+1)y=0$ verify that O is an ordinary point.

g) Show that $x=2e^{4t}, y=3e^{4t}$ & $x=e^{-t}, y=-e^{-t}$ are solution of the homogenous system $\frac{dx}{dt}=x+2y, \frac{dy}{dt}=3x+2y$.

P.T.O.

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

a) Prove that the necessary and sufficient condition for the differential equation M*dx*+N*dy=0 to be* exact is that $\frac{\partial M}{\partial y} = \frac{\partial N}{\partial x}$.

b) Solve the differential equation $(xy - 1)\, dx + (x^2 - xy)\, dy = 0$.

c) Solve the differential equation $(x + y)\, dx - (x - y)\, dy = 0$.

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

a) Explain the method of undetermined coefficients to solve the differential equation.

b) Solve the differential equation $y'' + y = \text{cosec}\, x$, by using method of variation of parameters.

c) Verify that $y_1 = x^2$ is one solution of $x^2 y'' + xy' - 4y = 0$ then find y_2 and general solution.

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

a) i) Explain the method to solve homogenous system of differential equation with contant coefficients for real and distinct roots.

ii) Find the general solutions of the system $\frac{dx}{dt} = x + y, \frac{dy}{dt} = 4x - 2y$.

b) Find the power series solution of the differential equation.

$y'' + y = 0$.

Total No. of Questions : 4]

SEAT No. :

P511

[Total No. of Pages : 2

[4817]-306
T.Y. B.Sc.
MATHEMATICS
MT-336:Problem Course Based on MT-334 and MT-335
(2008 Pattern) (Semester-III) (Paper-VI) (Old Course)

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

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Answers to the two sections should be written in separate answer books.***
4) ***Tie answer books of both sections together.***

SECTION-I
(Group Theory)

Q1) Attempt the following:

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

i) State whether the following statement is true or false and justify: "If G is any group of order 10, then G may have an element of order 6."

ii) Write all the right cosets of H in G, where G=(a) is a cyclic group of order 10 and H= (a^2) is a subgroup of G generated by a^2.

iii) Are the groups ($\mathbb{R}$,+) and ($\mathbb{Q}$, +) isomorphic? Justify.

iv) Show that if G is an abelian group and N is a normal subgroup of G then the group G/N is an abelian group.

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

i) If G is a group and H is a subgroup of index 2 in G, prove that H is a normal subgroup of G.

ii) Let G be a group. Consider the mappings of G into itself λ_g defined for g$\in$ G by $\lambda_g(x) = gx$ for all $x \in G$. Prove that λ_g is one-one and onto and that $\lambda_{gh} = \lambda_h \cdot \lambda_g$

P.T.O.

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

a) Suppose M and N are two normal subgroups of G and that $N \cap M$ =(e). Show that for any $n \in N, m \in M, nm = mn$.

b) If G is a group in which $(ab)^i = a^i \cdot b^i$ for three consecutive integers i for all $a, b \in G$, show that G is abelian.

c) Prove that the group of all even permutations A_n is a subgroup of S_n. Also, prove that $o(A_n) = \frac{n!}{2}$.

SECTION-II

(Ordinary Differential Equations)

Q3) a) Attempt <u>any three</u> of the following: **[6]**

i) Solve the differential equation $y'' - 5y' + 6y = 0$.

ii) Verify that $y = c_1 e^{2x} + c_2 e^{-2x}$ is a solution of $y'' - 4y = 0$

iii) Show that the series $y = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} +$------ satisfies $y'' + y = 0$.

iv) Solve the differential equation $y''+8y=0$

b) Attempt <u>any one</u> of the following: **[4]**

i) Find orthogonal trajectories to the curves $y=cx^2$, where c is a parameter.

ii) Solve the differential equation $\frac{dy}{dx} + \frac{y}{x} = x^2$, given that $y=1$ when $x=1$.

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

a) Solve the differential equation $(D^2 + 3D + 2)y = x^2$ by the method of undetermined coefficients.

b) Solve the system of differential equation $\frac{dx}{dt} = -3x + 4y$, $\frac{dy}{dt} = -2x + 3y$.

c) Find the power series solution of the differential equation $y' - y = 2$.

Total No. of Questions :4]

SEAT No. :

P512

[Total No. of Pages :4

[4817]-307
T.Y.B.Sc.
MATHEMATICS
MT-337 (A): Operations Research
(2008 Pattern) (Paper - VII & VIII) (Semester - III) (Elective -I)

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

Instructions to the candidates:

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

Q1) Attempt any five of the following: **[10]**

a) Give an example of a LPP which have un bounded solution.

b) Convert following A.P. into LPP form.

6	10
12	9

c) Define slack & surplus variable of a LPP.

d) Find IBFS of the following TP by NWC method

5	1	8	12
2	4	0	14
3	6	7	4
9	10	11	

e) Find one basic feasible solution of the following LPP.

Maximize $Z = x_1 + x_2$

Subject to $x_1 + x_2 \leq 5$

$x_1 - x_2 \leq 1$

$x_1, x_2 \geq 0$

P.T.O.

f) Write the dual of the following LPP

Maximize $Z = 5x_1 + 6x_2$

Subject to $x_1 + 2x_2 = 5$

$-x_1 + 5x_2 \geq 3$

$4x_1 + 7x_2 \leq 8$

$x_1, x_2 \geq 0.$

g) True or false

i) Every LPP has an optimum solution.

ii) A.P. is particular case of T.P.

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

a) A trucking firm has received on order to move 3,000 tonns of industrial material to a destination 1,000 km away. The firm has available at the momenta Fleet of 150 class - A 15 - tonne trailer trucks & another Fleet of 100 class - B 10- tonne trailer trucks. The operating cost of these trucks are Rs- 3 & Rs - 4 per tonne per km, Respectively. Based on past experience the firm has a policy of retaining at least one class-A truck with every two class-B trucks in reverse. It is desired to know how many of these two classes of vehicles should be despatched to move the material at minimal operating costs. Formulate this problem as an LP model.

b) Solve the following LPP by Graphical method.

Maximize $Z = 30x_1 + 20x_2$

Subject to $2x_1 + x_2 \leq 9$

$x_1 + 3x_2 \leq 8$

$x_1, x_2 \geq 0.$

c) Solve the following LPP by simplex method.

Maximize $Z = 2x_1 + 4x_2$

Subject to $x_1 + 2x_2 \leq 5$

$x_1 + x_2 \leq 4$

$x_1, x_2 \geq 0.$

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

a) Find Initial basic feasible solution of the following transportation problem by VAM method.

	1	2	3	4	
1	10	2	20	11	15
2	12	7	9	20	25
3	4	14	16	18	10
	5	15	15	15	

b) Solve the following A.P.

	Operator			
	I	II	III	IV
A	10	5	13	15
B	3	9	18	3
C	10	7	3	2
D	5	11	9	7

c) A project work consist of three major jobs for which on equal number of contractors have submitted tenders. The tenders amount quoted (in lacks) is given in the matrix.

		Job		
		I	II	III
Contractor	A	42	35	28
	B	30	25	20
	C	30	25	20

Find the assignment which maximize the total cost of the project. When each contractor has to be assigned at least one job.

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

a) Solve the following LPP by simplex method.

Maximize $Z = 3x_1 + 2x_2$

Subject to $2x_1 + x_2 \leq 2$

$3x_1 + 4x_2 \geq 12$

$x_1, x_2 \geq 0.$

b) Find the optimal solution of the following T.P.

	1	2	3	4	Supply
1	10	2	20	11	15
2	12	7	9	20	25
3	4	14	16	18	10
Demand	5	15	15	15	

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Total No. of Questions : 4]

SEAT No. :

P513

[Total No. of Pages : 2

[4817]-308
T.Y. B.Sc.
MATHEMATICS
MT-337(B):Lattice Theory
(2008 Pattern) (Semester-III) (Paper-VII) (Old Course)

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

Instructions to the candidates:

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

Q1) Attempt any five of the following: **[10]**

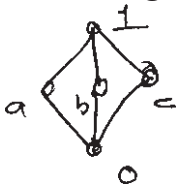
a) Draw the diagram of the product.

b) Let $\sum^{**}$ be a ordered set of all finite or infinite binary strings. For each $u \in \sum^{**}$, describe the set of elements covering u.

c) Give an example of modular lattice.

d) Write all ideals of a lattice of positive factors of 16 under divisibility.

e) Show that following lattice is non-distributive.



f) Prove or disprove: Every chain is a lattice.

g) In a Boolean algebra B, show that $(a')' = a, \forall a \in B$.

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

a) Draw the diagram of positive factors of 20 under divisibility. Show that it is same as the product of two chains with two and three elements.

b) Prove that every ideal is a sublattice. Is the converse true? Justify.

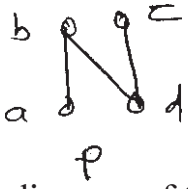
c) State and prove Knaster-Tarski fix point theorem.

P.T.O.

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

a) If M and N are distributive lattices then prove that M×N is distributive.

b) Write the family of all down sets of the ordered set P.



Also draw the diagram of O(p).

c) Show that a lattice of length 2 is modular.

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

a) i) In a Boolean algebra B, prove that $(a \vee b)' = a' \wedge b'$, for all $a, b \in$ B.

ii) Express the function $f = (a \wedge b) \vee (a \wedge c) \vee (b' \wedge c)$ in the disjunctive normal form.

b) i) Show that every chain is distributive lattice.

ii) Prove that homomorphic image of modular lattice is modular.

Total No. of Questions : 4]

SEAT No. :

P514

[Total No. of Pages : 2

[4817]-309
T.Y.B.Sc.
MATHEMATICS
MT-337(C): 'C' Programming-I
(Paper-VII & VIII) (2008 Pattern) (Old Course)(Semester-III)(Elective-I)

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

Instructions to the candidates:

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

Q1) Attempt any FIVE of the following. **[10]**

a) Determine which of the following are valid character constants? Justify.

i) '\023' ii) "a"

b) What is the difference between 23 and "23"?

c) Determine which of the following are valid identifiers. If invalid Explain.

i) 2nd ii) include

d) Find the value of the following expression:

2*3/4*5-3%4*2.

e) Explain the meaning of the following declaration.

int f (int a , float b);

f) Declare a function foo that accepts two integer arguments and returns a double.

g) Determine which of the following are valid integer constants: OXABC, 1234E+02

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

a) Write a note on while loop.

b) Write a note on switch statement.

c) Define a function to find lcm of two integers.

P.T.O.

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

a) Explain the use of scanf function.

b) Write a program to reverse a string.

c) Write a note on one-dimensional array.

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

a) i) Write a program to find sum of digits of a given number.

ii) Describe the use of continue statement.

b) i) Write a program to find binomial coefficient $\binom{n}{r}$.

ii) Describe the use of break statement.

◀▶◀▶◀▶

Total No. of Questions :4]

SEAT No. :

P515

[Total No. of Pages :2

[4817]-310
T.Y.B.Sc.
MATHEMATICS (Elective - I)
MT-337 (D): Differential Geometry
(2008 Pattern) (Old Course) (Paper - VII) (Semester - III)

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

Instructions to the candidates:

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

Q1) Attempt any five of the following: **[10]**

a) Find the tangent vector to the curve $r(t) = (e^t, t^2)$.

b) Show that the curve $r(t) = \left(\frac{4}{5}\cos t, 1-\sin t, \frac{-3}{5}\cos t\right)$ is of unit speed.

c) Show that the curve $r(t) = \left(\frac{1+t^2}{t}, t+1, \frac{1-t}{t}\right)$ is planar.

d) Find the first fundamental form of the surface $\sigma(u, v) = (\cos hu, \sin hu, v)$.

e) Show that every isometry is a confirmal map.

f) State any two properties of a developable surface.

g) Define ruled surface.

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

a) Find the curvature and torsion of the helix

$x = a \cos u$, $y = a \sin u$, $z = a\, u \tan\alpha$.

b) Show that an open disc in x - y plance is a surface.

c) Let $\sigma : U \to \mathbb{R}^3$ be a patch of a surface S containing a point P of S, and let (u, v) be coordinates in U. The tangent space to S at P is the vector subspace of $\mathbb{R}^3$ spanned by the vectors σ_u and σ_v evaluated at P.

P.T.O.

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

a) Show that the area of a surface patch is unchanged by reparametrisation.

b) Show that Möbius band is not orientable.

c) By applying the isoperimetric inequality to the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$, prove that $\int_0^{2\pi}\sqrt{a^2\sin^2 t+b^2\cos^2 t}\ dt \geq 2\pi\sqrt{ab}$.

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

a) i) State and prove Meusnier's theorem.

ii) Verify Frenet-Serret equations for the curve

$$r(t)=\left(\frac{1}{3}(1+t)^{3/2},\frac{1}{3}(1-t)^{3/2},\frac{t}{\sqrt{2}}\right).$$

b) i) Define 'Bertrand curve' and show that the angle between corresponding tangent lines to two Bertrand curves is a constant.

ii) Find the equation to the developable surface which has $x = 6t$, $y = 3t^2$, $z = 2t^3$ as its edge of regression.

EEE

Total No. of Questions : 4]

SEAT No. :

P516

[Total No. of Pages : 2

[4817]-311
T.Y. B.Sc.
MATHEMATICS
MT-337-E: Combinatorics (Ele-I)
(2008 Pattern) (Semester-III) (Paper-VII and VIII) (Old)

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

Instructions to the candidates:

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

Q1) Attempt any five of the following: **[10]**

a) Let $n \geq 2$, How many functions are there from $\{1,2,3,.....n\}$ to $\{1,2\}$?

b) Solve the recurrence relation $a_n = 2a_{n-1}, a_0 = 6$.

c) How many nonnegative integer solutions to the equation $x_1 + x_2 + x_3 + x_4 + x_5 = 28$

d) Determine the number of positive integers that are factors of 300.

e) Find the number of ways to distribute 4 identical balls among three children.

f) Find the number of distinct arrangements of letters in "MISSICIPPI".

g) How many ways are there to seat 5 different boys and 5 different girls around a circular table with 10 seats, if boys and girls alternate seats?

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

a) Show by a combinatorial argument $\binom{n}{r} = \binom{n-1}{r} + \binom{n-1}{r-1}$.

b) Find the coefficient of x^5 in the expansion of $\left(1 + 3x + 2x^2\right)^4$.

c) Solve the recurrence relation $a_n - 2a_{n-1} - 8a_{n-2} = 0,\ a_0 = 1,\ a_1 = 2$.

P.T.O.

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

a) How many integers are there from 1 to 10000 which are niether divisible by 4 nor by 7?

b) Suppose X is set of first 2n positive integers and S is any subset of X with n+1 elements. Show that S contains 2 integers such that one is divisible by the other.

c) How many arrangements are there of TAMELY with either T before A or A before M or M before E?

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

a) i) How many integer solution to the equation

$$x_1 + x_2 + x_3 + x_4 = 30,\ 0 \le x_i \le 10\ \ \forall\ i = 1,2,3,4$$

ii) Find the general solution of the recurrence relation.

$$a_n - 5a_{n-1} + 6a_{n-2} = 2 + 3n$$

b) i) How many ways are there to pick 4 cards from a standard 52 card deck such that atmost one card is heart and no card is king?

ii) Give a combinatorial argument to show that

$$n^3 = \binom{n}{1} + 6\binom{n}{2} + 6\binom{n}{3}$$

Total No. of Questions : 4]

SEAT No. :

P517

[Total No. of Pages : 2

[4817]-312
T.Y. B.Sc.
MATHEMATICS
MT-337:Elective F: Number Theory
(2008 Pattern) (Semester-III) (Paper-VII) (Old Course)

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

Instructions to the candidates:

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

Q1) Attempt any five of the following: **[10]**

a) Write two reduced residue system modulo 12.

b) If x is real number and m is positive integer, then prove that $\left[\frac{[x]}{m}\right]=\left[\frac{x}{m}\right]$

c) If a,b are integers such that $(a,b)=1$, then show that $(a+b,\ a-b)=1$ or 2.

d) Find the last digit in the ordinary decimal representation of 3^{60}.

e) Find $d(12),\sigma(12)$.

f) Prove that $n^{13}-n$ is divisible by 7, for any integer n.

g) Find the value of $\left(\frac{20}{17}\right)$.

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

a) If $p=2^m-1$ is a prime, then prove that m is a prime.

b) Find all integers that give remainder 1,3,3. When divided by 3,4 and 5 respectively.

c) State and prove Wilson's theorem.

P.T.O.

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

a) If p and q are distinct odd primes then show that $\left(\frac{p}{q}\right)\left(\frac{q}{p}\right)=(-1)^{\left\{\frac{p-1}{2}\right\}\left\{\frac{q-1}{2}\right\}}$

b) Find the highest power of 7 that divides 1000!.

c) Find the positive integer solutions of $7x+19y=213$.

Q4) Attempt <u>any one</u> of the following. **[10]**

a) i) For any positive integer m, prove that $(ma,mb)=m(a,b)$.

ii) Let p be an odd prime, prove that if there exist an integer x such that $p \mid x^2+2$ then $p \equiv$ 1 or 3 (mod 8).

b) i) If x,y,z is a primitive pythagorean triple then prove that one of the integers x and y is even while the other is odd.

ii) Prove that an integer is divisible by 3 if and only if the sum of its digits is divisible by3

Total No. of Questions : 4]

SEAT No. :

P518

[Total No. of Pages : 2

[4817]-313
T.Y. B.Sc.
PHYSICS
PH-331:Mathematical Methods in Physics
(2008 Pattern) (Semester-III) (Paper-I)

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

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Use of log-table & calculator is allowed.***

Q1) Attempt all of the following (one mark each) **[10]**

a) Define proper length.

b) What is frame of reference?

c) State any two frequently occurring differential equations.

d) State degree & order of differential equation $\left(\frac{dy}{dx}\right)^2 + 2x\frac{dy}{dx} - y = 0$.

e) State generating function of Bessel's function.

f) Rodrigue's formula for Legendre polynomial is $P_n(x) = \frac{1}{2^n n!}\frac{d^n}{dx^n}(x^2-1)^n$. Find $P_2(x)$.

g) State relations bet^n cartesian & cylindrical co-ordinate systems.

h) State expression for $\nabla\psi$ in spherical-polar co-ordinate system.

i) State relativistic Doppler effect.

j) State Fuch's theorem.

P.T.O.

Q2) Attempt any Two of the following.(5 Marks each) **[10]**

a) $x = r\sin\theta\cos\phi, y = r\sin\theta\sin\phi, z = r\cos\theta$ & $\bar{r} = x\hat{i} + y\hat{j} + z\hat{k}$,then find $\frac{\partial\vec{r}}{\partial r}$ & $\frac{\partial\vec{r}}{\partial\theta}$. Verify mutual orthogonality of it.

b) Express $f(x) = 4x^3 + 6x^2 + 7x + 2$ in terms of Legendre polynomials.

c) Show that $x = \infty$ is regular singular point of $(1-x^2)y'' - 2xy' + l(l+1)y = 0$.

Q3) Attempt any two of the following: (5 Marks each) **[10]**

a) Separate the variables of $\frac{\partial^2\psi}{\partial x^2} + \frac{\partial^2\psi}{\partial y^2} = 0$.

b) The density of substance is ρ in the S frame in which it is at rest. Find ρ' in S' frame moving with speed to S of V. Gold has density 19.3 g/ cm^3, when sample is at rest relative to observer. Determine density when relative velocity is 0.9 time speed of light.

c) If $J_{n-1}(x) = \frac{n}{x}J_n(x) + J_n'(x)$, then prove that $\frac{d}{dx}[x^n J_n(x)] = x^n J_{n-1}(x)$.

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

i) Obtain power series solution of $y'' + w^2 y = 0$ about x=0.

ii) Show that $x^2 + y^2 + z^2 = c^2t^2$ is invariant under Lorentz transformation.

b) Attempt any one of the following. **[2]**

i) If $\hat{e}_\rho = \hat{i}\cos\phi + \hat{j}\sin\phi$ and $e_\phi = -i\sin\phi + \hat{j}\cos\phi$, then show that $\frac{d}{dt}(\hat{e}_\rho) = \dot{\phi}\hat{e}_\phi$.

ii) State expression for ∇^2 in orthogonal curvilinear co-ordinate system.

Total No. of Questions : 4]

SEAT No. :

P519

[Total No. of Pages : 2

[4817]-314
T.Y. B.Sc.
PHYSICS
PH - 332 : Classical Electrodynamics
(2008 Pattern) (Semester - III) (Paper - II)

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

Instructions to the candidates:

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

Q1) Attempt All of the following (one mark each): **[10]**

a) Define volume charge density - Give its SI unit.

b) What is non-polar molecule?

c) State Ampere's circuital law.

d) Define magnetic Susceptibility.

e) What do you mean by hysteresis.

f) Write the relation between $\vec{B}, \vec{H}$ and $\vec{M}$.

g) Define current density. Give its SI unit.

h) Define poynting vector. Give its SI unit.

i) What is meant by linear polarization.

j) Find electric potential at a distance of 10 cm from charge 1.6×10^{-12}C.

(Given : $\frac{1}{4\pi\in 0} = 9 \times 10^9$ SI unit).

P.T.O.

Q2) Attempt any TWO (Five marks each): **[10]**

a) What is meant by electric susceptibility? Show that K = $1 + x_a^e$.

b) State Ampere's Force law. Show that the force between two current loops due to their magnitude interaction are equal in magnitude and opposite in direction.

c) Write maxwell's equations in integral form. Give physical significance of these equations.

Q3) Attempt any TWO (Five marks each): **[10]**

a) Three charges q, $-2q$ and $4q$ are placed at the corners of an equilateral triangle having length of each side one meter. Compute the potential energy of the structure. (Given : $q = 1 \times 10^{-6}$ C).

b) Two spheres of charges +20 and +80 coulomb are placed 18 cm apart. Find the position of the point between them where the intensity is zero.

c) A circular loop of radius 10 cm is located in XY plane in $\vec{B}$ field given by $\vec{B} = (0.5 \cos 377t)\left(3\hat{a}_y + 4\hat{a}_z\right)$. Determine the voltage induced in the loop.

Q4) a) Attempt any ONE (Eight marks): **[8]**

i) Draw and explain Hysteresis loop. Define the terms remanence and coercivity. Also show that $\mu_r = 1 + x_a m$.

ii) State and prove poynting theorem.

b) Attempt any ONE (Two marks): **[2]**

i) Find the magnitudes of $\vec{D}$ for a dielectric material in which E = 0.40×10^6 V/m and K = 5.

(Given : $\in_0 = 8.85 \times 10^{-12}$ c^2/Nm^2).

ii) Find the loss of energy per hour of a frequency of 25 cycles per second. If the energy dissipated in iron per cycle is 3×10^6 ergs.

Total No. of Questions : 4]

SEAT No. :

P520

[Total No. of Pages : 2

[4817]-315
T. Y. B.Sc.
PHYSICS
PH-333 : Classical Mechanics
(2008 Pattern) (New) (Paper-III) (Semester-III)

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

Instructions to the candidates:

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

Q1) Attempt all of the following. (one mark each) : **[10]**

a) State the laws of conservation of momentum.

b) Define the range of projectile.

c) What is meant by central force.

d) State Kepler's third laws of planetary motion.

e) Define the term total cross-section.

f) What is meant by Elastic Scattering?

g) State D'Alemberts principle.

h) What is meant by constraint?

i) Define the term inertial frame of reference.

j) Give the examples of Pseudo force.

Q2) Attempt any two (five marks each) **[10]**

a) Obtain the relation between differential cross sections in lab and CM systems.

b) Show that the path of charged particle moving with a uniform velocity in transverse electric field is parabola.

c) Show that $\ddot{\theta} + \frac{g}{\ell}\theta = 0$. Where the symbols have their usual meanings.

P.T.O.

Q3) Attempt any two (five marks each) : **[10]**

a) A geostationary satellite is orbiting the earth at a height of 11 Re above the surface of the earth. Calculate the time period of another satellite at height of 5 Re from the surface of earth (Re=radius of earth).

b) Calculate the fictitious force and the total force acting on a freely falling body of mass 7 kg with reference to a frame moving vertically downward on earth with an acceleration of $3m/s^2$

c) A charged particle having charge $2\times10^{-9}c$ enters in the magnetic field of induction $4\times10^{-4}T$ with velocity $3\times10^{4}m/s$ with an angle 30° with the field. Find the force acting on the particle.

Q4) a) Attempt any one (eight marks) **[8]**

i) Derive an expression for lagrange's equations of motion for a conservative holonomic system.

ii) Explain the principle of rocket motion. Obtain an expression for the instantaneous height attained by the rocket.

b) Attempt any one (two marks): **[2]**

i) State the principle of Galilean invariance.

ii) What do you mean by "differential cross section"?

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Total No. of Questions : 4]

SEAT No. :

P521

[Total No. of Pages : 2

[4817]-316
T.Y. B.Sc.
PHYSICS
PH-334: Atomic and Molecular Physics
(2008 Pattern) (Semester-III) (Paper-IV)

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

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Use of log table and calculater is allowed.***

Q1) Attempt all of the following. (One mark each). **[10]**

a) Give the selection rules for rotational energy spectra in diatomic molecule.

b) Which series of hydrogen spectrum lies in visible region of an electromagnetic spectra.

c) What is Larmour precession?

d) What are forbidden transitions?

e) Calculate the magnitude of total angular momentam $\bar{J}$ of an atom in $^2D_{5/2}$ state.

f) State Bhor's second postulate of hydrogen atom.

g) What is anomalous Zeeman effect?

h) What are antistokes lines?

i) What is ground state of an atom?

j) Define reduced mass of diatomic molecule.

Q2) Attempt any two of the following.

a) Give the comparison between X-ray spectra and optical spectra. **[5]**

b) What is Raman scattering? Explain the Raman effect on the basis of quantum theory. **[5]**

c) Obtain an expression for rotational energy levels of rigid diatomic molecule. **[5]**

P.T.O.

Q3) Attempt any two of the following.

a) An electron collides with hydrogen atom in ground state and exit if into a state of n=3. Determine the amount of energy in eV given by an electron to hydrogen atom. Given: Ground state energy of hydrogen= -13.6 eV n=1 **[5]**

b) The ionization energy of sodium atom is 460kJ/mole. Calculate the wavelength of incident spectral line of electromagnetic radiation which is just sufficient to ionise the sodium atom. **[5]**

Given: $C = 3\times10^{8}\ m/s$, $h = 6.64\times10^{-34}\ Js$, $N_{AV} = 6.023\times10^{23}$ per mole.

c) Carbon monoxide, CO, molecule has bond length of 0.113 nm and masses of ^{12}C and ^{16}O atoms are respectively 1.99 x 10^{-26} kg and 2.66 x 10^{-26}kg. Calculate the reduced mass moment of inertia and rotational energy of molecule in J=1 state in eV. **[5]**

[Given: $h = 6.64\times10^{-34}\ Js$, $1eV = 1.6\times10^{-19}\ J$]

Q4) a) Attempt any one of the following.

i) What is normal Zeeman effect? Explain it for single valance atom with suitable example and energy level diagramme. **[8]**

ii) What is L-S coupling scheme? Obtain all possible atomic terms for p-f electron configuration using L-S coupling. Draw necessary vector diagrammes. **[8]**

b) Attempt any one of the following:

i) Explain spinning motion of an electron in an atom. **[2]**

ii) Give two applications of Raman spectroscopy. **[2]**

Total No. of Questions : 4]

SEAT No. :

P522

[Total No. of Pages : 2

[4817]-317
T. Y. B.Sc.
PHYSICS
PH-335: 'C' Programming and Computational Physics
(Paper-V) (2008 Pattern)(Semester-III)

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

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Use of electronic calculator or log table is allowed.***

Q1) Attempt all of the following (one mark each) **[10]**

a) What is flow-chart?

b) Define keywords.

c) What is use of scanf function?

d) State different types of data used in 'C'.

e) Why break statement is used?

f) Write syntax of for statement.

g) What are inherent errors?

h) Give syntax of switch statement.

i) What are pointer variables?

j) Write use of gets ( ) & puts ( ) functions.

Q2) Attempt any two of the following.

a) What are variables? Write different rules for naming variables. **[5]**

b) Write C program to draw line, circle , ellipse and bar. **[5]**

c) What is meant by looping? Describe any two examples of looping. **[5]**

P.T.O.

Q3) Attempt any two of the following.

a) What is an operator? Describe any two types of operators. **[5]**

b) Explain an array with example. **[5]**

c) What are iterative method? Explain any one iterative method. **[5]**

Q4) A) Attempt any one of the following:

a) i) Fit a straight line of the form $y=a_0+a_1x$ to the following data. **[4]**

x	1	2	3	4	6	8
y	2.4	3.1	3.5	4.2	5.0	6.0

ii) Write an algorithm to find integration by Trapezoidal rule. **[4]**

b) i) Find the smallest positive root of $x^2 - x - 10 = 0$ using Newton-Raphson method. **[4]**

ii) Draw a flow-chart to find Factorial of given number. **[4]**

B) Attempt any one of the following:

a) Write formula for Simpson's $1/3^{rd}$ rule. **[2]**

b) Find the output of following 'C' program. **[2]**

```
#include <stdio.h>
main ( )
{
    int i = 5 ;
    while (i)
    {
        i – – ;
        if (i = = 3)
        break;
        printf ( " %d", i);
    }
}
```

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Total No. of Questions :4]

SEAT No. :

P523

[Total No. of Pages :10

[4817]-318
T.Y.B.Sc.
PHYSICS
PH-336 (A): Astronomy and Astrophysics
(2008 Pattern) (Paper - VI) (Elective - I) (Semester - III)

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

Instructions to the candidates:

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

Q1) Attempt all of the following (1 mark each): **[10]**

a) What are meteors?

b) After hydrogen and Helium, which is the most abundant element in the universe?

c) What are promineances?

d) What are Globular clusters?

e) Define Radio galaxy.

f) Which type of spectra is observed in 'M' stars?

g) What is a main sequence star?

h) State the difference between photometer and spectrometer.

i) How do we calculate temperature from Wien's law.

j) Where do comets originate from?

Q2) Attempt any two (5 mark each): **[10]**

a) Write short note on Butterfly diagram.

b) Describe solar Limb darkening.

c) Describe cassegrain Reflector Telescope.

P.T.O.

Q3) Attempt any <u>two</u> (5 mark each): **[10]**

a) Explain Non-optical Astronomy.

b) Describe in detail the working of CCD Camera.

c) Write a note on classification of star according to their spectra.

Q4) a) Attempt any <u>one</u>: **[8]**

i) What is the significance of Hubble's constant? Explain in detail.

ii) Describe the Proton - Proton cycle and formation of other elements in stars.

b) Attempt any <u>one</u>: **[2]**

i) What is a neutron star?

ii) What are Sun Spots?

EEE

Total No. of Questions :4]

P523

[4817]-318
T.Y.B.Sc.
PHYSICS
PH-336 (B): Elements of Material Science
(2008 Pattern) (New) (Paper - VI) (Semester - III) (Elective - I)

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

Instructions to the candidates:

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

Q1) Attempt all of the following (1 mark each): **[10]**

a) Define the term malleability.

b) What is elastic strain in Copper that is stressed 60 MPa? (Given: Modular of elasticity of Cu = 120,000 MPa)

c) What is solid solution?

d) What is fatique?

e) What is degree of polymerization?

f) Give any two types of piezoelectric materials.

g) What do you mean by eutectic temperature?

h) What is an alloy?

i) What is thermosetting plastics?

j) What is vulcanization of rubber?

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

a) What is annealing? Give the comparison between recovery and recrystallization.

b) Derive an expression for the calculation of the critical resolved shear stress in the case of plastic deformation within single crystal.

c) What is linear polymer? Explain the condensation polymerization with suitable example.

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

a) What is AX structure? Discuss the AX structure of CsCl type.

b) An activation energy of 0.32×10^{-18} J is required to form a vacancy in a metal. At 900°C there is one vacancy for every 10^4 atoms. At what temperature will there be one vacancy for every 1000 atoms?

(Given: $K=13.8 \times 10^{-24}$ J / atom °K)

c) The compound Cds has the same structure is ZnS. The centres of the two unlike ions are separated 0.25 nm.

i) What is the volume of the unit cell?

ii) What is the density?

Given: At. mass of Cd = 112.4 amu,

At. mass of S = 32.1 amu.

Avogadros Number = No = 0.6×10^{24} amu /g

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

i) What is atomic diffusion? Give the importance of the diffusion. State and explain the theory of diffusion mechanisms in detail.

ii) Draw phase diagram for two metals completely soluble in liquid state and solid state system and explain different areas in it. Draw Cu-Ni phase diagram.

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

i) State Gibb's phase rule.

ii) State Fick's laws of diffusion.

EEE

Total No. of Questions :4]

P523

[4817]-318
T.Y.B.Sc.
PHYSICS
PH-336 (C): Motion Picture Physics
(2008 Pattern) (New) (Paper - VI) (Semester - III) (Elective - I)

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

Instructions to the candidates:

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

Q1) Attempt all of the following (1 mark each): **[10]**

a) What do you mean by projection print?

b) What is normal lens?

c) What do you mean by perspective?

d) Draw neat labelled diagram of Intermittant of movie camera.

e) State the shutter speed scale and Aperture scale.

f) What is the role of pentaprism along with Reflex mirror.

g) What do you mean by medium form at?

h) Draw neat labelled diagram of composition of B/W paper.

i) Write E-6 process.

j) What do you mean by achromatic system?

Q2) Attempt any two of the following (5 marks each): **[10]**

a) Explain view finder of movie camera in brief. What is optical sound recorder?

b) Explain how the following special effects are added

i) blow up and ii) fast motion

c) Explain the main light, supplimentary light and fill in back light.

Q3) Attempt any two of the following (5 marks each): **[10]**

a) Explain the time mechanism of projector.

b) Describe any two aberrations in details.

c) Explain various filters in detail.

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

i) Explain principle, construction and working of TLR camera in details.

ii) Explain construction and working of projector.

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

i) What is the main role of intermittent in projector?

ii) Define the term magazine.

EEE

Total No. of Questions :4]

P523

[4817]-318
T.Y.B.Sc.
PHYSICS
PH-336 (D): Biophysics
(2008 Pattern) (New) (Paper - VI) (Elective -I) (Semester - III)

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

Instructions to the candidates:

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

Q1) Attempt all of the following (one mark each): **[10]**

a) Define bond length.

b) Define Gibb's free energy.

c) Give the composition of a cell.

d) State any two names of amino acids.

e) Write the equation explaining photosynthesis.

f) What is the full form of LVDT.

g) State the list of different leads of ECG.

h) State the function of photodiode.

i) Write the Nernst equation.

j) What is the full form of SEM and TEM?

Q2) Attempt any two (five marks each): **[10]**

a) Discuss the functional aspects of chloroplast.

b) With the help of block diagram explain the working of LVDT.

c) Explain working of ECG machine with the help of block diagram.

Q3) Attempt any two (five marks each): **[10]**

a) Discuss the structural aspects of Mitochondria.

b) Discuss the construction and working of colorimeters.

c) Explain the term Nuclear detector and state the Radiation doses.

Q4) a) Attempt any one (eight marks): **[8]**

i) Define Transducers. Explain construction and working of capacitive and Inductive transducers.

ii) What is electron microscope? Explain in brief the principle and construction of SEM and TEM.

b) Attempt any one (two marks): **[2]**

i) Distinguish between Animal and Plant cell.

ii) State the applications of Radioactivity.

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Total No. of Questions :4]

P523

[4817]-318
T.Y.B.Sc.
PHYSICS
PH-336 (E): Medical Electronics
(2008 Pattern) (New Course) (Paper - VI) (Elective -I) (Semester - III)

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

Instructions to the candidates:

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

Q1) Attempt all of the following (1 mark each): **[10]**

a) What are bio-potential electrodes?

b) Define transducer.

c) What is the normal range of WBC count?

d) What is sensor?

e) Draw the circuit diagram of Op-Amp as an integrator.

f) What do you mean by murmur?

g) State the uses of spectrophotometer.

h) What is cardiac pacemaker?

i) What is hematology?

j) Define low pass filter.

Q2) Attempt any two of the following:

a) Explain Op-Amp as differentiator with the help of a suitable diagram. **[5]**

b) Write a note on microelectrodes. **[5]**

c) Explain the principle, construction and working of inductive sensor. **[5]**

Q3) Attempt any two of the following:

a) Why are instruments essential in electronics? **[5]**

b) Explain blood gas and acid base measurement. **[5]**

c) Draw a block diagram of X-ray machine. Explain each block in brief. **[5]**

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

i) Give difference between short wave diatherapy and microwave diatherapy.

ii) What do you mean by Heart Sound? What is it's significance?

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

i) Give the difference between direct and indirect measurement of blood pressure.

ii) Give any two precautions while handeling X-ray machine.

EEE

Total No. of Questions : 4]

SEAT No. :

P524

[Total No. of Pages : 3

[4817]-319
T.Y. B.Sc.
CHEMISTRY
CH - 331 : Physical Chemistry
(New Course) (2008 Pattern) (Semester - III) (Paper - I)

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

Instructions to the candidates:

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

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

a) Define the term temperature coefficient.

b) Explain : CO_2 molecule is microwave inactive but IR active.

c) Sketch 110 plane in simple cubic crystal lattice.

d) Explain the term Adsorbent with suitable example.

e) What are isotropic substance?

f) What is sorption?

g) Calculate reduced mass of $^{14}NO^{16}$ molecule.

(Avogadros NO. = 6.023×10^{23} molecules.mole.$^{-1}$)

h) Define the term order of reaction.

i) Define axis of symmetry.

j) The rate constant of first order reaction has been found to be 2.3×10^{-5} min^{-1}. Find half life of reaction.

P.T.O.

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

i) Give the characteristics of second order reaction.

ii) How dipole moment is useful to determine the percentage ionic character of compound.

iii) What is adsorption? How adsorption is useful in purification of Water.

b) Solve any <u>one</u> of the following: **[4]**

i) Sodium Chloride has an f.c.c. lattice with unit cell edge is 5.64 Aº. Density of NaCl is 2.166 $g.cc^{-1}$. Calculate Avogadros number (Molecular weight of NaCl = 58.5)

ii) The dielectric constant of NH_3 at 0ºC and at 1 atm pressure is 1.0072. The density is 0.7714 g/lit.

Calculate the molar polarisation of NH_3.

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

a) Derive an integrated rate expression for first order reaction. What are the characteristics of first order reaction.

b) What is Raman Shift? Discuss the theory of Raman effect in the light of polarizability of molecule and quantum theory.

c) Define rate of reaction. Explain the different factors affecting the rate of reaction.

Q4) a) What are retardation reaction? Discuss the kinetics of retardation reaction in which single reacting gas involved. **[6]**

OR

Give the principle of Laue method. Describe the experimental method for determination of crystal structure. State the drawbacks of this method.

b) Solve the following (Any one): **[4]**

i) In a second order reaction $2A \rightarrow$ Products the time required for completion of 50% reaction was found to be 120 second. What will be the time required for 30% completion of the reaction?

ii) The frequency difference for successive lines in the rotational spectrum of HI molecule is observed to be $13.9cm^{-1}$. Calculate the rotational constant and the bond length at equilibrium.

(At. weight H = 1, I = 127, N = 6.023×10^{23}, h = 6.626×10^{-27} erg sec; c = 3×10^{10} cm. sec^{-1}).

Total No. of Questions :4]

SEAT No. :

P525

[Total No. of Pages :3

[4817]-320
T.Y.B.Sc.
CHEMISTRY
CH-332: Inorganic Chemistry
(2008 Pattern) (Paper - II) (Semester - III)

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

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Neat diagrams must be drawn.***
4) ***Use of log table and calculator is allowed.***
5) ***Automic Numbers: C: 6, O:8 Mn:25, Ni:28 N:7 Be:4, Ne:10, Fe:26***

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

a) Define, bonding molecular orbital.

b) What is co-ordination no. of Ni in $[Ni(en)_3]S_2O_3$?

c) Why $k_3[Fe(CN)_6]$ is electrolyte?

d) Explain ionisation isomerism with suitable example.

e) Give advantage or merits of sidgwicks model.

f) What is geometry for dsp^3 hybridisation?

g) Why He_2 is does not exist in nature?

h) Draw the d orbital splitting diagram for tetrahedral complex.

i) What is symmetry symbol for P orbital?

j) Calculate CFSE for d^4 ion in low spin octahedral complex.

Q2) a) Answer <u>any two</u> of the following: **[4]**

i) Give difference between 6 and π molecular orbital.

ii) Write note on geometrical isomerism in square planer complex.

iii) Give evidence for CFSE.

P.T.O.

b) Answer Any two of the following **[6]**

i) Discuss formation of CO molecule on basis of MOT.

ii) Explain Bonding in $[Mn\ Cl_4]^{2-}$ according to VBT & comment on its magnetic properties.

iii) Write IUPAC name of following complex:

1) $K_3\ [Fe(C_2O_4)_3]$

2) $[Cu\ (NH_3)_4]SO_4$

3) $[Al\ (en)_3]\ Cl_3$

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

a) Discuss the formation of $[Ni\ (NH_3)_6]^{2+}$ ion without π bonding on the basis of MOT.

b) Explain Jahn Teller distortion of octahedral complex w.r.t. dg configuration.

c) Discuss bonding in N_2 molecule and calculate bond order & magnetic properties.

Q4) a) Explain non existance of Be_2 and Ne_2 molecule on basis of molecular orbital theory. **[6]**

OR

a) i) State whether following complex obey EAN rule or not?

1) $[Ni\ (CO)_4]$

2) $K_4\ [Fe\ (CN)_6]$

3) $[Ni\ (NH_3)_6]^{2+}$

ii) What type of structural isomerism is present in following pair of complex.

1) $[Co(H_2O)_6]Cl_3$, $[Co(H_2O)_5Cl]Cl_2 H_2O$

2) $[Cr(H_2O)_5 SCN]^{2+}$ $[Cr(H_2O)_5 NCS]^{2+}$

3) $[Co(NH_3)_6][CrCl_6]$, $[Cr(NH_3)_6][Co Cl_6]$

b) **[4]**

i) Write note on outer orbital octahedral complex with suitable example.

OR

Explain primary valancies on basis of Werners Theory.

ii) Give draw back of CFT.

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Total No. of Questions : 4]

SEAT No. :

P526

[Total No. of Pages : 3

[4817]-321
T.Y. B.Sc.
CHEMISTRY
CH - 333 : Organic Chemistry
(2008 Pattern) (Semester-III) (Paper-III)

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

Instructions to the candidates:

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

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

a) Why trans 1, 4 (e, e) dimethyl cyclohexane is more stable than its cis isomer?

b) Write trivial name and IUPAC name for

c) Draw zig-zag structure of octa. 3, 5 dione.

d) Which type of groups are reduced by Sn/H-Cl?

e) Draw the resonating structures of Nitrobenzene.

f) Tri-chloro-acetic acid is extremely strong acid than acetic acid. Why?

g) Write intermediate during addition of $KMnO_4$ to > C = C <.

h) Which is good nucleophile amongst

i) 2-Bromobutane on heating with sodium methoxide gives 70% 2-butene. Why?

j) Acetaldehyde can not undergo Cannizzaro's reaction. Why?

P.T.O.

Q2) a) Answer Any Two of the following: **[6]**

i) What is hyperconjugation? Why 2-methyl, 2-butene is more stable than 2-methyl, 1-butene?

ii) Discuss the mechanism of oxy-mercuration de-mercuration reaction of 2-phenyl, 2-butene.

iii) Discuss the mechanism of acid catalysed and base catalysed hydration reaction to form gem-diols.

b) Attempt Any Two of the following: **[4]**

i) 1-butene on ozonolysis gives formaldehyde as a product but 2-butene does not. Explain.

ii) Write any two applications of SeO_2 with examples.

iii) Explain the relative stability of carbocation in SN^1 reaction.

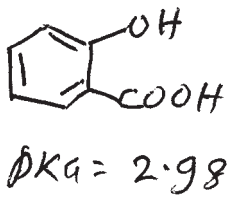
Q3) Attempt Any Two of the following: **[10]**

a) Draw all possible chair conformations of trans 1, 4 (a, a) dimethyl cyclohexane and comment on stability and optical activity.

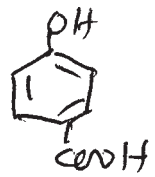
b) What is E^1 mechanism? Explain orientation and evidence of E^1 mechanism.

c) i) What are electrophiles and nucleophiles? Give examples of each.

ii) Explain the pka values of the following compounds.

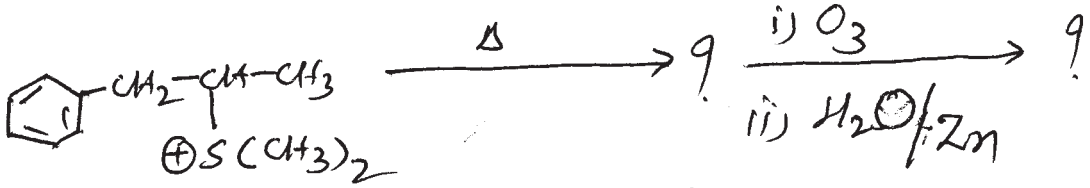


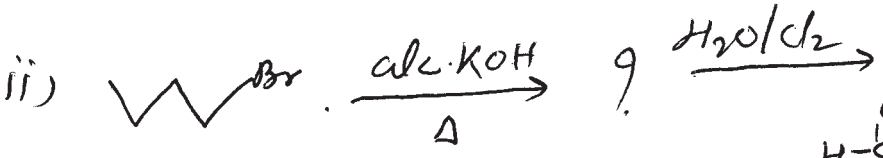
pKa = 2.98

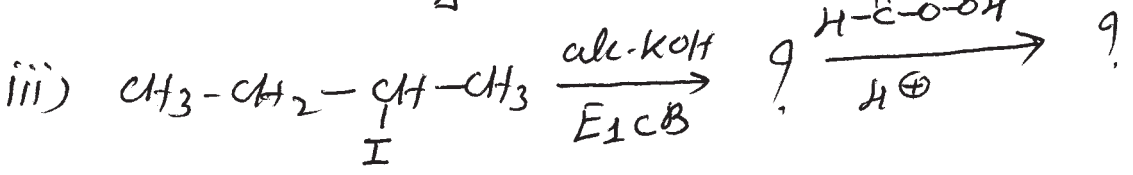


pKa = 4.58

Q4) a) Predict the products with mechanism. **[6]**

i) 

ii) 

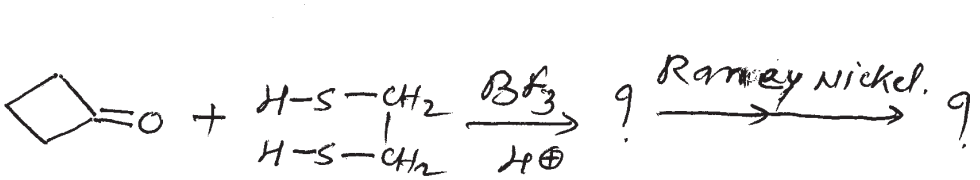
iii) 

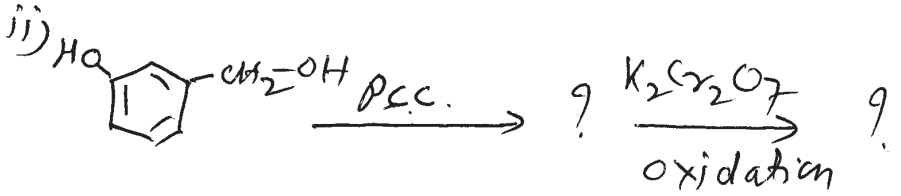
OR

a) i) What is SN^2 reaction? Discuss the stereo-chemistry of SN^2 with experimental evidences. **[4]**

ii) Discuss any one factor affecting the reaction of carbonyl compounds towards nucleophilic addition. **[2]**

b) Predict the products with justification. **[4]**

i) 

ii) 

OR

b) Write notes on: **[4]**

i) Halogenation of alkenes.

ii) Hofmann elimination.

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Total No. of Questions :4]

SEAT No. :

P527

[Total No. of Pages :2

[4817]-322
T.Y.B.Sc.
CHEMISTRY
CH-334: Analytical Chemistry
(2008 Pattern) (Paper - IV) (Semester - III)

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

Instructions to the candidates:

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

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

a) Draw the structure of α- nitroso β- naphthol.

b) For $Mg(OH)_2$ if moles at equilibrium for Mg^{+2} is x and for OH^- is $2x$. Calculate its Ksp.

c) What is post precipitation?

d) What is the decomposition potential?

e) Define the term molar absorptivity.

f) Calculate the wave number of radiation having wavelength 3700 $\mathring{A}$.

g) What are the functions of flame in AAS?

h) Give the Boltzmann equation in FES.

i) Give the principle of nephelometry.

j) Calculate the turbidity coefficient of a solution having concentration 5.3×10^{-5} moles/lit and having path length of 2 cm if its turbidance is 0.14.

P.T.O.

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

i) Give the important features of organic reagents used in gravimetric analysis.

ii) Explain the mole-ratio method by Yoe and Jones.

iii) Explain in brief the basic components of Atomic Absorption spectrophotometer.

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

i) Explain the use and care of electrodes in electrogravimetry.

ii) Calculate the weight of silver deposited when a current of 4.6 Ampere is passed through silver chloride solution for 1.5 hour

Given: Electrochemical equivalent of silver = 1.118×10^{-3}.

iii) A certain colored solution of concentration 1.42×10^{-4} m gives an absorbance of 0.83 at its λ_{max}. Calculate the concentration of the same unknown solution which shows an absorbance of 0.62 in the same curette.

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

a) What is the common ion effect? Discuss the importance of common ion effect in separation of III A group radicals from III B group radicals.

b) Describe single beam spectrophotometer with neat labelled diagram.

c) Explain with suitable diagram of total consumption burner and premixed or laminar-flow burner used in FES.

Q4) a) What is digestion? What is the purpose behind digestion? What are its advantages. **[6]**

OR

i) Explain electrolytic separation of metals with controlled cathode potential with diagram . **[3]**

ii) Explain the factors affecting measurements in nephelometry and turbidimetry. **[3]**

b) Solve any one: **[4]**

i) The absorbance of 1×10^{-2} m solution placed in 3 cm path length cell is 0.4. What will be the absorbance of the solution if it is placed in 1 cm path length cell?

ii) The solubility of silver chloride in water is 1.38×10^{-3} gm/lit at 25^{o}C. Calculate the solubility product for silver chloride assuming complete dissociation. Atomic weight of Ag is 108 and Cl is 35.5.

EEE

Total No. of Questions : 4]

SEAT No. :

P528

[Total No. of Pages : 2

[4817]-323
T. Y. B.Sc
CHEMISTRY
CH-335: Industrial Chemistry
(2008 Pattern) (New) (Semester-III) (Paper-v)

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

Instructions to the candidates:

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

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

a) Define the term capital investment.

b) Give any two important uses of sulphuric acid.

c) What are potassic fertilizers?

d) What is absolute alcohol?

e) Define the term massecuite.

f) Explain the term atom economy.

g) Explain the term working capital.

h) What is nitrification?

i) Explain the term mashing

j) Explain the term waste reduction.

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

i) Explain the term quality control and process control.

ii) Explain in conversion of so_2 to so_3 pressure kept is 1.5 to 1.7 atms, through this reaction is favourable at high pressure.

iii) What are advantages of organic fertilizers?

P.T.O.

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

i) What rights are related to copy right?

ii) Why biological treatments are used for waste containing organic impurities?

iii) Explain the factors determining the plant location of chemical industry.

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

a) Discuss with flowsheet the manufacture of sugar from sugarcane.

b) Discuss manufacture of ethanol with special reference to coffey still.

c) Describe the various terms involved in waste minimisation.

Q4) a) Give an account of physico chemical principles involved in manufacture of sulphuric acid. **[6]**

OR

Describe the manufacture of triple super phosphate with flowsheet.

b) Discuss utilization of byproducts of sugar industry. **[4]**

OR

Discuss the conditions favourable for fermentation.

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Total No. of Questions :4]

SEAT No. :

P529

[Total No. of Pages :10

[4817]-324
T.Y. B.Sc.
CHEMISTRY
CH-336 (A): Nuclear Chemistry
(2008 Pattern) (New) (Paper-VI) (Elective-I) (Semester-III)

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

Instructions to the candidates:

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

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

a) Which of the following nuclides is more stable?

i) $^{40}_{20}Ca$ ii) $^{119}_{50}Sn$

iii) $^{30}_{13}Al$ iv) $^{55}_{25}Mn$

b) Define isotones with one example.

c) State salient features of shell model.

d) State the limitations of liquid drop model.

e) Which are the two α active nuclides?

f) Define photonuclear reaction.

g) Complete the following nuclear reaction.

$$^{24}_{12}Mg + ^{2}_{1}H \rightarrow ^{22}_{11}Na + \cdots$$

h) The radioactive sodium has a decay constant of 0.07423 hours^{-1}. Calculate the half life.

i) In the shell model, nucleons in a nucleus

i) interacts strongly with other shells.

ii) had no interaction with other shells.

iii) Both a & b.

iv) revolves combinely.

j) What is reaction cross section? State its units.

P.T.O.

Q2) a) Attempt Any Two of the following: **[6]**

i) Discuss general characteristics of radioactive decay process.

ii) Explain conservation of protons and neutrons in nuclear reaction.

iii) Explain different types of quarks with respect to mass and charge.

b) Answer Any Two of the following: **[4]**

i) Calculate the binding energy for Argon atom $\left({}^{40}_{18}\mathrm{Ar}\right)$

given: mass of proton: 1.007825 amu

mass of neutron: 1.008665 amu

mass of argon atom = 39.962384 amu

ii) Complete the following nuclear reaction

1) ${}^{9}_{4}\mathrm{Be}+\cdots\cdots \rightarrow {}^{12}_{6}\mathrm{C}+{}^{1}_{0}\mathrm{n}$

2) ${}^{24}_{12}\mathrm{Mg}+{}^{1}_{1}\mathrm{H} \rightarrow \cdots + {}^{4}_{2}\mathrm{He}$

iii) Write short note on Geiger - Nuttal's law.

Q3) Answer Any Two of the following: **[10]**

a) Explain different types of radioactive decay processes with suitable examples.

b) State and explain semi-empirical mass equation.

c) What is compound nucleus? Discuss important features of compound nucleus theory.

Q4) a) Discuss the shell model in detail giving postulates. **[6]**

OR

Explain Bethe's notations. State different types of nuclear reaction.

b) Calculate the half life of $^{22}\mathrm{Na}$, if it decays 90% in 50 hours. **[4]**

OR

Write short note on thermonuclear reaction.

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Total No. of Questions :4]

P529

[4817]-324
T.Y. B.Sc.
CHEMISTRY
CH-336 (B): Polymer Chemistry
(2008 Pattern) (Paper-VI) (Elective-I) (Semester-III)

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

Instructions to the candidates:

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

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

a) Define the term - Biopolymers.

b) 'Glass is an example of organic polymer'. State whether the statement is true or false and rewrite.

c) Explain the term - Antioxidants.

d) Calculate the molecular weight of polyvinyl chloride whose DP is 1000.

e) Draw the structures of the following monomers.

i) Acrylonitrile ii) Methylvinyl ketone

f) Write the IUPAC name of PhEtBrSiOH.

g) Convert the name poly-(1-phenylethylene) into correct structure.

h) Name the scientist who received 'Nobel prize' for rapid polymerisation of polyethylene (HDPE).

i) Give two important applications of adhesives.

j) Define the term - co - polymer.

Q2) a) Explain the following (Any Two): **[6]**

i) Colourants are often added to the polymers during its processing.

ii) Nylon 6.6 is mainly used for making fishermen's net.

iii) Modern age is the age of polymers.

b) How will you distinguish the following (Any Two): **[4]**

i) Linear polymers and Block polymers.

ii) Man made polymers and nature made polymers.

iii) Plastics and Rubber.

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

a) Define the step polymerisation reaction. Give a full account of ring opening polymerisation.

b) What is meant by chain polymerisation reaction? Discuss in detail the ionic polymerisation technique with examples.

c) Explain in detail the electrochemical polymerisation technique.

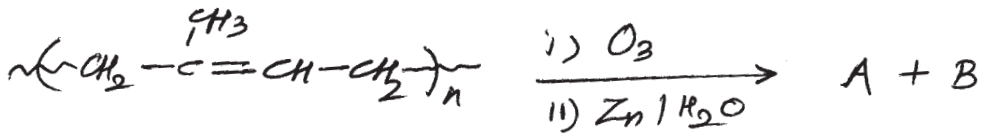
Q4) a) Attempt Any Two of the following: **[6]**

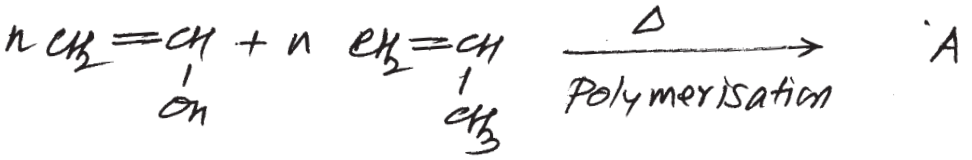
i) In a particular experiment, if 1.750g of polymer sample is required to neutralize 8.4ml of 0.1550N of alcoholic KOH solution. Calculate carboxyl equivalent per 100g and molecular weight ($\bar{M}_n$) of polymer sample ($f_n = 2$).

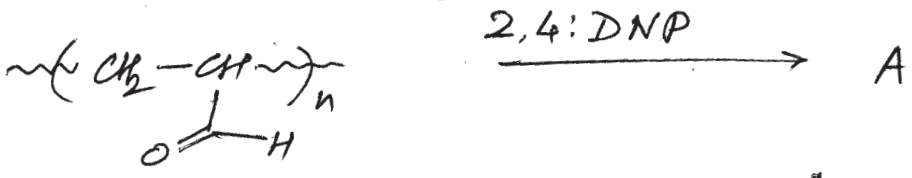
ii) Write a note on cure reactions of polymers.

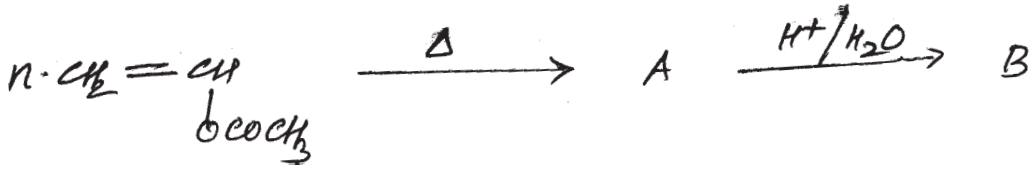
iii) Explain the term-melt polymerisation technique.

b) Complete the following polymer reactions: **[4]**

i) 

ii) 

iii) 

iv) 

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Total No. of Questions :4]

P529

[4817]-324
T.Y. B.Sc.
CHEMISTRY
Biochemistry
CH-336 (C): Introduction to Biochemistry and Molecular Biology
(2008 Pattern) (Paper-VI) (Elective-I) (Semester-III)

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

Instructions to the candidates:

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

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

a) List out two functions of cell membrane.

b) Define Anomers.

c) Name one saturated and one unsaturated fatty acid.

d) What is Isoelectric pH?

e) Give two examples of structural proteins.

f) Write MM equation.

g) Name one Anion and Cation exchanger in column chromatography.

h) What are the coenzymes of Niacin?

i) Write the significance of Insulin hormone.

j) Give one example of aldohexose and ketohexose.

Q2) a) Attempt Any Two: **[6]**

i) Write note on rancidity of lipids.

ii) Differentiate between reducing and nonreducing sugars.

iii) List out the features of active site of an enzyme.

b) Give the structures of the following: **[4]**

i) Sucrose.

ii) Cholesterol.

iii) Tyr-Lys.

Q3) Answer Any Two of the following: **[10]**

a) Explain the principle, procedure and applications of gel filtration.

b) Discuss the titration curve of glycine and its significance.

c) Classify carbohydrates with examples.

Q4) Answer the following:

a) Describe the steps involved in determination of primary structure of proteins. **[6]**

OR

Elaborate on various types of enzyme inhibitions.

b) Give details of source, biological functions and deficiency disorders of riboflavin. **[4]**

OR

Classify hormones based on biochemical nature.

●●●●●

Total No. of Questions :4]

P529

[4817]-324
T.Y. B.Sc.
CHEMISTRY
CH-336 (D): Environmental Chemistry
(2008 Pattern) (New) (Paper-VI) (Elective-I) (Semester-III)

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

Instructions to the candidates:

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

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

a) Define contaminant.

b) 1 ppm =----%.

c) Write any two major components of air.

d) Define Air pollution.

e) Define Biological Oxygen Demand.

f) Define Disease.

g) What is Humin?

h) Define pH.

i) Define primary pollutant.

j) What is Altitude of Troposphere.

Q2) a) Attempt Any Two of the following: **[6]**

i) Explain Minamata Disease.

ii) Explain Earthquake.

iii) Explain Acid rain due to air pollution.

b) Write short notes on Any Two: **[4]**

i) Atmosphere.

ii) Physical properties of water.

iii) Marine pollution.

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

a) Explain corrosion of metals due to air pollution.

b) Explain chemical speciation of mercury.

c) Explain ozone chemistry in Atmosphere.

Q4) a) Give an account on sources and sink of CO. Explain control and effect of CO pollution. **[6]**

OR

How can we determine C.O.D.? Explain method.

b) Write short note Any One: **[4]**

i) Stratification of water bodies.

ii) Organic particulate matter.

●●●●●

Total No. of Questions :4]

P529

[4817]-324
T.Y. B.Sc.
CHEMISTRY
CH-336 (E): Agriculture Chemistry
(2008 Pattern) (New Course) (Paper-VI) (Elective-I) (Semester-III)

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

Instructions to the candidates:

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

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

a) What is biological control of pests?

b) What do you understand by 'ESP'?

c) Define the term 'agriculture chemistry'.

d) What are fumigants?

e) Define the term 'alkaline soil'.

f) What is F.Y.M.?

g) Define micronutrients.

h) Define saline soil.

i) What do you understand by activated sludge?

j) What is Fouling index?

Q2) a) Answer Any Two of the following: **[6]**

i) Explain organochlorine insecticides with respect to DDT and BHC.

ii) Give advantages of mixed fertilizers.

iii) Explain the magnesium deficiency symptoms.

b) Answer Any Two of the following: **[4]**

i) Give the classification of essential nutrients.

ii) What are the sources of water?

iii) What are different methods for soil fertility evaluation?

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

a) Define soil solution. Describe factors affecting the composition of soil solution.

b) Define green-manuring. Discuss green leaf manuring in detail.

c) Describe minor constituents present in irrigation water.

d) Explain the classification of insecticides on the basis of mode of action.

Q4) a) Answer Any Two of the following: **[6]**

i) Define particle density and bulk density. Give their importance in agriculture.

ii) What is lime requirement? State effect of lime on acid soil.

iii) What are water quality problems related to public health, environment and agriculture?

b) Attempt Any Two of the following: **[4]**

i) Give the classification of herbicides based on their effects on weeds.

ii) What is need of plant nutrients?

iii) Explain anion exchange in soil.

●●●●●

Total No. of Questions : 4]

SEAT No. :

P530

[Total No. of Pages : 2

[4817]-325
T.Y. B.Sc.
BOTANY
BO - 331 : Algae, Fungi and Bryophytes
(New Course) (2008 Pattern) (Semester - III) (Paper - I)

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

Instructions to the candidates:

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

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

a) Name any two classes of Algae as per G.M.Smith (1966).

b) Enlist the types of Mycorrhizae.

c) What are Bryophytes?

d) Name the fungus which causes "Tikka Disease" of groundnut.

e) What is the function of Rhizoids in Bryophytes.

f) Name any two genera from xanthophyta.

g) Whether Marchantia is monoecious or dioecious plant.

h) Name the chlorophyll pigment commonly found in the member of chlorophyta.

i) Give any two characters of Rhodophyta.

j) Name any two orders of class Bryopsida.

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

a) Give the general characters of charophyta.

b) Explain Sexual reproduction in Zygomycetes.

c) Give the economic importance of Nostoc.

P.T.O.

Q3) Write short notes (any two): **[10]**

a) Male conceptacle in Sargassum.

b) Somatic phase in myxomycetes.

c) External structure of gametophyte in Anthocerotopsida.

Q4) Describe the different stages in life cycle of Puccinia graminis on wheat plant. **[10]**

OR

Explain the methods of reproduction in Polytrichum.

Total No. of Questions :4]

SEAT No. :

P531

[Total No. of Pages :2

[4817]-326
T.Y.B.Sc.
BOTANY
BO-332: Molecular Biology
(2008 Pattern) (New Course) (Paper - II) (Semester - III)

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

Instructions to the candidates:

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

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

a) Give any two characteristics of 'A' form of DNA.

b) What is transformation?

c) Define semiconservative DNA replication.

d) Name any two model organisms used in molecular biology.

e) Define recon.

f) What is overlapping gene?

g) Give any one difference between structural and functional genomics.

h) Mention role of ribosomes.

i) Give characteristics of genetic materials.

j) Mention constituents of DNA.

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

a) Explain the central dogma of molecular biology.

b) Give difference between RNA and DNA as genetic materials.

c) Enlist types of DNA damages and add a note on photoreactivation method of DNA repair.

P.T.O.

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

a) Watson and Crick's model of DNA.

b) Transcription of mRNA in prokaryotes.

c) Lac operon concept.

Q4) What is genetic code? Discuss properties of genetic code. **[10]**

OR

What is trnslation? Give structure and role of tRNA.

EEE

Total No. of Questions : 4]

SEAT No. :

P532

[Total No. of Pages : 2

[4817]-327
T.Y. B.Sc.
BOTANY
BO - 333 : Angiosperms and Evolution
(2008 Pattern) (Semester-III) (Paper-III)

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

Instructions to the candidates:

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

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

a) Define Artificial System of classification.

b) State one limitation of Hutchinson's system.

c) Give one economically important plant of family poaceae.

d) What is Monophyletic origin of Angiosperms?

e) Give a distinguishing character of family Caesalpiniaceae.

f) Mention any one Major Herbaria of India.

g) Give any one phytogeographic region of India.

h) What is endemism?

i) Give any one Aim of BSI.

j) What is speciation?

P.T.O.

Q2) Answer Any Two of the following: **[10]**

a) Give distinguishing characters of Orchidaceae.

b) Write on Bennettitalean theory.

c) State the importance of Herbaria.

Q3) Write short notes on Any Two of the following: **[10]**

a) Merits of Engler and Prantl's system of classification.

b) Aims & objectives of BSI.

c) Paleoendemics.

Q4) Give distinguishing characters, Floral formula and floral diagram of Acanthaceae and Nyetaginaceae. **[10]**

OR

What is speciation? Discuss allopatric and sympatric speciation?

●●●●●

Total No. of Questions : 4]

SEAT No. :

P533

[Total No. of Pages : 2

[4817]-328
T.Y. B.Sc.
BOTANY
BO-334: Genetics and Plant Breeding
(2008 Pattern) (Semester-III) (Paper-IV) (New Course)

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

Instructions to the candidates:

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

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

a) What is monohybrid cross?

b) Define self incompatibility in plants.

c) What is quantitative genetics?

d) Define gene map.

e) What is criss-cross inheritance?

f) Define spontaneous mutations.

g) What are nullisomics?

h) Define plant breeding.

i) What is hybrid vigour.

j) What is gamma garden?

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

a) Explain duplicate gene interaction with a suitable example.

b) What is linkage? Explain incomplete linkage.

c) Give advantages of plant introduction.

P.T.O.

Q3) Write short notes <u>Any Two:</u> **[10]**

a) Mitochondrial inheritance

b) Balance concept of sex determination.

c) Emasculation.

Q4) What are induced mutations? Describe various types of mutagens and add a note on tautomerization. **[10]**

OR

What is pure-line selection? Explain pure-line selection method of crop improvement.

Total No. of Questions : 4]

SEAT No. :

P534

[Total No. of Pages : 2

[4817]-329
T.Y. B.Sc.
BOTANY
BO - 335 : Biometry and Computer Applications
(2008 Pattern) (Semester-III) (Paper-V) (New Course)

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

Instructions to the candidates:

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

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

a) Give any two applications of windows.

b) Enlist the types of graphs.

c) Give any two importance of biometry.

d) What is GUI?

e) Define data.

f) Give any two features of M.S.-Word.

g) Define probability.

h) What is Null hypothesis?

i) Mention any two accessories of computer.

j) Give any two applications of photoshop.

P.T.O.

Q2) Attempt Any Two of the following: **[10]**

a) What is correlation? Describe any two types of correlation.

b) Explain input devices.

c) Mention advantages of networking.

Q3) Write short notes on Any Two of the following: **[10]**

a) Binomial distribution.

b) Chi - Square test.

c) Internet.

Q4) Calculate mean, mode and median from given data- **[10]**

8, 10, 9, 10, 9, 8, 7, 11, 6, 9, 9.

OR

Give an account of MS - Excel.

●●●●●

Total No. of Questions : 4]

SEAT No. :

P535

[Total No. of Pages : 2

[4817]-330
T.Y. B.Sc.
BOTANY
BO-336:Cell Biology and Seed Technology
(2008 Pattern) (Semester-III) (Paper-VI) (New Course)

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

Instructions to the candidates:

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

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

a) Why are mitochondria called as power house of cell?

b) What is Pinocytosis?

c) Who proposed cell theory?

d) What is genome?

e) Enlist chemical composition of cell wall.

f) What are glyoxysomes?

g) Give any two difference in between prokaryotic and eukaryotic cell.

h) Write any two equipments used for seed sampling.

i) What is seed storage?

j) What is seed marketing.

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

a) What is endoplasmic reticulum? Describe smooth endoplasmic reticulum.

b) Describe the properties of cytoplasmic matrix.

c) Explain in brief the principles of seed processing.

P.T.O.

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

a) Anaphase-1 of meiosis.

b) Lampbrush chromosome

c) Seed certification

Q4) What are plastids? Explain the ultrastructure of chloroplast and add a note on its functions. **[10]**

OR

What is seed? Describe stages of seed production.

Total No. of Questions : 4]

SEAT No. :

P536

[Total No. of Pages : 2

[4817]-331
T.Y. B.Sc.
ZOOLOGY
ZY - 331 : General Zoology
(2008 Pattern) (New Course) (Semester - III) (Paper - I)

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

Instructions to the candidates:

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

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

a) State habital of pila.

b) Define dormancy.

c) What is Mysis?

d) Define Metanephric Kidney.

e) State the feeding habit of calotes.

f) Give scientific name of garden lizard.

g) State the function of pecten in calotes.

h) What is Neoteny?

i) State the function of radula in pila.

j) What is homodont dentination?

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

a) Sketch and label the parts of female reproductive system in pila.

b) Describe any two dipnoi fishes.

c) Describe the structure of Heart in calotes.

P.T.O.

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

a) Electric organs in fishes.

b) Scales in calotes.

c) Aortic arches in amphibians.

d) Statocust in pila.

Q4) Describe nervous system of pila. **[10]**

OR

Describe the digestive system of calotes.

Total No. of Questions :4]

SEAT No. :

P537

[Total No. of Pages :2

[4817]-332
T.Y.B.Sc.
ZOOLOGY
ZY-332: Mammalian Histology
(2008 Pattern) (New Course) (Paper - II) (Semester - III)

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

Instructions to the candidates:

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

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

a) Define connective tissue.

b) What is cementum?

c) Name histochemical method used for localisation of DNA.

d) What are islets of Langerhans?

e) What are sertoli cells?

f) What is microtechnique?

g) Give names of any two types of cells in liver.

h) Define nephron.

i) What is hyline cartilage?

j) State the names of any two salivary glands.

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

a) Sketch and label V.S. of tooth.

b) Describe histochemical localization of carbohydrates.

c) Describe C.S. of lung.

P.T.O.

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

a) Histology of ovary

b) Histological structure of taste bud.

c) JG complex

d) T.S. of Liver

Q4) Describe basic histological organisation of alimentory canal. **[10]**

OR

Describe histology of adrenal gland.

EEE

Total No. of Questions : 4]

SEAT No. :

P538

[Total No. of Pages : 2

[4817]-333
T.Y. B.Sc.
ZOOLOGY
ZY - 333 : Biological Chemistry
(2008 Pattern) (Semester-III) (Paper-III)

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

Instructions to the candidates:

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

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

a) What are Vander Waals forces?

b) Define proteins.

c) State the names of fat soluble vitamins.

d) Give the structure of water molecule.

e) Define Bronsted base.

f) State any two names of enzymes.

g) Give any two examples of disaccharides.

h) State any two uses of colloids.

i) Give the names of types of proteins.

j) What is saponification?

P.T.O.

Q2) Attempt Any Two of the following: **[10]**

a) Describe physical properties of carbohydrates.

b) Describe primary structure of proteins.

c) Describe the effect of substrate concentration on the rate of an enzyme catalysed reaction.

Q3) Write notes on Any Two of the following: **[10]**

a) Arteriosclerosis.

b) Sorenson's Formal titration.

c) Acidosis.

d) Stereoisomerism in carbohydrates.

Q4) What are amino acids? Give an account of properties of amino acids related to any one of their functional groups. **[10]**

OR

Define lipids. Describe classification of lipids with suitable examples.

●●●●●

Total No. of Questions : 4]

SEAT No. :

P539

[Total No. of Pages : 2

[4817]-334
T.Y. B.Sc.
ZOOLOGY
ZY - 334 : Environmental Biology and Toxicology
(Semester - III) (New Course) (2008 Pattern) (Paper - IV)

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

Instructions to the candidates:

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

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

a) What is toxicology?

b) Give the names of any two natural ecosystem.

c) Define pond ecosystem.

d) Define biodegradable pollutants.

e) State the names of any two agricultural wastes.

f) Define population explosion.

g) Define Forest.

h) Define dose.

i) Give the names of any two pesticides.

j) Define Food Web.

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

a) Describe role of environmental organizations.

b) Describe sources of noise pollution.

c) Describe different types of toxicants.

P.T.O.

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

a) Land degradation.

b) Endangered species.

c) Soil Conservation.

d) Sewage.

Q4) Define air pollution. Describe different types of air pollutants and their effects. **[10]**

OR

Describe in detail oxygen cycle in the atmosphere.

Total No. of Questions : 4]

SEAT No. :

P540

[Total No. of Pages : 4

[4817]-335
T.Y. B.Sc.
ZOOLOGY
ZY - 335(A) : General Pathology (Elective-I)
(2008 Pattern) (Semester-III) (Paper-V)

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

Instructions to the candidates:

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

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

a) What is experimental pathology?

b) What is mucoid degeneration?

c) What is jaundice?

d) Define metastatic calcification.

e) Define coagulative necrosis.

f) State any two types of gangrene.

g) Define hyperamia.

h) State any two examples of chronic inflammation.

i) What is secondory healing?

j) Define leukomia.

P.T.O.

Q2) Attempt Any Two of the following: **[10]**

a) Describe process of dystrophic calcification.

b) Describe the normal process of pigmentation.

c) Describe renal function test.

Q3) Write notes on Any Two of the following: **[10]**

a) Tuberculosis.

b) Amyloid degeneration.

c) Caseous necrosis.

d) Malignant tumour.

Q4) Define inflammation. Describe acute and chronic inflammation. **[10]**

OR

Define embolism. Describe in detail sources and types of embolism. Write a note on effects of embolism.

●●●●●

Total No. of Questions : 4]

P540

[4817]-335
T.Y. B.Sc.
ZOOLOGY
ZY - 335(B) : Basic Entomology (Elective-I)
(2008 Pattern) (Semester-III) (Paper-V) (New Course)

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

Instructions to the candidates:

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

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

a) Write functions of Ocelli.

b) What is Furcula?

c) Explain tactile receptors.

d) What is Coractate Pupae?

e) What is insect biotechnology?

f) What is apodemes?

g) Explain aristate antenna.

h) Name any two genital appendages.

i) What is tymbal?

j) Name any two insects used in genetics studies.

Q2) Attempt Any Two of the following: **[10]**

a) Describe any two types of insect pheromones.

b) Describe sound producing organ in cicada.

c) Describe auditory receptors in insects.

Q3) Write note on Any Two of the following: **[10]**

a) Use of insects in medicine.

b) Hemimetabola type of metamorphosis.

c) Any two branches or entomology.

d) Corbiculate legs.

Q4) Describe light producing organ and mechanism of light production in insects. **[10]**

OR

Describe any two types of mouth parts in insects.

●●●●●

Total No. of Questions : 4]

SEAT No. :

P541

[Total No. of Pages : 2

[4817]-336
T.Y. B.Sc.
ZOOLOGY
ZY-336:Cell Biology
(2008 Pattern) (Semester-III) (Paper-VI)

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

Instructions to the candidates:

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

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

a) What is plasmodesmata.

b) What is synapsis.

c) What is RER.

d) Define nuclear matrix.

e) Define karyokinesis.

f) What is synaptonemal complex.

g) What is fimbrae.

h) What is plasmid.

i) What is crossing over.

j) What is exocytosis.

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

a) Explain daniell and davson model of plasma membrane.

b) Describe Nucleo-cytoplasmic interactions.

c) Describe polymorphism in lysosomes.

P.T.O.

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

a) Functions of mitochondria.

b) Active transport.

c) Endoplasmic reticulum.

d) Ageing.

Q4) What is cancer? Describe extrinsic causes of cancer **[10]**

OR

What is cell cycle? Describe various phases of mitosis.

Total No. of Questions : 4]

SEAT No. :

P542

[Total No. of Pages : 2

[4817]-337
T.Y. B.Sc.
GEOLOGY
GL - 331 : Mineralogy
(2008 Pattern) (Semester - III) (Paper - I)

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

Instructions to the candidates:

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

Q1) Answer in 2/3 lines: **[10]**

a) Explain the term Uniaxial minerals.

b) What is R.I. of a mineral?

c) Explain the term Polymorphism.

d) Give the names of end-members in an isomorphous series of Pyroxene Mineral Group.

e) Name any two Carbonate minerals.

f) Give crystal system of Sodalite.

g) Name the three polymorphs of K-felspar.

h) Explain the term Pleochroism.

i) What is Aquamarine?

j) What are refractory minerals?

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

a) Clinoamphiboles.

b) Paragenesis of Felspar Minerals.

c) Paragenesis of Alumino-Silicate minerals.

P.T.O.

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

a) Becke's Line method.

b) Geological and geographical distribution of Kyanite.

c) Composition and paragenesis of Limonite.

Q4) Give Silicate structure, Chemical Composition, Physical and Optical properties, Paragenesis and alteration products of Garnet Mineral Group. **[10]**

OR

Olivine Mineral Group.

Total No. of Questions :4]

SEAT No. :

P543

[Total No. of Pages :2

[4817]-338
T.Y.B.Sc.
GEOLOGY
GL-332: Igneous Petrology
(2008 Pattern) (Paper - II) (Semester - III)

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

Instructions to the candidates:

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

Q1) Answer the following in 2/3 lines: **[10]**

a) Reaction rim.

b) Magmatic contamination.

c) Soret effect.

d) Orbicalar structure.

e) Flow crystallisation.

f) Types of magma.

g) Selective nucleation.

h) Pyrogenetic minerals.

i) Give the name of the rock showing flow structure.

j) Give the base of Niggli's classification.

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

a) Primary magma.

b) S J Shand's classification of lgneous rocks - silica saturation concept.

c) Generation of magma with respect to temperature and pressure conditions.

P.T.O.

Q3) Write notes on (any two): **[10]**

a) Mixing of similar magmas.

b) Basalt - Origin & composition.

c) Significance of rock kindred.

Q4) Describe in detail the crystallisation of Ab - An - Di system and its significance. **[10]**

OR

What is meant by magmatic evolution? Explain in detail, the process of crystal fractionation. Add a note on the system Fosterite- Fayalite.

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Total No. of Questions : 4]

SEAT No. :

P544

[Total No. of Pages : 2

[4817]-339
T.Y. B.Sc.
GEOLOGY
GL - 333 : Sedimentary Petrology
(2008 Pattern) (Semester-III) (Paper-III)

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

Instructions to the candidates:

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

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

a) Define maturity of sediments.

b) Name three components used by Okada for the classification of sandstones.

c) Name any two sedimentary environments.

d) What are heavy minerals?

e) What is provenance?

f) Name any two heavy minerals which indicate igneous provenance.

g) What is grey wacke?

h) Name two types of maturity of sediments.

i) What do you mean by mineral stability?

j) Who proposed phi scale?

P.T.O.

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

a) Define the term sedimentology. Describe its relations with other basic sciences.

b) Explain the terms syngenetic and epigenetic ores with suitable examples.

c) Define the term weathering. Explain with examples the processes of hydrolysis and carbonation.

Q3) Answer in short (Any Two): **[10]**

a) Describe Folk's classification of Limestones.

b) What are primary sedimentary structures? Describe the significance of ripple marks.

c) Explain the tectonic control on sedimentation.

Q4) Describe the classification of depositional sedimentary environments. **[10]**

OR

Explain the concept of dispersal based on size, sphericity, roundness and mineral composition.

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Total No. of Questions : 4]

SEAT No. :

P545

[Total No. of Pages : 2

[4817]-340
T.Y. B.Sc.
GEOLOGY
GL - 334 : Structural Geology
(2008 Pattern) (Paper - IV) (Semester - III)

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

Instructions to the candidates:

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

Q1) Answer the following in 2/3 lines: **[10]**

a) Couple.

b) Ultimate strength.

c) Economic importance of salt dome.

d) Translational gliding.

e) Foliation.

f) Recrystallisation.

g) Mullion.

h) Brittle and ductile deformation.

i) Fracture clavage.

j) Slip folding.

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

a) The concept of stress ellipsoid.

b) Ultimate causes of folding.

c) Objectives of structural Geology.

P.T.O.

Q3) Write notes on (any two): **[10]**

a) Stages of deformation in rocks.

b) Composition and resolution of forces.

c) Explain the mechanics of normal fault.

Q4) Define stress. State the factors controlling behaviours of rocks under stress. Explain the role of confining pressure. **[10]**

OR

What are lineations? Explain the formation of primary lineation.

Total No. of Questions : 4]

SEAT No. :

P546

[Total No. of Pages : 2

[4817]-341
T.Y. B.Sc.
GEOLOGY
GL - 335 : Precambrian Stratigraphy of India
(2008 Pattern) (Semester-III) (Paper-V)

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

Instructions to the candidates:

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

Q1) Answer in 2/3 lines: **[10]**

a) Define Oceanic trench.

b) Give physiographic divisions of India.

c) Name the cratons found in Southern Peninsular India.

d) Name the older green stone belt of Dharwar craton.

e) Name the rocks of Chalk Hills.

f) Give geographic location of Vaikrita Group.

g) Give economic importance of Singhbhum Shear Zone.

h) Name any two lower Purana basins / Groups from Northern Indian Peninsula.

i) On which craton the rocks of Bhima Group are found?

j) What is Anorthosite? Where is it found?

P.T.O.

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

a) Dharwar Supergroup.

b) Singhbhum Group.

c) Litho stratigraphic classification of Cuddapah Supergroup.

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

a) Salkhala Group.

b) Rocks of Eastern Ghat Mobile Belt.

c) Lithostratigraphic succession of Vindhyan Supergroup.

Q4) Give geographic distribution, stratigraphic succession, lithology and economic importance of Kaladgi Supergroup. OR Dongargarh Supergroup. **[10]**

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Total No. of Questions : 4]

SEAT No. :

P547

[Total No. of Pages : 2

[4817]-342
T.Y. B.Sc.
GEOLOGY
GL-336:Applied Geology-I
(2008 Pattern) (Semester-III) (Paper-VI)

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

Instructions to the candidates:

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

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

a) What is reconnaissance survey?

b) What is chilled contact?

c) What is white body?

d) What is oblique aerial photograph?

e) Give spectral bandwidth of thermal IR.

f) What is area feature?

g) What is proximity analysis?

h) State any two uses of GIS.

i) What is active sensor?

j) What does RADAR stand for?

Q2) Write in short (any two): **[10]**

a) Explain how will you select the area for field survey.

b) Classify aerial photographs on the basis of camera axis.

c) Compare the raster and vector data model.

P.T.O.

Q3) Answer in short (any two): **[10]**

a) Explain atmospheric windows.

b) Describe significance of rectangular drainage pattern.

c) Give applications of remote sensing in groundwater survey.

Q4) What are aerial photographs? Explain their geometrical characteristics. Explain various discripancies occurring in aerial photographs. **[10]**

OR

Give a brief history of remote sensing satellites.

Total No. of Questions : 4]

SEAT No. :

P548

[Total No. of Pages : 3

[4817]-343
T.Y. B.Sc.
STATISTICS (Principal)
ST - 331 : Distribution Theory - I
(2008 Pattern) (Semester - III) (Paper - I)

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

Instructions to the candidates:

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

Q1) a) Attempt each of the following: **[1 each]**

i) If X~ $\beta_2(2, 1)$ then harmonic mean of X is:

A) 2 B) 1

C) 1/2 D) 3

ii) (X_1, X_2, X_3)~ MD(n, p_1, p_2, p_3) then cov(X_1, X_3) is

A) $n\, p_2\, p_3$ B) $-n\, p_1\, p_3$

B) $n\, p_3\, q_1$ C) $-nq_1\, p_3$

iii) Let X ~W($\alpha = 6$, $\beta = 1$) then mean of X is

A) 6 B) 5

C) 1/6 D) 1/5

iv) If X ~ $\beta_1(m, n)$ then the distribution of 1–X is

A) $\beta_2(n, m)$ B) $\beta_1(n, m)$

C) $\beta_2(m, n)$ D) $\beta_1(m, n)$

P.T.O.

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

i) If $(X_1, X_2, X_3) \sim MD(n, p_1, p_2, p_3)$ then $X_1 + X_2 \sim \beta(n, p_1 + p_2)$

ii) Let $X \sim W(\alpha, \beta)$ then distribution of X^{α} is standard exponential.

c) i) Define order statistics

ii) State Chebychev's inequality.

iii) Define convergence in probability.

iv) Obtain Hazard rate of $W(\alpha, \beta)$ distribution.

[1 each]

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

a) Let $X \sim \beta_1(m, n)$. Derive the expression for r^{th} raw moment of X. Hence or otherwise find mean and variance of X.

b) State and prove central limit theorem for i.i.d. random variables.

c) Five independent observations are made on r.v. X having N(0, 1) distribution. Find the probability that 2 observations are less than –1, two observations lie between –1 and 1 and one observation is greater than 1.

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

a) Obtain the p.d.f. of i^{th} order statistic $X_{(i)}$ for a random sample of size n from a continuous distribution.

b) Let $X \sim W(\alpha, \beta)$. Obtain expression for distribution function $F(x)$ and hence find the median of X.

c) Let $X_1, X_2, \ldots X_{100}$ be i.i.d. random variables having mean $\mu = 75$ and variance $\sigma^2 = 225$. Using central limit theorem Find $P\left[\left|\bar{X} - \mu\right| < 6\right]$.

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

a) i) Find the expectation of sample median drawn from U(0, 1) distribution when sample is of size $(2n + 1)$ where n is non-negative integer. **[7]**

ii) If X ~ $\beta_1(m,n)$ then show that $Y = \frac{1-X}{X} \sim \beta_2(n,m)$. **[3]**

b) i) If X and Y are independent random variables having $G(\lambda, m)$ and $G(\lambda, n)$ distribution respectively, then show that $\frac{X}{Y} \sim \beta_2(m,n)$. **[6]**

ii) If X is random variable such that E(X) = 3 and $E(X^2) = 13$, show that $P[-2 < X < 8] \geq 21/25$. **[4]**

Total No. of Questions :4]

SEAT No. :

P549

[Total No. of Pages :3

[4817]-344
T.Y.B.Sc.
STATISTICS (Principal)
ST-332: Theory of Estimation
(2008 Pattern) (Paper - II) (Semester - III) (Theory)

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

Instructions to the candidates:

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

Q1) Attempt each of the following:

A) In each of the following cases, choose the correct alternative: **[1each]**

a) If $X_1, X_2, - - -, X_n$ is a random sample from N(μ,1), then the likelihood function is _____.

i) $\left(\frac{1}{\sigma\sqrt{2\pi}}\right)^n e^{-\frac{1}{2\sigma^2}\sum(x_i-\mu)^2}$ ii) $\left(\frac{1}{\sqrt{2\pi}}\right)^n e^{-\frac{1}{2}\sum(x_i-\mu)^2}$

iii) $-n.\log_e(2\pi)-\frac{1}{2}\sum(X_i-\mu)^2$ iv) $\left(\frac{1}{\sqrt{2\pi}}\right)^n e^{-\frac{1}{2}\sum x_i^2}$

b) If $\bar{X}$ is a mean of a random sample from Poisson (θ), then _____.

i) $(\bar{X})^2$ is an unbiased estimator of θ^2.

ii) $\sqrt{\bar{X}}$ is an unbiased estimator of $\sqrt{\theta}$.

iii) $5\bar{X}$ is an unbiased estimator of 5θ.

iv) $\log \bar{X}$ is an unbiased estimator of logθ.

P.T.O.

c) If $X_1, X_2, - - -, X_n$ is a random sample from U(0, θ) then, the sufficient estimator of θ is _____.

i) $\bar{X}$ ii) $\sum X_i$

iii) $X_{(n)}$ iv) ΠX_i

d) If $X_1, X_2, - - -, X_n$ is a random sample from N(μ, σ^2) μ unknown then, the pivotal quantity for interval estimation of σ^2 is _____.

i) $\frac{\bar{X}-\mu}{\sigma/\sqrt{n}}$ ii) $\frac{\sum(X_i-\mu)^2}{\sigma^2}$

iii) $\frac{\bar{X}-\mu}{s/\sqrt{n}}$ iv) $\frac{\sum(X_i-\bar{X})^2}{\sigma^2}$

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

a) Unbiased estimator is always a function of sufficient statistic.

b) Maximum likelihood estimator is unique.

C) Attempt each of the following: **[1each]**

a) Distinguish between estimator and estimate.

b) Define the efficiency of estimator T_1 in relation to T_2.

D) Attempt each of the following: **[1each]**

a) Explain the term 'interval estimation'

b) State the Neyman factorization criterion to find the sufficient statistic.

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

a) If $X_1, X_2, - - -, X_n$ is a random sample from a distribution with variance σ^2 then, show that $s^2 = \frac{\sum(X_i-\bar{X})^2}{n-1}$ is an unbiased estimator of σ^2.

b) If X is a Poisson (λ) random variable, then find the Fisher information function I(λ).

c) If $X_1, X_2, - - -, X_n$ is a random sample from Poisson (λ) then , show that the sample mean $\bar{X}$ is a minimum variance bound unbiased estimator (MVBUE) of λ.

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

a) If $X_1, X_2, - - -, X_n$ is a random sample from geometric distribution taking non-negative values with parameter p, then find the estimator of p using the method of moments.

b) If $X_1, X_2, - - -, X_n$ is a random sample from $U(0,\theta)$ then, find the maximum likelihood estimator of θ.

c) If $X_1, X_2, - - -, X_n$ is a random sample from Bernoulli distribution with parameter p, then find the sufficient estimator of p.

Q4) Attempt any one of the following:

a) State and prove the Cramer-Rao inequality. Also derive the condition when an estimator attains the Cramer -Rao lower bound. **[10]**

b) i) Suppose T_1 and T_2 are the unbiased estimators of θ, $Var(T_1) = \sigma_1^2$, $Var(T_2) = \sigma_2^2$, Corr $(T_1, T_2) = \rho$. If $T = a\ T_1 + (1-a)\ T_2$, $(0<a<1)$ then, show that T is an unbiased estimator of θ. Find the value of a for which Var(T) is minimum. **[5]**

ii) If $X_1, X_2, - - -, X_n$ is a random sample from $N(\mu, \sigma^2)$, σ^2 unknown then, state the pivotal quantity for interval estimation of μ and hence construct the $(1-\alpha)$ 100% confidence interval for μ. **[5]**

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Total No. of Questions : 4]

SEAT No. :

P550

[Total No. of Pages : 3

[4817]-345
T.Y. B.Sc.
STATISTICS (Principal)
ST - 333 : Statistical Process Control (Online Methods)
(2008 Pattern) (Semester-III) (Paper-III)

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

Instructions to the candidates:

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

Q1) Attempt each of the following:

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

i) The natural spread of the production process is given by

A) μ B) 6σ

C) σ D) 6μ

ii) The following probability distribution is used to obtain the control limits for C-chart.

A) Poisson B) Uniform

C) Binomial D) Hypergeometric

iii) The following limits are not decided by a statistician

A) 3σ limits

B) Exact probability limits

C) Specification limits

D) Trial control limits

iv) For a continuous production process, under CLT, the variable X follows a

A) Binomial distribution B) Poisson distribution

C) Geometric distribution D) Normal distribution

P.T.O.

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

i) A p-chart is a variable control chart.

ii) When a process is under statistical control w.r.t. a chart, then those control limits are called future control limits.

c) Distinguish between:

i) A defect and defective. **[1]**

ii) Attribute control charts and variable control charts. **[1]**

d) Explain the terms:

i) Natural tolerance limits. **[1]**

ii) Low spots and high spots on a p-chart. **[1]**

Q2) Attempt Any Two of the following (5 each):

a) i) Distinguish between online methods and off line methods of quality control.

ii) Out of R-chart and $\bar{X}$ chart, which chart is drawn first? Justify your answer.

b) Explain the construction of R-chart when standards are not given.

c) The following information is obtained for a manufacturing process:

Sample size = 5, number of samples = 30, $\Sigma\bar{X}_i = 18000$, $\Sigma R_i = 300$.

Obtain the fraction non confirming if the specification limits are 585 and 605 respectively. State the assumptions.

Q3) Attempt Any Two of the following (5 each):

a) Explain the construction of $\bar{X}$ chart when the standards are not given.

b) Write a note upon 'Operating characteristic curve (o.c. curve) for $\bar{X}$ chart'. State the assumptions.

c) Draw an appropriate control chart on number of weaving defects per rim of cloth(c_i) in following random sample of size 8 in a manufacturing process:

Sample number i	1	2	3	4	5	6	7	8
c_i	14	19	16	22	21	13	8	7

State your conclusion.

Q4) Attempt Any One of the following:

a) i) State the 7 PC tools in SPC. Explain the Fish bone diagram. **[5]**

ii) Give the construction of p chart based upon stabilized (standardized) control limits. (the population parameter P is unknown. Sample size n_i is variable). **[5]**

b) i) Distinguish between:

1) Chance causes and assignable causes of variation.

2) C_p and C_{pk} for a stable process. **[4]**

ii) State the different criteria for a process to be out of statistical control. **[3]**

iii) Explain the following terms: **[3]**

1) Exact probability limits.

2) The probability of catching the shift in process average on the first sample after the shift.

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Total No. of Questions : 4]

SEAT No. :

P551

[Total No. of Pages : 3

[4817]-346
T.Y. B.Sc.
STATISTICS (Principal)
ST - 334 : Design of Experiments
(2008 Pattern) (Theory) (Semester - III) (Paper - IV)

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

Instructions to the candidates:

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

Q1) Attempt each of the following:

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

i) In RBD with 4 blocks and 6 treatments, degrees of freedom for error sum of squares is

A) 14 B) 15

C) 18 D) 16

ii) A factorial experiment corresponding to three factors each at two levels is a

A) 3^2 factorial experiment.

B) 3×2 factorial experiment.

C) 2^3 factorial experiment.

D) 2×3 factorial experiment.

iii) When the experimental units are homogeneous, the following design is used:

A) LSD B) RBD

C) CRD D) Split plot design

P.T.O.

iv) In ANOCOVA, the main variable and the concomitant variable are

A) Independent B) Uncorrelated

C) Only posively Correlated D) Correlated

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

i) In split plot design, it is possible to study the interaction effect between main plot treatments and subplot treatments.

ii) All the three principles of design of experiments are used in LSD.

c) Define each of the following terms: **[1 each]**

i) treatment

ii) Experimental error

d) i) In a 2^2 factorial experiment, write expression for the main effect B. **[1]**

ii) Define a linear treatment contrast. **[1]**

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

a) State the mathematical model used in RBD with the underlying assumptions. Also obtain the least square estimate of treatment effect.

b) Explain Kruskal Wallis H test.

c) Show that mean sum of squares due to error is unbiased estimator of error variance in CRD.

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

a) Explain the concept of ANOCOVA with an illustration. Give the mathematical model for ANOCOVA in CRD with assumptions.

b) What are factorial experiments? For a 2^3 factorial experiments with factors A, B and C, write the expression for the interaction effects AB and ABC.

c) Obtain efficiency of LSD over corresponding RBD with rows as well os columns as blocks.

Treatment. S.S = 372.52, Row. S.S = 421.34

Column. S.S = 298.68, Row. d.f. = 3

Total. S.S = 1240.84

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

a) i) Explain the concept of confounding in factorial experiments. Also differentiate between total and partial confounding in 2^3 factorial experiments. **[5]**

ii) Explain a split plot design. Give one example where it is applicable with a layout. **[5]**

b) i) Give the analysis of testing the significance of regression coefficient B and the equality of treatment effects of RBD with ANOCOVA. **[6]**

ii) Describe any two principles of design of experiments. **[4]**

Total No. of Questions : 4]

SEAT No. :

P552

[Total No. of Pages : 3

[4817]-347
T.Y. B.Sc. (Theory)
STATISTICS (Principal)
ST - 335 : C Programming (Turbo C)
(2008 Pattern) (Semester-III) (Paper-V)

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

Instructions to the candidates:

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

Q1) Attempt each of the following:

a) In each of the following cases, choose the correct alternative: **[1 each]**

i) In C language, notation "A" is for a -

A) Character B) String

C) Constant D) Operator

ii) Which of the following is not a valid variable name?

A) Pushp1 B) _Pushp

C) 1Pushp D) Pushp_rose

iii) The new line character is -

A) \o B) \t

C) \y D) \n

iv) int $*x$; declares variable x as -

A) a pointer to integer

B) integer variable

C) integer variable with multiplication

D) variable with not an integer value

P.T.O.

b) In each of the following cases, state whether the given statement is true or false: **[1 each]**

i) An array should be used to store dissimilar elements and a structure to store similar elements.

ii) Binary operator needs two operands.

c) i) What do you mean by calling a function by reference? **[1]**

ii) Explain how the for loop is executed. **[1]**

iii) Explain the concept of union. **[1]**

iv) When do you prefer to use a switch statement? **[1]**

Q2) Attempt Any Two of the following:

a) Draw a flow chart to obtain mean and variance of X_1, X_2, ..., X_n observations. **[5]**

b) Explain each of the following giving syntax and one suitable example.

i) do.....while

ii) if.....else **[3 + 2 = 5]**

c) What is an user defined function? Write a function to compute x^4. **[5]**

Q3) Attempt Any Two of the following:

a) i) Explain giving illustration the procedure of declaring and initializing a one dimensional away. **[3]**

ii) Distinguish between local and global variables. **[2]**

b) Write a C program to find area of a circle and a triangle. **[5]**

c) Write a C program to check whether a given integer is odd or even. **[5]**

Q4) Attempt Any One of the following:

a) i) Explain the different formats of syntax and use of printf( ). **[4]**

ii) Write a C program, that will read two 3×3 matrices and print their addition. **[6]**

b) i) Describe how increment and decrement operators work in C language. **[4]**

ii) Write a C program to obtain correlation coefficient for a bivariate data. **[6]**

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Total No. of Questions :4]

SEAT No. :

P553

[Total No. of Pages :7

[4817]-348
T.Y.B.Sc.
STATISTICS (Principal)
ST-336 (A): Operations Management
(2008 Pattern) (Paper - VI) (Semester - III) (Elective - I) (Theory)

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

Instructions to the candidates:

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

Q1) Attempt each of the following:

A) In each of the following cases, choose the correct alternative from the given alternatives: **[1each]**

a) If the three time estimates of an activity in PERT are 18, 20 and 46 days, then the expected time of the activity is

i) 24 days ii) 20 days

iii) 23 days iv) 42 days

b) In Hurwitz criterion the decision maker is optimistic if the value of α is

i) 0 .2 ii) 0.5

iii) 0.9 iv) 0

c) A critical path in a network is the path with

i) Minimum number of activities

ii) Maximum number of activities

iii) Minimum duration

iv) Maximum duration

P.T.O.

d) Suppose for any activity, normal time = 7 days, crash time = 5 days, normal cost = 8000 Rs, crash cost = 10,000 Rs. then cost slope of the activity is

i) 2000 ii) 1000

iii) 4000 iv) 2500

B) In each of the following cases, state whether the given statement is true or false: **[1each]**

a) In CPM, forward pass computations are required to find latest finish time.

b) PERT is probabilistic while CPM is deterministic.

C) Define following terms: **[1each]**

a) Expected Monetary Value (EMV) of a strategy.

b) States of nature

D) a) State in brief how inventory items are classified as items of category A. **[1]**

b) Explain meaning of cost benefit analysis. **[1]**

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

a) Write a short note on ABC analysis.

b) A plant manager deciding replacement policies for a new machine estimates the following costs of spare parts and labour. The purchase cost of machine is Rs.60,000/-. Determine the optimum period for replacing machine.

Year	1	2	3	4	5
Cost of spare parts	4000	4270	4880	5700	6800
Cost of labour	14000	16000	18000	21000	25000
Resale value	42000	30000	20400	14400	9650

c) The annual demand for an item is 3200 units. The unit cost is Rs. 6/-. The inventory carrying cost is 25% per annum per unit. The cost of one procurement is Rs 150/-. Determine EOQ and number of orders per year.

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

a) Write short note on Vital, Essential and Desirable (VED) analysis.

b) The time estimates of activities of a small project are listed below.

Activity	Time estimates (in days)		
	Optimistic	Most likely	Pessimistic
1 - 2	1	1	7
1 - 3	1	4	7
1 - 4	2	2	8
2 - 5	1	1	1
3 - 5	2	5	14
4 - 6	2	5	8
5 - 6	3	6	15

i) Find expected duration and variance of each activity.

ii) Find expected duration and variance of the project.

c) Consider the following pay-off table:

Event / Strategy	I	N	D
H	70	30	15
M	50	45	0
S	30	30	30

Determine optimal strategy using

i) Maxmin criterion

ii) Laplace criterion

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

a) The following table shows details of a project. **[10]**

Task	Immediate Predecessor	Normal		Crash	
		Time (in weeks)	Cost (in Rs.)	Time (in weeks)	Cost (in Rs.)
A	-	10	20,000	7	30,000
B	-	8	15,000	6	20,000
C	B	5	8,000	4	14,000
D	B	6	11,000	4	15,000
E	B	8	9,000	5	15,000
F	E	5	5,000	4	8,000
G	A, D, C	12	3,000	8	4,000

Indirect cost is Rs. 2,800 per day. Find the optimal duration and the associated minimum project cost.

b) i) Derive the expression for Economic order Quantity (E.O.Q) in an inventory model with uniform demand, instantaneous replacement rate and no shortages. **[5]**

ii) Define following terms: **[5]**

1) Earliest start time of an event.

2) Decision making under uncertainity.

3) Free float of an activity.

4) Regret table.

5) Hurwitz criterion.

EEE

[4817]-348

P553 **T.Y.B.Sc.**

STATISTICS (Principal)

ST-336 (B): Actuarial Statistics

(2008 Pattern) (Paper - VI) (Theory) (Semester - III) (Elective - I)

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

Instructions to the candidates:

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

Q1) A) In each of the following cases, choose correct alternative: **[1each]**

a) Range of possible values of curtate future life time of (X) is

i) $(0, \infty)$ ii) 0, 1, 2 -------

iii) $(-\infty, \infty)$ iv) $x, x+1$ ------

b) If δ is constant force of interest then δ=

i) $-\vartheta$ ii) $\log \vartheta$

iii) ϑ iv) $-\log \vartheta$

c) If force of mortality is μ and force of interest is δ then $\bar{A}_x$ is

i) μ ii) $\mu+\delta$

iii) $\frac{\mu}{\mu+\delta}$ iv) $\frac{1}{\mu+\delta}$

d) Relationship between T_x and L_x is given by

i) $L_x = L_x + L_{x+1}$ ii) $T_x = L_x + T_{x+1}$

iii) $T_x = L_x - L_{x+1}$ iv) $T_x = \frac{L_x}{T_{x+1}}$

B) In each of the following cases, state whether the given statement is true or false: **[1each]**

a) Loss at issue I(t) is decreasing function of t.

b) If $s(x)$ is survival function, $s(\infty) = 1$.

C) Explain each of the following terms: **[1each]**

a) Insurer

b) Annuity

D) Give meaning of each of following notation: **[1 each]**

a) e_x^o

b) $\ddot{a}_{\overline{n}|}$

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

a) Obtain E(z) where z is net single premium in terms of ϑ for the following:

i) n year term insurance

ii) Whole life insurance

iii) n year term insurance

b) Under the assumption of uniform distribution of deaths in unit interval of time

$l_{48} = 8910$ $l_{49} = 8800$, $l_{50} = 8560$ find:

i) ${}_{1.5}P_{48}$

ii) $\mu_{49.5}$

c) With the effective rate of interest 10% per annum, obtain the following:

i) Effective rate of discount.

ii) Nominal rate of interest convertible quarterly.

iii) Present value of Rs.25000 due at the end of 3rd year.

iv) Accumulated value of Rs.30000 at the end of 4th year.

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

a) Define curtate future life time variable of X, K(X). Show that the p.m.f of $k(x)$ is

$$P[k(x)=k]=\begin{cases} {}_kP_x \; Q_{x+k} & ;\ k=0,1,2... \\ 0 & ;\ \text{otherwise} \end{cases}$$

b) Explain the concept of pure risk. Discuss the characteristics of insurable risk.

c) For a fully continuous whole life insurance 1 on (x), you are given that $\mu_X(t)= 0.04;\ t \geq 0$ and $\bar{A}_x = 0.4$. If premiums are determined by equivalence principle, calculate variance of the loss L.

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

a) i) Mortality rates q_x for a given type of population are as follows **[5]**

Age in years (X)	0	1	2	3	4	5	6
q_x	0.2	0.25	0.30	0.60	0.80	0.90	1.00

Construct the columns of d_x and L_x for a radix of 50,000.

ii) Under the assumption of a constant force of mortality μ and of a constant force of mortality δ, evaluate $\bar{a}_x$ and $P[\bar{a}_{\overline{T}|} > \bar{a}_x]$. **[5]**

b) i) If for the annuity certain, the payments are made at the beginning of year in each year for the period of n years then show that $\ddot{s}_{\overline{n}|} = (1+i)^n \ddot{a}_{\overline{n}|}$. **[5]**

ii) State any three uses of life table. **[3]**

iii) Show that force of interest at time t (δ_t) is independent of t. **[2]**

EEE

Total No. of Questions : 4]

SEAT No. :

P554

[Total No. of Pages : 2

[4817]-349
T.Y. B.Sc.
GEOGRAPHY
Gg - 331 : Principles and Techniques of Watershed Management
(Semester - III) (2008 Pattern) (Paper - I)

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

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Diagrams & maps must be drawn whenever necessary.***
4) ***Use of map stensils is allowed.***

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

a) Define catchment area.

b) List any two needs of watershed management.

c) What do you mean by relative relief?

d) What is the size of milli-watershed?

e) Define autochthonous rivers.

f) How does the sheet erosion takes place?

g) What is interception?

h) State various types of runoff.

i) What do you mean by LCC?

j) Mention any two criteria used in LCC.

Q2) Write short answers : (any two) **[10]**

a) Describe the principles of watershed Management.

b) Elaborate the geomorphic characteristics of watershed.

c) Explain the processes of soil erosion by wind.

P.T.O.

Q3) Write short notes: (any two) **[10]**

a) Objectives of Watershed Management.

b) Relief aspects of Watershed.

c) Hydrological cycle.

Q4) Define Soil erosion. Describe the major factors affecting soil erosion according to USLE. **[10]**

OR

Give an account of criteria and need of Land Capability classified in Watershed.

Total No. of Questions :4]

SEAT No. :

P555

[Total No. of Pages :2

[4817]-350
T.Y.B.Sc.
GEOGRAPHY
Gg-332: Geography of Travel and Tourism
(2008 Pattern) (Paper - II) (Semester - III)

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

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Diagrams and maps must be drawn wherever necessary.***
4) ***Use of map stencils is allowed.***

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

a) What is tourism?

b) Why is tourism called a multifaceted phenomena?

c) State any two dynamic elements of tourism.

d) What is absolute location?

e) Why is accessibility regarded as a physical asset?

f) What is meant by intervening opportunity?

g) State any two effects of climate on tourism.

h) Mention any two national parks from Central India.

i) State any two differences between travel and tourism.

j) State any two characteristic features of an international tourist.

Q2) Write short answers (any two): **[10]**

a) Tourism as a regional resource.

b) Natural features as tourists attraction.

c) Heritage tourism in India.

P.T.O.

Q3) Write short notes (any two): **[10]**

a) Impact of vegetation on tourism.

b) Tourism and travel as basic needs of man.

c) Levels of tourist satisfaction.

Q4) What is resort? Discuss the types and geography of resorts. **[10]**

OR

Describe the impact of cultural diversity on tourism. Provide suitable examples.

EEE

Total No. of Questions : 4]

SEAT No. :

P556

[Total No. of Pages : 2

[4817]-351
T.Y. B.Sc.
GEOGRAPHY
Gg - 333 : Fundamentals of Geoinformatics (Paper-I)
(2008 Pattern) (Semester-III) (Paper-III)

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

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Diagrams and maps must be drawn wherever necessary.***
4) ***Use of map stencils is allowed.***

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

a) Write any two advantages of GIS.

b) Mention any four characteristics of Aerial photography.

c) Write the meaning of vector.

d) Define Geoinformatics.

e) What is TIN?

f) What do you understand by spatial data?

g) Name any two functions of GIS.

h) What is DBMS?

i) Define DTM.

j) Name any two commercial data sources of GIS.

P.T.O.

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

a) Explain spatial database giving suitable examples.

b) Write a brief history of GIS.

c) Explain surveying as a data source in GIS.

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

a) Spatial measurements.

b) GPS as a data source in GIS.

c) GIS softwares for vector data analysis.

Q4) Give an account of modelling surfaces in GIS. **[10]**

OR

Discuss the application of RS & GIS in agricultural studies.

●●●●●

Total No. of Questions : 4]

SEAT No. :

P557

[Total No. of Pages : 2

[4817]-352
T.Y. B.Sc.
GEOGRAPHY
Gg - 334 : India - A Geographical Study
(2008 Pattern) (Semester - III) (Paper - IV)

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

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Diagrams and Maps must be drawn wherever necessary.***
4) ***Use of Map stencils is allowed.***

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

a) What is the Latitudinal extent of mainland India?

b) Which is the oldest rock system found in India?

c) Give the geomorphic divisions of the Great Plains.

d) Name two left bank tributaries of the Indus.

e) What is EL Nino?

f) Name two species of sofwoods common in India.

g) What are littoral forests?

h) Name two areas affected by gully erosion in India.

i) What is desertification?

j) What is strip cropping?

Q2) Write short answers (any two): **[10]**

a) What are the main characteristics of the cool season in India?

b) West flouring rivers of the Peninsula.

c) Importance of forest conservation in India.

P.T.O.

Q3) Write short notes (any two): **[10]**

a) Deccan Trap.

b) Wind erosion in India.

c) Dry Tropical Forests.

Q4) Divide India into different physiographic divisions and discuss the characteristics of any one of them. **[10]**

OR

Discuss the theories of the Monsoon.

Total No. of Questions : 4]

SEAT No. :

P558

[Total No. of Pages : 2

[4817]-353
T. Y. B. Sc.
GEOGRAPHY
Gg-335: Geography of Soils (Paper-I)
(Paper-V) (2008 Pattern) (Semester-III)

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

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Diagrams & maps must be drawn wherever necessary.***
4) ***Use of map stencils is allowed.***

Q1) Answer the following in one or two sentences: **[10]**

a) What is pedology ?

b) What are soil separates ?

c) State any two primary minerals found in soil.

d) Define Weathering.

e) What is the significance of soil colour ?

f) What is wilting point ?

g) Define Oxidation.

h) What is soil pH ?

i) Define humus.

j) What are intrazonal soils ?

Q2) Write short answers : (any two) **[10]**

a) Explain the genetic structure of soil profile.

b) Describe the effect of soil moisture in pedogenesis.

c) Explain redox potential.

P.T.O.

Q3) Write short notes : (any two) **[10]**

a) Significance of Ion Exchange

b) Porosity & Permeability of the soil.

c) Processes of weathering.

Q4) What is soil science ? Give an account of the history of soil science. **[10]**

OR

Discuss the classification of zonal and azonal soils.

Total No. of Questions : 4]

SEAT No. :

P559

[Total No. of Pages : 2

[4817]-354
T.Y. B.Sc.
GEOGRAPHY
Gg-336: Fundamentals of Geoinformatics (Paper-II)
(2008 Pattern) (Semester-III) (Paper-VI)

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

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Diagrams and maps must be drawn wherever necessary.***
4) ***Use of map stencils is allowed.***

Q1) Answer the following questions in one or two sentences. **[10]**

a) What is electro-magnetic radiation?

b) What is photonadir?

c) What do you understand by IR colour photos?

d) State the use of oblique aerial photograph.

e) What do you understand by air base?

f) What is panchromatic photograph?

g) Mention various types of scattering.

h) What do you understand by principle point?

i) Mention types of stereoscope.

j) What does NRSC stand for?

Q2) Write short answers (any two): **[10]**

a) Distinguish between visible and NIR spectrum.

b) What are fudicial marks on an aerial photograph?

c) Distinguish between normal colour and IR colour photographs

P.T.O.

Q3) Write short notes (any two): **[10]**

a) Vertical aerial photograph.

b) Various spectral regions

c) Pseudoscopic image.

Q4) Describe historical development of remote sensing. **[10]**

OR

Give an account of applications of remote sensing in natural resource surveys.

Total No. of Questions : 4]

SEAT No. :

P560

[Total No. of Pages : 2

[4817]-355
T.Y. B.Sc.
MICROBIOLOGY
MB - 331 : Medical Microbiology - I
(New) (Semester - III) (2008 Pattern) (Paper - I)

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

Instructions to the candidates:

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

Q1) Attempt the following:

a) Match the following: **[5]**

	A		B
a)	Staphylococcus aureus	i)	Strict anaerobe
b)	Clostridium tetani	ii)	Coagulase positive
c)	Mycobacterium leprae	iii)	Virulence Marker Antigen
d)	Leptospira	iv)	Unculturable on artificial media
e)	Shigella	v)	Spirochete

b) State True or False: **[2]**

i) One of the possible effects of Gonorrhea is sterility.

ii) Delirium and rose spots on trunk are the characteristic symptoms of Typhoid fever.

c) Fill in the blanks: **[3]**

i) Blue pus is a characteristic symptom of infection by _____.

ii) _____ cocci are bile soluble.

iii) VDRL test is used for the diagnosis of _____.

P.T.O.

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

a) Sources and Reservoirs of infection.

b) Classification of streptococci.

c) Formation of tubercle.

Q3) Write short notes (Any two): **[10]**

a) Laboratory diagnosis and treatment of Anthrax.

b) Pathogenesis of clostridium perfringens.

c) Disease distribution with respect to place and person.

Q4) Attempt any one: **[10]**

a) Explain pathogenesis, Laboratory diagnosis and treatment of cholera.

b) Discuss defences and any two diseases of Respiratory system with respect to causative agents and symptoms.

Total No. of Questions :4]

SEAT No. :

P561

[Total No. of Pages :2

[4817]-356
T.Y.B.Sc.
MICROBIOLOGY
MB-332: Genetics & Molecular Biology -I
(2008 Pattern) (Paper - II) (Semester - III)

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

Instructions to the candidates:

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

Q1) A) Match the following: **[5]**

A		B	
a)	Anticodon	i)	Protein synthesis
b)	Charged tRNA	ii)	One step growth curve
c)	Ribosomes	iii)	Amino acyl tRNA synthetase
d)	Burst size	iv)	Tryptophan Operon
e)	Attenuation control	v)	Binding site on tRNA

B) Choose the correct answer: **[5]**

a) Which of the following is false about E.coli Lac Operon.

i) Polycistronic

ii) e.g of - ve control

iii) Allolactose is the inducer

iv) Repressor binds to Z gene

b) RNA primer generates _____ for DNA pol III activity.

i) free 3′ - PO_4 grp ii) free 5′ - PO_4 grp

iii) free 5′-OH grp iv) free 3′ - OH grp

P.T.O.

c) Repressor binds at the _____.

i) Promotor ii) Operator

iii) Structural gene iv) None of the above

d) _____ protein plays an important role in the termination of transcription.

i) Cro protein ii) Rho protein

iii) N protein iv) Q protein

e) T_2 h' bacteriophages are _____ mutants.

i) host range ii) plaque morphology

iii) star iv) conditional lethal

Q2) Diagrammatically represent (any two): **[10]**

a) Lytic & lysogenic switchover - genetic control.

b) Structure & control of Ara operon.

c) Recombination repair.

Q3) Write short notes on (any two): **[10]**

a) Role of ribosomes in translation.

b) Plaque morphology mutants.

c) Catabolite regression of Lac Operon.

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

a) Describe in detail the initiation, elongation & termination of DNA replication.

b) Describe all the stages of Parasexual cycle with special emphasis on mitotic crossover & haploidization & their use in mapping Aspergillus nidulans genome.

ℰℰℰ

Total No. of Questions : 4]

SEAT No. :

P562

[Total No. of Pages : 2

[4817]-357
T.Y. B.Sc.
MICROBIOLOGY
MB - 333 : Enzymology
(2008 Pattern) (Semester-III) (New Course) (Paper-III)

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

Instructions to the candidates:

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

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

a) Define:

i) Allosteric enzyme.

ii) Electrophoresis.

iii) Isoelectric point.

b) Enlist any two types of feedback inhibition.

c) In non competitive inhibition.

i) km decreases, V_{max} increases.

ii) km unchanged, V_{max} increases.

iii) km unchanged, V_{max} decreases.

iv) km increases, V_{max} unchanged.

d) Write any 2 symptoms caused by deficiency of folic acid.

e) Vitamin B_7 is an example of water insoluble vit. state whether True / False.

f) Write any 2 commonly occuring amino acids in catalytic site.

P.T.O.

g) Name the enzyme that can be assayed by chemiluminiscence method.

h) Enlist any 2 methods of purification of an enzyme based on solubility criteria.

Q2) Attempt Any Two of the following: **[10]**

a) How will you determine molecular weight of a protein by sedimentation velocity.

b) What is zymogen? Explain the mechanism of zymogen activation with suitable example.

c) Explain the method of immobilization of an enzyme by adsorption tech.

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

a) Explain the spectrophotometric method of an enzyme assay.

b) Draw the structure of Pantothenic acid and give its biochemical role.

c) Write a note on enzyme compartmentation.

Q4) Attempt Any One of the following: **[10]**

a) With graphical representation derive initial velocity equation for uncompetitive inhibition.

b) Explain with principle, methodology and applications of ion exchange chromatography.

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Total No. of Questions : 4]

SEAT No. :

P563

[Total No. of Pages : 2

[4817]-358
T.Y. B.Sc.
MICROBIOLOGY
MB - 334 : Immunology - I
(2008 Pattern) (Paper - IV) (Semester - III)

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

Instructions to the candidates:

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

Q1) Attempt the following:

a) Match the following and rewrite: **[5]**

A		B	
1)	Stem Cell	i)	Soluble antigen
2)	Lymph node	ii)	anti tetanus serum
3)	Precipitation	iii)	haemopoiesis
4)	Passive immunization	iv)	allotype of Ig
5)	Gm	v)	Secondary Lymphoid tissue

b) State True or False: **[2]**

i) SRBC is an example of particulate antigen.

ii) Hinge region is present between C_H1 and C_H2 domains.

c) Enlist, atleast two of each: **[3]**

i) Applications of FACS.

ii) Techniques of immunoelectrophoresis.

iii) Types of dendritic cells.

P.T.O.

Q2) Describe ANY TWO: **[10]**

a) Preparation of Monoclonal antibody.

b) Acute inflammation.

c) Host factors that effect immunogenecity.

Q3) Attempt any TWO: **[10]**

a) Explain :- Immunoglobulins can destroy antigen by various ways.

b) Illustrate diagrammatically - process of phagocytosis.

c) Compare in tabular form - Innate and Acquired immunity.

Q4) Attempt ANY ONE **[10]**

a) Describe in detail - immunofluorescence techniques.

b) Describe classical pathway of complement activation.

Total No. of Questions : 4]

SEAT No. :

P564

[Total No. of Pages : 2

[4817]-359
T. Y. B. Sc.
MICROBIOLOGY
MB-335: Fermentation Technology-I
(2008 Pattern) (Semester-III) (Paper-V)

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

Instructions to the candidates:

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

Q1) Do as directed:

a) Define **[3]**

i) Strain

ii) Patent

iii) Secondary metabolite

b) Fill in the blanks. **[3]**

i) The temperature of fermentation is monitored using _____.

ii) The biomass can be quantitated by _____.

iii) The validation of pharmaceutical product is done by _____ department of fermentation industry.

c) State whether true or false : **[4]**

i) Revertants always have single site mutation and thus show increase in productivity.

ii) Sterility testing is carried out by Ames test.

iii) Spectrophotometric method is used for estimation of enzyme.

iv) Foam formation can be controlled by mechanical method as well as chemical agent.

P.T.O.

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

a) With suitable example, discuss protocol for strain improvement of growth associated product.

b) Describe Sham test.

c) Briefly explain Plackett-Burman design.

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

a) Write note on fermentation process control with respect to temperature and pH.

b) Comment on 'Recovery processes of fermentation products are not 100% efficient'.

c) What is market potential? Explain recurring and non- recurring expenses of fermentation processes.

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

a) What is 'Scale up'? Explain its stages for fermentation process.

b) Enlist methods used for detection and estimation of fermentation products. Describe Physicochemical methods.

Total No. of Questions : 4]

SEAT No. :

P565

[Total No. of Pages : 2

[4817]-360
T.Y. B.Sc.
MICROBIOLOGY
MB-336: Food and Dairy Microbiology
(2008 Pattern) (Semester-III) (Paper-VI) (New Course)

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

Instructions to the candidates:

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

Q1) Attempt the following:

a) Match the following: **[5]**

I	II
i) Yellow milk	a) Extrinsic factor
ii) Temperature of storage	b) Pseudomonas synxantha
iii) Red milk	c) Intrinsic factor
iv) Stormy fermentation	d) Brevibacterium erythrogens
v) O-R potential	e) Clostridium perfringens

b) Fill in the blanks **[2]**

i) The full form of NDDB is _____.

ii) The skimmed milk has_____% fat.

c) Define: **[2]**

i) Blanching

ii) Water activity

d) Write significance of tetra pak. **[1]**

P.T.O.

Q2) Attempt any two: **[10]**

a) Explain HTST method of pasteurization.

b) Describe spoilage of fruits and vegetables.

c) Write principles of food preservation.

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

a) Phosphatase test

b) Role of microorganisms in Idli batter fermentation

c) Preservation by canning

Q4) Attempt any one: **[10]**

a) Describe clostridial food poisoning with respect to sources and prevention.

b) Describe succession of microorganisms in milk leading to spoilage.

Total No. of Questions : 4]

SEAT No. :

P566

[Total No. of Pages : 3

[4817]-361
T.Y. B.Sc.
ELECTRONIC SCIENCE
EL - 331 : Advanced Digital System Design
(Semester - III) (2008 Pattern) (Paper - I)

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

Instructions to the candidates:

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

Q1) Attempt all of the following:

a) Define maximal compatibles. **[1]**

b) When the fundamental mode asynchronous sequential machine becomes unstable? **[1]**

c) State the difference between PAL and GAL. **[1]**

d) Write one disadvantage of VHDL. **[1]**

e) Write the steps to construct implication graph. **[2]**

f) "Transition tables are used for synchronous sequential machine" - Comment. **[2]**

g) State any two advantages of EPROM as PLD. **[2]**

h) "STD - LOGIC and STD-LOGIC-VECTOR are predefined data types" - Comment. **[2]**

Q2) Attempt any two of the following:

a) With the help of block diagram, explain working of asynchronous sequential circuit. **[4]**

b) Write various steps to explain how equivalence classes method is used to eliminate redundant states, with the help of suitable state table. **[4]**

c) Draw general structure of PLA and explain it. **[4]**

P.T.O.

Q3) Attempt any two of the following:

a) Draw logic diagram for mixed operating mode flip-flop. Discuss its working. **[4]**

b) What is digital system? Draw flow chart to indicate designing steps of a modern digital system. **[4]**

c) Explain various Algorithm state machine symbols. **[4]**

Q4) Attempt any two of the following:

a) List three critical race free state assignment techniques. Explain any one in detail. **[6]**

b) Draw the block diagram of stepper motor sequence generator and explain its working. **[6]**

c) i) Compare CPLD and FPGA. **[3]**

ii) Explain in brief Data objects used in VHDL. **[3]**

OR

Q4) Attempt all of the following:

a) Reduce the given state table using implication chart method. **[4]**

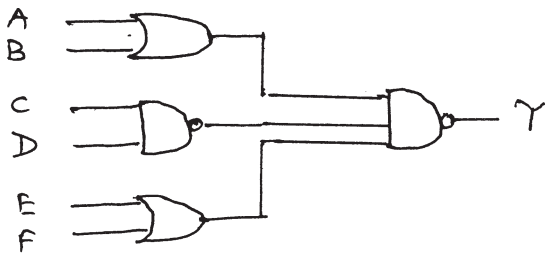
Present State	Next State $x = 0$	Next State $x = 1$	Output $x = 0$	Output $x = 1$
a	a	b	0	0
b	c	d	0	0
c	a	d	0	0
d	e	f	0	1
e	a	f	0	1
f	g	f	0	1
g	a	f	0	1

b) For a given boolean function, specify the required size of PAL and draw the structure of PAL. **[4]**

$f_1 = \overline{x}\,\overline{y} + \overline{x}\,y\,z + x\,y\,\overline{z}$

$f_2 = \overline{x}\,\overline{z} + \overline{y}\,z + x\,y\,z$

c) Write VHDL program that will implement the following logic circuit. **[4]**



Total No. of Questions :4]

SEAT No. :

P567

[Total No. of Pages :2

[4817]-362
T.Y.B.Sc.
ELECTRONIC SCIENCE
EL-332: Microcontrollers
(2008 Pattern) (New Course) (Paper - II) (Semester - III)

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

Instructions to the candidates:

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

Q1) Attempt all of the following:

a) What is Emulator? **[1]**

b) What is the capacity of internal RAM of 8051 μC? **[1]**

c) If (A) = 95 H, find the content of A after execution of the instruction SWAP A. **[1]**

d) What is the purpose of SP register? **[1]**

e) What is simulator? **[2]**

f) If (A) = 99 H and CY = 0, then after execution of instruction RLC A, what will be content of A? **[2]**

g) Write the purpose of ULN 2003 placed between 8051 and stepper motor. **[2]**

h) List the various SFRs used in 8051 μC. **[2]**

Q2) Attempt any two of the following:

a) Explain the various addressing modes with proper example used in 8051 μC. **[4]**

b) Draw and explain the interfacing of LCD with 8051 μC. **[4]**

c) Show the status of various flags of PSW register after execution of following instructions- **[4]**

MOV A, # 38 H

ADD A, # 2F H

P.T.O.

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

a) Write a note on assembler and debugger used for 8051 μC programming. **[4]**

b) Find the content of register A after execution of following program: **[4]**

```
MOV   A, # 0F H
SWAP  A
ORL   A, # 0F H
RR    A
```

c) List the instructions by which accumulator can be cleared. Explain any two with suitable example. **[4]**

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

a) Draw a flow chart and write a program to find the largest number out of given number in an array. The array starts from RAM location 71 H and the length of array is stored in RAM location 70 H. **[6]**

b) Interface data RAM of 32 K byte memory capacity to 8051 μC. Draw a suitable diagram and provide memory map. **[6]**

c) Draw internal block diagram of 8051 μC. State its features in detail. **[6]**

OR

Attempt <u>all</u> of the following:

a) Illustrate DAA instruction with suitable example. **[4]**

b) Interface 8-bit DAC to 8051 μC. Write a program to send data to the DAC to generate a stair-step ramp. **[4]**

c) Assume an oscillator running at 11.0592 MHz controls 8051. Write a subroutine program to create a time delay of 10 ms. **[4]**

EEE

Total No. of Questions : 4]

SEAT No. :

P568

[Total No. of Pages : 2

[4817]-363
T.Y. B.Sc.
ELECTRONIC SCIENCE
EL - 333 : Analog Circuit Design and Applications of Linear ICs
(2008 Pattern) (Semester-III) (Paper-III)

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

Instructions to the candidates:

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

Q1) Attempt All of the following:

a) State one feature of UTP cable. **[1]**

b) List the sources of errors in practical integrator. **[1]**

c) Write one advantage and one disadvantage of active filter. **[1]**

d) What is the purpose of shielding? **[1]**

e) List two features of V/F converter IC LM331. **[2]**

f) Write the values of reference voltage and maximum output current of regulator IC 723. **[2]**

g) Define following parameters of OP - AMP. **[2]**

i) PSRR ii) Slew rate

h) State two applications of antilog amplifier. **[2]**

P.T.O.

Q2) Attempt Any Two of the following:

a) Describe the working of S/H circuit using 2 op-amps. **[4]**

b) Draw the circuit diagram of voltage regulator using IC 317. Write the expression for output voltage. **[4]**

c) Using op-amp and pn-junction diode as a logging element, draw neat circuit of log amplifier. Derive expression for its output voltage. **[4]**

Q3) Attempt Any Two of the following:

a) Explain working of frequency to voltage converter using op-amps. Write the expression for its output voltage. **[4]**

b) To select op-amp IC for a particular application, write different parameters that are to be considered. **[4]**

c) With the help of circuit diagram, explain working of peak-detector. **[4]**

Q4) Attempt Any Two of the following:

a) What are the problems associated with ideal differentiator? Draw the neat diagram of practical differentiator. Write designing steps for it. **[6]**

b) Explain how resistor is simulated in switched capacitor filter. State its advantages and limitations. **[6]**

c) Draw the circuit diagram of voltage comparator using IC LM 311. Discuss its operation with voltages at INV and Non-INV input terminals. Write role of strobe terminal. **[6]**

OR

Attempt All of the following:

a) If R = 1kΩ, C = 0.047 μF, $\pm V_{CC} = \pm 10V$, f_o =3 kHz for function generator using IC 8038 calculate sweep voltage. **[4]**

b) Determine the output pulse width for monostable multivibrator using timer IC 555, if R = 2.2 kΩ and C = 47 nF. **[4]**

c) Design second order low pass filter at high cut off frequency of 15 kHz and pass band gain 1.586. **[4]**

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Total No. of Questions : 4]

SEAT No. :

P569

[Total No. of Pages : 2

[4817]-364
T.Y. B.Sc.
ELECTRONIC SCIENCE
EL - 334 : Foundation of Nanoelectronics
(2008 Pattern) (Paper - IV) (Semester - III)

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

Instructions to the candidates:

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

(Given: Mass of electron = 9.11×10^{-31} Kg.
Plancks constant = 6.625×10^{-34} Js.

Q1) Attempt all of the following:

a) What is statistical mechanics? **[1]**

b) Define critical angle. **[1]**

c) What is matter waves? **[1]**

d) What is Fermi energy? **[1]**

e) Define elastic and inelastic collision. **[2]**

f) State basic characteristics of flash memory. **[2]**

g) What is polarization? State its types. **[2]**

h) For glass interface if $n_1 = 1$ and $n_2 = 1.5$, determine reflection coefficient. **[2]**

Q2) Attempt any two of the following:

a) Explain Top down and Bottom up approach in Nanoelectronics. **[4]**

b) Obtain Schrodinger time dependent equation for free particle. **[4]**

c) Write Maxwell's equation in differential and integral form. **[4]**

P.T.O.

Q3) Attempt any two of the following:

a) Explain Fermi Dirac probability distribution function. **[4]**

b) Describe circular polarization. **[4]**

c) State and explain Pauli exclusion principle. **[4]**

Q4) Attempt any two of the following:

a) The EM wave is incident normally at the interface of non-conducting media, show that: **[6]**

$$R_n = \left(\frac{n_1 - n_2}{n_1 + n_2} \right)^2 \text{ and } T_n = \frac{4 n_1 n_2}{(n_1 + n_2)^2}$$

b) What is quantum wire? Explain electron transport in quantum wire. **[6]**

c) i) What is the smallest possible uncertainty in the position of an electron moving with velocity 10^6 m/sec. **[3]**

ii) Calculate the de Broglie wavelength of an electron moving with speed $1/10^{th}$ of the velocity of light. **[3]**

Total No. of Questions : 4]

SEAT No. :

P570

[Total No. of Pages : 2

[4817]-365
T. Y. B. Sc
ELECTRONIC SCIENCE
EL-335; 'C' Programming
(2008 Pattern) (Semester-III)(Paper-V)

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

Instructions to the candidates:

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

Q1) Answer all of the following :

a) Define structure. **[1]**

b) What do you mean by key words in 'C'? **[1]**

c) Explain Nesting of a functions? **[1]**

d) What is pointer? **[1]**

e) Explain integer constants and floating point constant in 'C'. **[2]**

f) How are arrays initialized? **[2]**

g) What do you mean by operator? Discuss logical operators in brief. **[2]**

h) State basic file operations in C. **[2]**

Q2) Answer any two of the following :

a) Explain the following terms **[4]**

i) Resolution ii) Initgraph iii) Graphics driver iv) Graphics.h

P.T.O.

b) Explain with proper example SWITCH statement in 'C'. How 'break' statement is useful in 'C'. **[4]**

c) Distinguish between **[4]**

i) Printf and f print f.

ii) Getc and getchar.

Q3) Answer any two of the following:

a) Explain Bitwise operators in 'C' with example. **[4]**

b) Write a program which will enters 3×3 matrix, and print it out. **[4]**

c) Explain the following function giving their syntax and example **[4]**

i) arc ii) ellipse

Q4) Answer any two of the following:

a) What is function ? Explain the meaning of call by value and call by reference. **[6]**

b) Write a program which will convert decimal number to binary number. **[6]**

c) What do you mean by pointer variable ? How they are declared ? Withthe help of suitable example explain passing the pointer to a function. **[6]**

OR

Q4) Answer all of the following:

a) Explain function with arguments and no return values, with suitable example. **[4]**

b) State the rules for initializing structures. **[4]**

c) Write a program to print smallest number out of given 10 number using one dimensional array. **[4]**

Total No. of Questions :4]

SEAT No. :

P571

[Total No. of Pages :4

[4817]-366
T.Y.B.Sc.
ELECTRONIC SCIENCE
EL-336 (A): Fiber Optics and Fiber Optic Communication (Optional)
(2008 Pattern) (New) (Paper - VI) (Semester - III)

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

Instructions to the candidates:

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

Q1) Attempt all of the following:

a) What are meridional rays? **[1]**

b) What is bandwidth? **[1]**

c) What is WDM? **[1]**

d) State Snell's law. **[1]**

e) Define external quantom efficiency. **[2]**

f) What is necessity of cladding for an optical fiber? **[2]**

g) State any two conditions for internal reflection. **[2]**

h) "Repeaters are require in optical fiber communication". Comment. **[2]**

Q2) Attempt any two of the following:

a) What are the requirements of Laser action? Define population inversion. **[4]**

b) Draw the block diagram of fiber optic communication system. Explain each block, in brief. **[4]**

c) Waht do you understand by optical detector? Discuss its various types of optical detector and parameters of photo detectors. **[4]**

P.T.O.

Q3) Attempt any two of the following:

a) Explain the various structure of LED, in brief. **[4]**

b) Write a note on fiber optical video link, in brief. **[4]**

c) A step index fiber has a core and cladding index of 1.50 and 1.30 respectively. What is the value of NA and acceptance angle of the fiber? **[4]**

Q4) Attempt any two of the following:

a) Explain the community Antenna Television (CATV) with neat diagram, in adequte details. **[6]**

b) Explain the losses in splices and connectors, in adequate details. **[6]**

c) Explain in detail about the methods of fiber splicing. **[6]**

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Total No. of Questions :4]

P571

[4817]-366
T.Y.B.Sc.
ELECTRONIC SCIENCE
EL-336 (B): Sensors and Actuators (Optional)
(2008 Pattern) (Paper - VI) (Semester - III)

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

Instructions to the candidates:

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

Q1) All sub questions are compulsory:

a) State the performance parameters of sensors. **[1]**

b) What is thermistor? List the materials used in thermistors. **[1]**

c) Define sensitivity of sensor. **[1]**

d) State three basic types (configuration) of optocoupler. **[1]**

e) "Active filters are advantages over passive filters". Comment. **[2]**

f) What is actuator? State applications of actuators. **[2]**

g) Why signal conditioning is required in measurement system. **[2]**

h) State types of magnetic sensors. Give applications of eddy current magnetic sensor. **[2]**

Q2) Attempt any two of the following:

a) State the advantages of SMD and MEMs technology used in sensor. **[4]**

b) What are the different criteria used in the selection of sensor for measurement of physical parameter. **[4]**

c) What is instrumentation amplifier? State important parameters of instrumentation amplifier. **[4]**

Q3) Attempt any two of the following:

a) Give classification of sensors based on - **[4]**

i) Transduction principle

ii) Energy requirement

b) List the sensors used for temperature measurement. Explain construction and working of RTD. **[4]**

c) How junction semi conductor diodes are used as temperature sensor? What are the factors on which output of sensor depends. **[4]**

Q4) Attempt any two of the following:

a) What is actuator? Explain the working of solenoid. State applications of solenoid. **[6]**

b) State different types of sensors used in - **[6]**

i) Industrial applications,

ii) Automobile applications, and

iii) Computer applications.

c) With neat diagram explain construction and working of stepper motor. State applications of it. **[6]**

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Total No. of Questions : 4]

SEAT No. :

P572

[Total No. of Pages : 2

[4817]-367
T.Y. B.Sc.
DEFENCE AND STRATEGIC STUDIES
DS - 331 : Science, Technology and National Security
(2008 Pattern) (Semester - III) (Paper - I)

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

Instructions to the candidates:

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

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

a) Define Science.

b) Define Technology.

c) Define National Security.

d) What is Difference between Atmosphere and Space?

e) What is Material Science?

f) Define Aeronautics.

g) What is meant by High Energy Physics?

h) What are the forces acting on a flying aircraft?

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

a) Write about the Industrial Revolution.

b) Write the concept of Electronic Warfare.

c) Write the strategic application of satellite.

P.T.O.

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

a) Information Warfare.

b) Development Trends in Defence Material.

c) Military Application of Bio-Technology.

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

a) Explain about Bernoulli's Theorem and explain its application in Theory of Flight.

b) Explain about the promising and new military technologies.

Total No. of Questions :4]

SEAT No. :

P573

[Total No. of Pages :2

[4817]-368
T.Y.B.Sc.
DEFENCE & STRATEGIC STUDIES
DS-332: Defence Economics
(2008 Pattern) (Paper - II) (Semester - III)

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

Instructions to the candidates:

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

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

a) State the meaning of public good.

b) What do you mean by defence programme.

c) Define Ideology.

d) What do you mean by is peacetime economy?

e) What is war finance?

f) What is a perspective planning?

g) What are the elements of war potential?

h) What do you mean by actual cost of war?

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

a) Describe merits of wartime economy.

b) Discuss structure of India's defence budget.

c) Explain significance of economic warfare.

P.T.O.

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

a) Defence vs. Development.

b) Importance of rationing during war.

c) Techniques of price control during war.

Q4) Answer in 18 to 20 sentences (any one): **[8]**

a) Explain determinants of defence expenditure.

b) Discuss nature and problems of Indian economy.

EEE

Total No. of Questions : 4]

SEAT No. :

P574

[Total No. of Pages : 2

[4817]-369
T.Y. B.Sc.
DEFENCE AND STRATEGTIC STUDIES
DS - 333 : Study of Disaster
(2008 Pattern) (Semester-III) (Paper-III)

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

Instructions to the candidates:

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

Q1) Answer in 2 to 4 Sentences each: **[16]**

a) Define Disaster.

b) Define manmade Disaster.

c) Define Cyclone.

d) What are the limitations of Disaster Management?

e) Define Environmental Disaster.

f) Define Global warming.

g) Define Chemical warfare.

h) Define Sustainable development.

Q2) Answer in 8 to 10 Sentences each (Any Two): **[8]**

a) Explain Disaster management in India.

b) Discuss need of study of Coastal environment.

c) Describe Global warming.

P.T.O.

Q3) Write short notes on (Any Two): **[8]**

a) Nuclear war.

b) Disaster and national security.

c) Effects of Environmental disaster.

Q4) Answer in 18 to 20 Sentences (Any One): **[8]**

a) Explain relationship between war and disaster.

b) Discuss relationship between population and environment.

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Total No. of Questions : 4]

SEAT No. :

P575

[Total No. of Pages : 2

[4817]-370
T.Y. B.Sc.
DEFENCE AND STRATEGIC STUDIES
DS - 334 : Research Methodology
(2008 Pattern) (Semester - III) (Paper - IV)

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

Instructions to the candidates:

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

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

a) Establish correlation between invention and discovery.

b) What is meant by observation method?

c) Define investigational data.

d) Write the importance of scientific technique of method in research.

e) How Physical Sciences differ from Social Sciences in neutrality?

f) What is Historical research?

g) Introduce action research?

h) What is Theory?

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

a) Explain the role of research.

b) State about the importance of research.

c) What are the sources of stating a problem?

P.T.O.

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

a) Research Design.

b) Hypothesis.

c) Necessity of research in Security Studies.

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

a) Write about the style and structure of a research report.

b) What are the qualities of interviewer?

Total No. of Questions : 4]

SEAT No. :

P576

[Total No. of Pages : 2

[4817]-371
T. Y. B. Sc
DEFENCE AND STRATEGIC STUDIES
DS-335; Computer Applications in Defence Management
(2008 Pattern) (Semester-III) (Paper-v)

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

Instructions to the candidates:

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

Q1) Answer in 2 to 4 Sentences each **[16]**

a) Write the meaning of "computer offer Low cost Readiness"

b) What is scientific approach?

c) Define war Gaming

d) Define Topology

e) State the meaning of cloud computing

f) Define battlefield information system

g) Define Target acquisition system

h) State the meaning of IT and Night vision.

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

a) Explain scientific approach to decision making

b) Discuss application of IT in pay roll system

c) Explain scientific approach to weather forecasting

P.T.O.

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

a) Surveillance

b) Operational Research

c) Data Analysis

Q4) Answer in 18 to 20 sentences (any one) **[8]**

a) Explain use of computer in defence preparedness

b) Discuss IT and its importance on national security

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Total No. of Questions : 4]

SEAT No. :

P577

[Total No. of Pages : 4

[4817] - 372
T.Y.B.Sc.
DEFENCE AND STRATEGIC STUDIES
DS - 336 (A) : Indian Military System (I) (Optional)
(2008Pattern) (Semester - III) (Paper - VI)

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

Instructions to the candidates:

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

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

a) What do you know about Angad?
b) What do you understand by Chaturangbal?
c) How you would like to define Military History?
d) Between whom the battle of Jhelum (Hydaspus) it was fought?
e) Write any two demerits of Rajputs.
f) What do you understand by Rajput?
g) Write the weapons of turks.
h) Who was sudas?

Q2) Answer in 8 or 10 sentences (Any two): **[8]**

a) How you would distinguish between General History & Military History?
b) Explain in brief the battle of Ten kings.
c) Explain in brief the concept of Kshatriya.

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

a) Alexander as a strategian.
b) Kautilya as a strategic thinker.
c) Merits of Rajputs.

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

a) Analyse the battle of Tarrain with special reference to its implications & significance.
b) Explain in detail the laws of war during Ramayana & Mahabharata period.

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P.T.O.

Total No. of Questions : 4]

P577

[4817] - 372
T.Y.B.Sc.
DEFENCE AND STRATEGIC STUDIES
DS - 336 (B) : Maratha Military System (I) (Optional)
(2008 Pattern) (Semester - III) (Paper - VI)

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

Instructions to the candidates:

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

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

a) What do you know about Vankoji?
b) Who was Afzulkhan?
c) What do you know about teacher of Shivaji?
d) State any two names of Shivaji's Commrade.
e) State the aim of Shivaji for battle of Jawali.
f) Write about the weapons of Maratha.
g) Between whom the Treaty of Purandar it was signed?
h) What do you mean by Paga?

Q2) Answer in 8 or 10 sentences (Any two): **[8]**

a) Highlight on the significance of Treaty of Purandar.
b) Write about political powers in Maharashtra before the birth of Shivaji.
c) Write a few lines on 'Chandrarao More of Jawali'.

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

a) Murarbaji
b) Intelligence Department of Shivaji.
c) Dadoji Kondder as a Maker of Shivaji.

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

a) Evaluate the gains of Shivaji from "Karnataka Compaign".
b) Explain in detail Shivaji as a " Master of Discipline".

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Total No. of Questions : 4]

P577

[4817] - 372
T.Y.B.Sc.
DEFENCE AND STRATEGIC STUDIES
DS - 336 (C) : Indian Wars Since Independence (I) (Optional)
(2008 Pattern) (Semester - III) (Paper - VI)

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

Instructions to the candidates:

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

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

a) Who was the Chou - Eu - Lai?

b) State the name of Indias PM during Indo-Pak war of 1965.

c) What do you know about 'Tashkand'?

d) Write the date and year of Chinese aggression.

e) State the basic aim of Pakistan during 1947-48 war.

f) At which post first time Pakistani troops attacked on Army of Raje Harisingh?

g) What do you mean ceasefire?

h) What was the basic interest of Raje Harisingh of Kashmir?

Q2) Answer in 8 or 10 sentences (Any two): **[8]**

a) Write a few lines on " ceasefire for Indo-Pak war of 1947-48".

b) Explain in brief India's stand on "Kashmir Issue".

c) Highlight on role of U.S.S.R. during Indo-Pak war of 1965.

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

a) Significance of "Instrument of Accession".

b) Role of U.S.A. during Indo-Pak war of 1965.

c) Beginning of Indo-Pak war of 1965.

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

a) Analyse the causes of India - China war of 1962.

b) "Though India won the war of 1965 but! lost it at negotiation table". Do you agree? Justify your answer.

EEE

Total No. of Questions : 4]

SEAT No. :

P578

[Total No. of Pages : 4

[4817] - 373
T.Y.B.Sc.
DEFENCE AND STRATEGIC STUDIES
DS - 337 (A) : Military Sociology (Optional)
(2008 Pattern) (Semester - III) (Paper - VII)

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

Instructions to the candidates:

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

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

a) Evaluate the Military Values.
b) Write about the significance Chetwodian Motto.
c) Define integrity and moral values.
d) What is Nation-Building?
e) Define traditions.
f) Define Military Sociology.
g) What is the concept of Soldiering?
h) What is JUST WAR (*Dharma Yudha*)

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

a) Explain about the intangible correlation between military and society.
b) What makes combatant to fight?
c) Write about the Strategic Culture in India.

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

a) Socio-Political Causes of War.
b) Strategic Importance of 26th January-Republic Day Parade.
c) One Class Army.

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

a) Explain about the need of Militarization of populace in India.
b) Rationalize, why Military is indispensable to the survival of State?

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Total No. of Questions : 4]

P578

[4817] - 373
T.Y.B.Sc.
DEFENCE AND STRATEGIC STUDIES
DS - 337 (B) : Defence Journalism (Optional)
(2008 Pattern) (Semester - III) (Paper - VII)

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

Instructions to the candidates:

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

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

a) Write the functions of Air Force.
b) Write the role of Submarine.
c) Who is Supreme Commander of Armed Forces?
d) What do you understand by INS - *VIKRAMADITYA*?
e) What do you understand by supersonic aircrafts?
f) What are the functions of Maintenance Command of Indian Airforce?
g) Elaborate C^4 ISR.
h) What do you mean by the term "LIMITED WAR?"

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

a) Explain the distinctiveness of defence journalism.
b) What defence and security matters should not and should be reported?
c) Write the scope and wide extent of Defence Journalism.

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

a) Mountainous Warfare.
b) Role of Security Forces in Counter Terrorism.
c) Media and National Security.

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

a) Write a report on Republic Day Parade.
b) Explain about the hurdles and difficulty in Defence Journalism?

EEE

Total No. of Questions : 4]

P578

[4817] - 373
T.Y.B.Sc.
DEFENCE AND STRATEGIC STUDIES
DS - 337 (C) : Defence Preparedness of India (I) (Optional)
(2008 Pattern) (Semester - III) (Paper - VII)

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

Instructions to the candidates:

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

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

a) Comment on India's maritime capability.

b) Comment on India's ship building capability.

c) What is meant by 'Unity in Diversity'?

d) Why defence preparedness is indispensable?

e) What is strategic culture?

f) Define Economic Potential.

g) Introduce EEZ.

h) Obsolescence Factor in weapon systems.

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

a) Explain about India's Maritime Boundaries.

b) Discuss the issues between India and Pakistan.

c) Explain about the role of political leadership in defence preparedness.

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

a) Ups & Down in Sino-Indian relations.

b) India's Land Border.

c) Status of Indian Air Force.

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

a) Discuss the relationship between defence and development.

b) Justify, why war now-a-days is more influenced by the science of economics than the art of strategy?

EEE

Total No. of Questions : 4]

SEAT No. :

P579

[Total No. of Pages : 4

[4817] - 374
T.Y.B.Sc.
DEFENCE AND STRATEGIC STUDIES
DS - 338 (A) : Armed Conflict and Human Rights(Optional)
(2008 Pattern) (Semester - III) (Paper - VIII)

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

Instructions to the candidates:

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

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

a) Define democracy.
b) What are the elements of state?
c) Define intervention.
d) Define piracy.
e) Define human trafficking.
f) What do you mean by laws of war?
g) Define international law.
h) Define nationality.

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

a) Explain principles of human rights.
b) Discuss armed conflicts and wounded soldiers.
c) Explain the spectrum of international law.

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

a) Pacific settlement.
b) Armed conflict and prisoners of war.
c) Laws of armed conflict.

Q4) Answer in 18 to 20 sentences (Any one): **[8]**

a) Write a note on international humanitarian studies.
b) Write a note on war, peace and international politics.

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P.T.O.

Total No. of Questions : 4]

P579

[4817] - 374
T.Y.B.Sc.
DEFENCE AND STRATEGIC STUDIES
DS - 338 (B) : International Organisation & National Security (Optional)
(2008 Pattern) (Semester - III) (Paper - VIII)

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

Instructions to the candidates:

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

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

a) Define "National Security".
b) Where the HQ of UN is located?
c) How many permanent members are their in security council?
d) What do you understand by UN-charter?
e) State any two functions of socio-economic council of UN.
f) At present who is Secretary General of UN?
g) Define "International Organisation".
h) To whom we called "World Parliament".

Q2) Answer in 8 or 10 sentences (Any two): **[8]**

a) Explain the objectives of U.N.
b) What do you know about PM-5 of UN security council?
c) Critically evaluate the treaty of versailles.

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

a) Secretariat of UN.
b) History of International Organisation.
c) Permanent court of international justice.

Q4*)* Answers in 16 to 20 sentences (Any one): **[8]**

a) Critically evaluate the role of U.N. for maintenance of international peace & security.
b) Highlight on "origin & structure" of U.N.

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Total No. of Questions : 4]

P579

[4817] - 374
T.Y.B.Sc.
DEFENCE AND STRATEGIC STUDIES
DS - 338 (C) : International Law (I) (Optional)
(2008 Pattern) (Semester - III) (Paper - VIII)

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

Instructions to the candidates:

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

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

a) What do you mean by international conflict?

b) State the long form of I.H.R.C.

c) What do you mean by UN peace keeping forces?

d) Define convention.

e) How you would like to define "International Law"?

f) What do you understand by UN charter?

g) Write any two laws of Air warfare.

h) What do you mean by General Protocol?

Q2) Answer in 8 or 10 sentences each (Any two): **[8]**

a) Explain in brief the concept of Human Rights.

b) Write in short "Nature of International Law".

c) Explain any one source of International Law.

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

a) Laws of POW.

b) Chemical warfare.

c) Biological warfare.

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

a) Discuss the role of UN for maintenance of international peace & security.

b) Trace out the historical development of "International Law".

Total No. of Questions : 4]

SEAT No. :

P580

[Total No. of Pages : 4

[4817] - 375
T.Y.B.Sc.
DEFENCE AND STRATEGIC STUDIES
DS - 339 (A) : Defence Management in India (Optional)
(2008Pattern) (Semester - III) (Paper - IX)

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

Instructions to the candidates:

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

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

a) Write the concept of MANAGEMENT.
b) Write the role of Defence Management.
c) Differentiate between leadership and management.
d) What is meant by "Industrial Military Complex"?
e) Define the motto of "Atmy Supply Corps'
f) Define the concept of Team.
g) What do you mean by Military?
h) What is the concept of "Battle Dynamism?"

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

a) Explain the rationale of Human Resource Management in Indian Armed Forces.
b) Explain the applicability of Management in Armed Forces.
c) Explain the role of leadership in the defence management.

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

a) Nature of Management.
b) Function of Management.
c) Scope of Management.

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

a) Discuss the principles of Management.
b) Discuss the Similarity of Industrial and Military concept on Management.

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P.T.O.

Total No. of Questions : 4]

P580

[4817] - 375
T.Y.B.Sc.
DEFENCE AND STRATEGIC STUDIES
DS - 339 (B) :Internal Security of India (I) (Optional)
(2008 Pattern) (Semester - III) (Paper - IX)

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

Instructions to the candidates:

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

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

a) Define "Internal Security".
b) What do you mean by "State"?
c) Write any two dimensions of internal security of India.
d) Write the long form of S.E.Z .
e) What do you understand by seven sister?
f) When Kashmir was merge with India?
g) Write any three states of India which affected by Naxalite.
h) What do you mean by POK?

Q2) Answer in 8 or 10 sentences (Any two): **[8]**

a) Write a few lines on "AZAD KASHMIR"
b) Explain the concept of Human security.
c) Explain the concept of "Internal Security".

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

a) Concept of S.E.Z .
b) Instrument of Accession.
c) Bottle neck of India.

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

a) Explain the nature of Kashmir problem.
b) Discuss how the agitations over religious & caste issue is threat to India's internal security.

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Total No. of Questions : 4]

P580

[4817] - 375
T.Y.B.Sc.
DEFENCE AND STRATEGIC STUDIES
DS - 339 (C) : Maritime Security of India-I (Optional)
(2008 Pattern) (Semester - III) (Paper - IX)

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

Instructions to the candidates:

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

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

a) State the meaning of territorial water.

b) Define maritime state.

c) Define sea power.

d) Define contiguous zone.

e) What do you mean by fixed asset?

f) State the meaning of Light house?

g) What is continental shelf?

h) What do you mean by maritime boundary?

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

a) Describe relations between sea power and economy.

b) Discuss role of Coast Guard in India's national security.

c) Explain concept of navigational aids.

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

a) EEZ.

b) Strategic importance of Indian Ocean.

c) Coast Guard.

Q4) Answer in 18 to 20 sentences (any one): **[8]**

a) Explain "New challenges to India's maritime security".

b) Explain India's military maritime strategy.

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Total No. of Questions : 4]

SEAT No. :

P581

[Total No. of Pages : 2

[4817]-376
T.Y. B.Sc.
ENVIRONMENTAL SCIENCE
ENV - 331 : Terrestrial Ecosystems and Management
(2008 Pattern) (New Course) (Semester - III) (Paper - I)

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

Instructions to the candidates:

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

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

a) Define the term: Community and give one example of it.

b) Write the names of hotspots in India.

c) Name any two Keystone species of India.

d) What are Biogeochemical Cycles?

e) Mention any two terrestrial Natural Resources.

f) Who is the leader of Chipko Movement?

g) What is meant by Habitat Restoration?

h) Write the full form of GIS.

i) Name any two Sedimentary Cycles.

j) What is Mutualism? Give one example of it.

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

a) Joint Forest Management.

b) Eco-tourism.

c) Managing rain for future.

P.T.O.

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

a) Discuss the effects of exploitation of terrestrial natural resources. Add a note on its consequences.

b) Describe Eco-Development Programe with reference to terrestrial ecosystem management.

c) Write a detailed account on 'Western Ghat' as a hotspot.

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

a) What is Carbon Sequestration? Explain its potential in terrestrial ecosystem management.

b) Write detailed account on Forest fire with reference to reasons, effects & control measures.

Total No. of Questions :4]

SEAT No. :

P582

[Total No. of Pages :2

[4817]-377
T.Y.B.Sc.
ENVIRONMENTAL SCIENCE
ENV-332: Wildlife Biology
(2008 Pattern)(New Course) (Paper - II) (Semester - III)

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

Instructions to the candidates:

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

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

a) What is wildlife management?

b) What are pteridophytes?

c) Enlist the habitats of crustaceans.

d) Define 'food chain'.

e) What is pugmark census?

f) Define 'wetlands'.

g) Enumerate the threats to wildlife.

h) Define 'Geographical information system'.

i) What is mangrove ecosystem?

j) What is Quadrat sampling?

P.T.O.

Q2) Write a short note on (any two): **[10]**

a) Insect diversity.

b) Governments role in wildlife protection.

c) Landscape patterns.

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

a) Write the difference between preservation & conservation.

b) Describe the food chain in brackish water habitats.

c) How we determine the sampling area for plant diversity assessment?

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

a) Explain in details the importance of tiger conservation in India. Add a note on tiger conservation projects in India.

b) What are protected areas? Explain its role in wildlife conservation.

EEE

Total No. of Questions : 4]

SEAT No. :

P583

[Total No. of Pages : 2

[4817]-378
T.Y. B.Sc.
ENVIRONMENTAL SCIENCE
ENV - 333 : Water Quality
(2008 Pattern) (Semester-III) (Paper-III) (New Course)

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

Instructions to the candidates:

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

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

a) What is meant by Black Water?

b) Differentiate Point & Non-point sources of water pollution.

c) What is COD?

d) Name any 2 diseases caused by heavy metal pollution of water.

e) Define Water Crisis.

f) What is meant by Oligotrophic state of a lake?

g) Name the stages/steps covered under primary water treatment process.

h) Enlist any 2 ways in which water resources can be developed.

i) What is the full form of BIS & WHO?

j) Enumerate any 2 preventive measures to control water borne diseases.

P.T.O.

Q2) Write a short note on Any Two: **[10]**

a) Trickling Filter.

b) Ground water pollution.

c) Types of detergents.

Q3) Answer Any Two from the following: **[10]**

a) What is meant by Water Quality Standards? Enumerate any 6 parameters with their standards from the respective agency.

b) How is Science & Policy of much importance in solving water problems?

c) What is water cycle? Differentiate the water cycle in an urban area from the natural water cycle.

Q4) Attempt Any One of the following question: **[10]**

a) Explain the application & use of RS & GIS for the management of water resources.

b) Describe the laboratory analysis methods for any 2 physical, 2 chemical & 1 biological parameter of water.

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Total No. of Questions : 4]

SEAT No. :

P584

[Total No. of Pages : 2

[4817]-379
T.Y. B.Sc.
ENVIRONMENTAL SCIENCE
ENV - 334 : Issues in Environmental Science - I
(2008 Pattern) (New Course) (Semester - III) (Paper - IV)

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

Instructions to the candidates:

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

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

a) Define the term Environmentalism.

b) Write the full form of LCA.

c) What are Bioresources?

d) Mention the significance of Biodiversity.

e) Write any two problems of energy crisis.

f) What is meant by WTO?

g) Define the term 'Political Economy'.

h) Name any two examples of GM plants.

i) Write any two impacts of global warming on human health.

j) What is meant by genesis of environmental movements?

Q2) Write a short note on (**any two**) **[10]**

a) Pastoralism.

b) Carbon Sequestration.

c) Citizen participation in environmental issues.

P.T.O.

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

a) Write about various approaches of rehabilitation of degraded lands.

b) Explain the significance of Green Revolution.

c) Discuss the role of National Environmental Advisory Board.

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

a) Differentiate between convertion and protocol with suitable example of each.

b) What is meant by GHE? Mention various consequences of it. Add a note on remedial measures.

Total No. of Questions : 4]

SEAT No. :

P585

[Total No. of Pages : 2

[4817]-380
T. Y. B. Sc
ENVIRONMENTAL SCIENCES
ENV-335: Environmental Governance and Equity : Law and Ethics
(New course)(Paper-V) (2008 Pattern) (Semester-III)

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

Instructions to the candidates:

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

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

a) What is the main objective of wildlife Act, 1972 ?

b) Mention any two strategies to increase forest cover.

c) What is meant by 'non-forest purpose' ?

d) Define the term 'occupier'.

e) What is meant by 'eco-centric view' ?

f) Mention any two fundamental rights of Indian citizens.

g) Under which act 'Central Zoo Authority' is created ?

h) Write full form for 'CBD'

i) Mention any two principles of 'stockholm Declaration'

j) What is the objective of 'Motor Vehicle Act' ?

Q2) Write a short note on (any Two) **[10]**

a) National Forest Policy

b) Ecomark Scheme

c) Public Liability Insurance Act

P.T.O.

Q3) Answer any two from the following **[10]**

a) Write an account on environmental ethics in spirituality.

b) Discuss in detail on outcomes of 'Rio Conference'

c) Explain the major issues involved in application of environmental ethics

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

a) Discuss in detail need for environmental governance in India. Also add a note on role of public participation in successful implementation of it.

b) What are the salient features of

i) Environment (Protection) Act, 1986 and

ii) Water Act, 1974.

Total No. of Questions : 4]

SEAT No. :

P586

[Total No. of Pages : 2

[4817]-381
T.Y. B.Sc.
ENVIRONMENTAL SCIENCE
ENV-336:Environmental Biotechnology-I
(2008 Pattern) (Semester-III) (Paper-VI) (New Course)

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

Instructions to the candidates:

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

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

a) Define the process of composting.

b) Enlist any two petrocrops.

c) Write any two earthworm species used for composting.

d) What is meant by micropropagation?

e) Define air pollution.

f) What is meant by hydrothermal vent?

g) Write fullform of PSM.

h) Define sustainable agriculture.

i) What is scientific name for neem plant?

j) What is meant by droplet nuclei?

Q2) Write a short note on (any two): **[10]**

a) Applications of environmental biotechnology.

b) Risk of GMO's.

c) Control of airborne infection.

P.T.O.

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

a) Explain manufacturing process of biopesticides from bacteria.

b) Describe the process of pesticide production from neem.

c) Explain the process of Ethanol production.

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

a) Define the term biofertilizers? Explain different types of biofertilizers.

b) Discuss enrichment, isolation and counting methods for microbes.

Total No. of Questions : 4]

SEAT No. :

P587

[Total No. of Pages : 2

[4817]-382
T. Y. B. Sc.
INDUSTRIAL CHEMISTRY
Industrial Methods of Chemical Analysis
(Paper-V) (2008 Pattern) (Semester-III)(Vocational Course)

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

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Use of calculator/Logarithmic table is allowed.***
5) ***Assume suitable additional data if necessary.***

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

a) Enlist different electrodes which are used as cathode and anode in polarography.

b) Define the term 'half-wave potential' in polarography.

c) What is Bremsstrahlung?

d) Give two applications of X-ray absorption technique.

e) Why are crystals used for diffraction of X-rays?

f) Give the sources of neutrons.

g) What is the temperature of butane- air flame?

h) State the two forms of lead found in petrol.

i) Name two detectors used in mass spectrometry.

j) Name the gas filled in hollow cathode lamp.

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

i) Write Ilkovic equation and explain the terms involved in it.

ii) Write a note on fluoride ion electrode.

iii) Draw and explain a typical spectrum of an X-ray absorption technique.

P.T.O.

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

i) Explain the 'voltage ramp' used in differential pulse polarography.

ii) Write the expression for resolution in mass spectrometry peaks.

iii) What are the limitations of AAS?

Q3) Answer the following (any two) **[10]**

a) Compare AAS with FES.

b) A time of flight mass spectrometer has a flight path of 50.0cm and accelerating potential of 1250 V. What is the time required for ionic fragments with $\frac{m}{2} = 50$ to strike the detector?

c) Determine the capillary characteristics of a capillary at a potential of -0.6 V with respect to calomel, if 100 drops of mercury weigh 490 mg and the time of formation of 10 drops is 45 sec.

Q4) a) Draw a neat labelled diagram of a polarograph and explain its working. **[6]**

OR

Describe with a neat labelled diagram solid- state membrane electrode.

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

i) Give the principle and application of neutron diffraction analysis.

ii) The accelerating potential in an X-ray tube was 25.0 kV. Calculate the short wavelength cutoff of the lamp.

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Total No. of Questions : 4]

SEAT No. :

P588

[Total No. of Pages : 2

[4817]-383
T.Y.B.Sc.(Vocational)
BIOTECHNOLOGY
Plant Biotechnology
(Paper-V) (2008 Pattern) (Semester-III)

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

Instructions to the candidates:

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

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

a) Give examples of two auxins.

b) What is the main carbon source used in plant tissue culture?

c) Give full form of GM food?

d) Enlist two methods of gene transfer in plants.

e) What is cryopreservation?

f) Give one example of endangered plant species.

g) What is anther culture.

h) What are secondary metabolites?

i) Define totipotency?

j) What is somatic embryo?

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

a) What is somaclonal variation? What are the causes of somaclonal variation?

b) Comment on uses of haploids in plant breeding.

c) Write in brief about gynogenesis.

P.T.O.

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

a) Cryopreservation.

b) Artificial seed.

c) Production of secondary metabolites.

Q4) What is gene transfer? Discuss the biological methods of gene transfer in plants. **[10]**

OR

Explain steps involved in anther culture.

Total No. of Questions : 4]

SEAT No. :

P1261

[Total No. of Pages : 2

[4817]-384

T. Y. B. Sc. (Vocational)

PHOTOGRAPHY AND AUDIO-VISUAL PRODUCTION

Video Recording and Playback Systems

(Semester - III) (Paper - V) (2008 Pattern)

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

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.***

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

a) State the frequency range of audio and video signals.

b) State the function of tuner in a TV receiver.

c) Name the primary colours used in TV.

d) What is the application area for a magnetic video disc?

e) Why is the rotating head mechanism necessary in a VCR?

f) Compare motion picture film with video tape.

g) State colour TV standard used in India.

h) State the principle on which Image Ornithon camera tube works.

i) How is optical video disc replayed?

Q2) Answer any two: **[10]**

a) Draw a neat diagram and explain the working of Vidicon camera tube. Give its transfer characteristics and the spectral response.

b) Draw a neat diagram and explain one complete frame of odd-line interlaced scanning used in India.

c) Why is the base band video signal converted into FM before recording it on a magnetic tape? What is 'pre' and 'de-emphasis'?

P.T.O.

Q3) Answer any two: **[10]**

a) Explain how an optical video disc is constructed. Give working of an optical video disc player. How does the detector block work?

b) Discuss the construction and working of magnetic video disc machine.

c) What is colour burst? Why is it necessary? Explain the PAL, colour signal used in India.

Q4) Answer any one: **[10]**

a) Draw a neat block diagram and wave forms at different points explain the working of a B/W TV receiver.

b) Explain the working of record/replay electronics in a VCR.

Total No. of Questions : 4]

SEAT No. :

P589

[Total No. of Pages : 2

[4817]-385
T. Y. B. Sc.
ELECTRONIC EQUIPMENT AND MAINTENANCE (EEM)
Electronic Equipment Troubleshooting & Repairs
(Paper-V) (2008 Pattern) (Semester-III)(Vocational)

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

Instructions to the candidates:

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

Q1) Answer the following :

a) State the effects if switching transistor in SMPS become open. **[1]**

b) Mention the cause if the output voltage of dc power supply is zero volt. **[1]**

c) State the environmental factors which cause faults in capacitor. **[1]**

d) Why is delay line used in CRO? **[1]**

e) Signal generator works normally for square wave but not for sine wave. What could be the fault. **[2]**

f) When sine wave signal is fed to the y-input, there is only one horizontal line on the screen of CRO. What could be the fault? **[2]**

g) Specification checking is necessary after repairing an electronic instrument - comment. **[2]**

h) Explain the method of identifying the type of transistor with an Ohm-meter. **[2]**

Q2) Answer any two of the following:

a) Mention typical faults in Resistor and indicate their causes. **[4]**

b) State common faults that occur in transistor. **[4]**

c) Name typical faults in capacitor and mention their causes. **[4]**

P.T.O.

Q3) Answer any two of the following.

a) Explain various steps required in systematic troubleshooting of Electronic equipment. **[4]**

b) Describe the method to test a transformer for efficiency and load regulation. **[4]**

c) How do you test a dc power supply for load and line regulation. **[4]**

Q4) Answer the following.

a) Explain the working of following digital test and service instruments.

i) Logic pulser ii) Logic probe. **[6]**

b) Prepare a corrective maintenance table for regulated power supply for common symptoms and their remedies. **[6]**

OR

Write short notes on the following **:**

a) Common faults in OP-AMP and their causes . **[4]**

b) Typical faults in CRO and their repairing. **[4]**

c) Troubleshooting of microprocessor based system. **[4]**

Total No. of Questions : 4]

SEAT No. :

P590

[Total No. of Pages : 3

[4817]-386
T. Y. B. Sc.(Vocational)
INDUSTRIAL MICROBIOLOGY
VOC-IND-MIC-335: Pollution Control Technology
(Paper-V) (2008 Pattern) (Semester-III)

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

Instructions to the candidates:

1) ***Neat diagrams must be drawn wherever necessary.***
2) ***Figures to the right indicate full marks.***
3) ***All questions carry equal marks.***
4) ***Use of electronic pocket calculator is allowed.***
5) ***Assume suitable data, if necessary.***
6) ***All questions are compulsory.***

Q1) Answer as directed. **[10]**

For (a) to (d) state whether the statement given is True or False:

a) Good activated sludge activity can be indicated by the colour of mixed liquor in an activated sludge tank.

b) COD can never be lower that its BOD under normal conditions.

c) Removal of BOD in the settling / sedimentation tank in STP is not negligible and should be considered in plant design.

d) Bulking of sludge is caused due to excessive growth of filamentous bacteria.

For (e) to (j) choose the best option / answer among those given:

e) The ratio of MLVSS to MLSS is usually:

i) 0.4 ii) 0.5 iii) 0.8 iv) 1.0

f) Removal of settleable solids occurs mainly during:

i) Preliminary treatment

ii) Primary treatment

iii) Secondary Treatment

iv) Domestic sewage treatment.

P.T.O.

g) Suspended Solids (SS) are estimated by:

i) Evaporation of the sample.

ii) Filtration of the sample followed by weighing of dried residue.

iii) Measuring the volume after settling in a column.

iv) Drying a filtrate of the sample and weighing.

h) The efficiency of a trickling filter is measured in :

i) Percent of electricity reduction.

ii) Percent of Mixed Liquor Re-circulated

iii) Persent COD Reduction

iv) Percent BOD Removed

i) Organic matter in wastewater can be _____ or _____ and makesup approximately _____ % of the total solids.

i) Dissolved or Suspended/40%.

ii) Dissolved or Suspended/65%.

iii) Septic or Fresh/85%.

iv) Domestic or Industrial/45%.

j) Which of the following unit processes cannot be used for removal of suspended solids from wastewater:

i) Sedimentation tank

ii) Trickling filter

iii) Sand filter

iv) Disinfection

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

a) State the principle on which Type II sedimentation is based, and explain the phenomenon, mentioning its application.

b) Draw a labeled diagram of any type of anaerobic filter used for treatment of wastewaters.

c) Describe the process of activated carbonadsorption. Use a diagram to explain the process.

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

a) Explain the working of a Rotating Biological Contactor as a unit process for secondary treatment of wastewaters.

b) Draw a flow-chart for removal of phosphorus from wastewaters.

c) List the critical parameters used for controlling the functioning of a settler-clarifier. Explain any one of them with respect to how it is a critical parameter.

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

a) Draw a flow chart of a dairy wastewater treatment process.

b) Draw a flow chart of a distillery wastewater treatment process.

◀▶◀▶◀▶

Total No. of Questions : 4] SEAT No. :

P3249 [Total No. of Pages : 2

[4817]-387

T.Y. B.Sc. (Vocational) (Semester - III)

COMPUTER HARDWARE & NETWORK ADMINISTRATION

Computer/IT Service Management

(2008 Pattern) (Paper - V)

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

Instructions to the candidates:

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

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

a) What is Segregation of Duties in IS?

b) COBIT Stands for

c) What is the function of Request For Proposal?

d) Who manages Problem Escalation?

e) Use of Freeware License on Single PC is allowed. State True or False.

f) Name an ISO Standard for ISMS.

g) What does EUL stands for -

h) Network Administrator is responsible to maintain Database. State True or False.

i) What is Stored in Access Control List?

j) What is Escalation?

Q2) Attempt any Two of the following : **[2 × 5 = 10]**

a) How social engineering helps to extract information from a user?

b) Explain the Functions of a Helpdesk.

c) What is an incident management Process?

P.T.O.

Q3) Attempt any Two of the following : **[2 × 5 = 10]**

a) Explain the Importance of Software Testing before implementation.

b) Explain Importance of Control Matrix in SOD?

c) How cost based analysis and planning helps CFO?

Q4) Attempt any One of the following : **[1 × 10 = 10]**

a) Comment on : -

i) Software Licensing Issues

ii) Service Level Agreement.

b) What is the importance of Information System Organizational Structure?

Total No. of Questions : 4]

SEAT No. :

P591

[Total No. of Pages : 2

[4817]-388
T.Y.B.Sc. (Vocational)
SEED TECHNOLOGY
Seed Pathology and Entomology
(Paper-V) (2008 Pattern) (Semester-III)

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

Instructions to candidates:

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

Q1) Answer the following in one or two lines. **[10]**

a) Give the correct definition of seed transmission.

b) Name one disease caused by seed borne bacteria.

c) Give the scientific name of one storage fungus.

d) Write the correct definition of pest.

e) Give one example of seed borne viral disease.

f) Give the scientific name of any one pest of economic importance.

g) What is seed entomology?

h) Write one distinguishing character of order orthoptera.

i) How many stages the insect pest has to pass in it's life cycle.

j) What damage does the red cotton bug cause?

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

a) Write an account on the measures for controlling rice weevil.

b) Write five distinguishing characters of order Heteroptera.

c) What are storage fungi? Give an account on the damages caused by them.

P.T.O.

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

a) Seed infection.

b) Pest problem in seed storage.

c) History of seed pathology.

Q4) Draw and describe the life cycle of khapra beetle. Add a note on the damage caused by it. **[10]**

OR

Describe any two methods used for seed treatment.

◀▶◀▶◀▶

Total No. of Questions : 4]

SEAT No. :

P592

[Total No. of Pages : 2

[4817]-389
T.Y. B.Sc. (Vocational Course)
INDUSTRIAL CHEMISTRY
Inorganic and Organic Based Industries-I
(2008 Pattern) (Semester-III) (Paper-VI)

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

Instructions to the candidates:

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

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

a) What is Aldvin?

b) What temperature and pH is favourable for fermentation?

c) What is DDT?

d) What is Tyndall effect? Where it is used.

e) Give two uses of sulphuric acid.

f) What is fungicide?

g) What is wash?

h) What is proof spirit?

i) What are paint removers? Give example.

j) What are two qualities of good paint?

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

i) What are potassium fertilizers? Give suitable examples and mention percentage of potassium in it.

ii) What are emulsion paints? Give synthesis and uses of emulsion paints.

iii) What are rodenticides and herbicides? Explain with example.

P.T.O.

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

i) Give the essential requirements of fermentation.

ii) Write a note on 'contact converter'.

iii) What are qualities of good fertilizer?

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

a) What is malathion and parathion? How parathion is prepared?

b) Explain by-products of sugar industry.

c) Give characteristics of explosives and classify it.

Q4) a) Describe manufacturing of alcohol from molasses. **[6]**

OR

Describe manufacturing of urea with flow sheet diagram.

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

i) Write a note on 'Triple phosphate'.

ii) Give synthesis and uses of Polyethylene.

Total No. of Questions : 4]

SEAT No. :

P593

[Total No. of Pages : 2

[4817]-390
T.Y. B.Sc. (Vocational)
BIOTECHNOLOGY
Biotech-336:Environmental Biotechnology
(2008 Pattern) (Semester-III) (Paper-VI)

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

Instructions to the candidates:

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

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

a) Define phytoremediation.

b) Give the types of biofertilizers.

c) Name any two bioreactors used for waste water treatment.

d) What is the difference between a waste and pollutant?

e) What is composting?

f) Name two bacteria involved in biosorption of heavy metals.

g) Give uses of biogas.

h) Define in-situ bioremediation.

i) What is biostimulation?

j) Give two examples of xenobiotic compounds.

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

a) Explain the process of biogas production.

b) Discuss the applications of bioremediation.

c) Describe the role of biotechnology in treatment of wastes of tannery industry.

P.T.O.

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

a) Biotreatment of wastes

b) Ethanol production.

c) Biopesticides.

Q4) Whet are hazardous wastes? Describe in detail the role of biotechnology in treatment of hazardous wastes. **[10]**

OR

Describe in detail the role of biotechnology in environment protection.

Total No. of Questions : 4]

SEAT No. :

P1262

[Total No. of Pages : 2

[4817]-391

T. Y. B. Sc. (Vocational)

PHOTOGRAPHY AND AUDIO-VISUAL PRODUCTION

Television Software

(Semester - III) (Paper - VI) (2008 Pattern)

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

Instructions to the candidates:

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

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

a) Differentiate between reading a book and watching a movie.

b) Distinguish between a compact shot and an extreme close up.

c) Discuss: 'Brainstorming'.

d) Discuss the importance of preproduction stage.

e) Why is the folk format used to generate a social message?

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

a) Give suitable examples and distinguish between 'Subjective Camera' and 'Following Camera'.

b) How would you show a person's superior image in a film?

c) Give suitable examples and distinguish between "Zoom and Walking".

Q3) Write a script for 30 sec social advertisement on the following theme in the **interview format**. **[10]**

"Environmental Awareness".

OR

P.T.O.

Q3) Write a script for 30 sec social advertisement on the following theme in the **documentary format**. **[10]**

"Environmental Awareness"

Q4) Write short notes on any <u>two</u>: **[10]**

a) Magazine format.

b) Screenplay and script.

c) Selection of tool to communicate with masses.

Total No. of Questions : 4]

SEAT No. :

P594

[Total No. of Pages : 2

[4817]-392

T.Y. B.Sc. (Vocational)

ELECTRONIC EQUIPMENT AND MAINTENANCE

Electronic Instrumentation

(2008 Pattern) (Semester-III) (Paper-VI)

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

Instructions to the candidates:

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

Q1) Answer the following:

a) State application of dynamometer. **[1]**

b) Define selectivity. **[1]**

c) What is impedance? **[1]**

d) What is load cell? **[1]**

e) Explain deflection type instrument. **[2]**

f) Classify instrument- Bourdon tube. **[2]**

g) Define accuracy with mathematical formula. **[2]**

h) What is NTC? Give one example. **[2]**

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

a) Explain frequency domain analysis.

b) Explain optical encoder.

c) Discuss logic analyzer.

P.T.O.

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

a) Give an account on impedance.

b) Discuss elastic force devices.

c) Explain relative motion measurement.

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

a) Explain generalized instrumentation system.

b) Write a note on hydraulic load cell.

OR

Answer the following:

a) Explain LDR as light sensor.

b) Give four applications of DSP.

c) Write a note on distortion analyzer.

Total No. of Questions : 4]

SEAT No. :

P595

[Total No. of Pages : 2

[4817]-393
T.Y. B.Sc. (Vocational)
INDUSTRIAL MICROBIOLOGY
VOC-IND-MIC-336:Plant and Animal Tissue Culture
(2008 Pattern) (Semester-III) (Paper-VI)

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

Instructions to the candidates:

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

Q1) Answer As directed. **[10]**

a) State whether the following statement is TRUE or FALSE:

Cell disaggregation is first step for animal cell culture, which can be carried out more efficiently by calcium depletion along with use of proteolytic enzymes.

b) State whether the following statement is TRUE or FALSE:

The main objective in developing animal organ culture is to maintain the architecture of the tissue and it can be achieved by treating the tissue explants with TPVG (Trypsin Versene Glucose) solution.

c) Following are the applications of animal cell lines, EXCEPT:

i) Developing recombinant based DNA vaccines

ii) Large scale bio-synthesis of monoclonal antibodies

iii) Tissue engineering for stem cell based therapies

iv) Single cell protein manufacturing.

d) Animal cell suspension cultures require:

i) Organogenesis

ii) Differentiation

iii) Aggregation

iv) Disaggregation

P.T.O.

e) An indication for passaging a chick embryo fibroblast cell line is:
   i) Change in color of medium from pink to purple
   ii) Cytoplasmic vacuolation and granulation
   iii) Adherence of cells to the substratum
   iv) Increase in number of attached cells

f) Define: Totipotency

g) Enlist the micronutrients for plant tissue culture medium.

h) Ti plasmid do not show
   i) Vi genes
   ii) T DNA
   iii) Agropine/Nopaline/Octopine genes
   iv) Ampicillin resistance gene

i) State whether the following statement is TRUE or FALSE:
   The latest development in vaccination is plantibodies

j) Name any two types of bioreactors used for growing plant cells.

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

a) Describe the design of reactors used for large scale production of animal cell suspension cultures.

b) Explain the differences between primary cell line and established cell lines.

c) Explain use of animal cell lines for dye exclusion tests in cytotoxicity testing of drugs.

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

Describe the following in detail with the help of suitable diagrams

a) Callus culture

b) Protoplast fusion

c) Suspension culture

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

a) List different methods used for the development of animal organ cultures; explain with diagram any two methods in detail.

b) Comment on the use of genetic engineering techniques to obtain transgenic plants. Elaborate with at least two examples.

Total No. of Questions : 4] SEAT No. :

P3250 [Total No. of Pages : 2

[4817]-394

T.Y. B.Sc. (Vocational) (Semester - III)

COMPUTER HARDWARE & NETWORK ADMINISTRATION

Network Concepts - I (Paper - VI)

(2008 Pattern)

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

Instructions to the candidates:

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

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

a) Give the default Port no for POP Service.

b) What is a VPN?

c) What is a File Server?

d) Why do we use DHCP Protocol?

e) Why do we need a Device Driver?

f) Give the importance of TCP/IP protocol in internet world.

g) Windows XP is a Desktop Operating System. State True or False

h) List any two Types of Networks.

i) Which type of Server is used to Store emails?

j) Name the Service to resolve a domain name.

Q2) Attempt any Two of the following : **[2 × 5 = 10]**

a) Why do we need a Print Server in large Networks?

b) What are the different functions of a Network Operating System?

c) Which types of Topologies can be used while designing a Network?

P.T.O.

Q3) Attempt any Two of the following : **[2 × 5 = 10]**

a) What is a Application Server? Explain its need.

b) Discuss various components needed to design a Network.

c) Differentiate between : Windows OS and Linux OS.

Q4) Attempt any One of the following : **[1 × 10 = 10]**

a) What is OSI Model? Explain its Need.

b) What is a Protocol? List any four Protocols with proper Example.

Total No. of Questions : 4]

SEAT No. :

P596

[Total No. of Pages : 2

[4817]-395
T.Y. B.Sc. (Vocational)
SEED TECHNOLOGY
Seed farm Management, Processing and Storage
(2008 Pattern) (Semester-III) (Paper-VI)

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

Instructions to the candidates:

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

Q1) Answer in one sentence each. **[1 x 10 = 10]**

a) Give diagrammatic representation of seed flow during processing.

b) What is seed storage.

c) Give any one factor involved in the selection of a farm business.

d) What is general farming?

e) Give any one component of seed marketing.

f) What is farm management?

g) Define seed treatment

h) What is seed bagging?

i) Define seed drying.

j) Enlist seed treating equipments.

Q2) Answer the following (Any two) **[2 x 5 =10]**

a) Describe in detail any two methods of seed treatment.

b) Describe in detail factors involved in the selection of a farm business.

c) Write an account on comparison of farm management and Agricultural economics.

P.T.O.

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

a) General vs. specialized farming.

b) Farm management as personel matter.

c) Receiving the seed in seed processing unit.

Q4) What is seed processing? Describe in detail any two steps involved in seed processing. **[10]**

OR

Describe in detail basic requirements for seed storage.