

Indian School Certificate Examination

Specimen Question Papers

(Based on the ISC March 2010 Regulations & Syllabuses)



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Council for the Indian School Certificate Examinations
Pragati House, 3rd Floor
47-48 Nehru Place
New Delhi – 110 505

April 2009

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Specimen Papers for those Syllabuses (ISC March 2010 Examination) where no incorporations or modifications were made have not been included in this booklet.

All question papers will be set as per the rubrics and Mark distribution given in the Syllabuses.

MATHEMATICS

(Three hours)

(Candidates are allowed additional 15 minutes for only reading the paper.

They must **not** start writing during this time)

Section A – Answer **Question 1** (Compulsory) and **five** other questions

Section B and Section C – Answer **two** questions from **either** section B or Section C

All working, including rough work, should be done on the same sheet as and adjacent to, the rest of the answer

The intended marks for questions or parts of questions are given in brackets []

Mathematical tables and graph papers are provided.

Slide rule may be used.

SECTION A

Question 1

- (i) If $\begin{pmatrix} 3 & x-1 \\ 2x+3 & x+2 \end{pmatrix}$ is a symmetric matrix then find the value of x . [3]
- (ii) If $\cos(2\sin^{-1} x) = \frac{1}{9}$ find the values of x [3]
- (iii) Find the value of 'k' if the line $y = 4x + k$ touches the parabola $y^2 = 16x$. [3]
- (iv) Evaluate: $\lim_{x \rightarrow 0} (1 + \sin x)^{\cot x}$ [3]
- (v) Evaluate: $\int \sin \sqrt{x} dx$ [3]
- (vi) Evaluate: $\int_0^{\frac{\pi}{2}} \log \left[\frac{3 + 5 \cos x}{3 + 5 \sin x} \right] dx$ [3]
- (vii) Five books on Mathematics and 3 books on Physics are placed at random on a bookshelf. What is the probability that books on Mathematics are placed side by side on the bookshelf? [3]
- (viii) If the two lines of regression are $4x + y = 225$ and $x + 4y = 150$, find the value of Karl Pearson's coefficient of correlation for the data represented by 'x' and 'y'. [3]
- (ix) If $(\sqrt{3} + i)^6 = x + iy$ find the values 'x' and 'y'. [3]
- (x) Solve $\log \frac{dy}{dx} = 4x - 2y - 2$. [3]
-

Question 2

(a) Prove that:

$$\begin{vmatrix} -bc & b^2+bc & c^2+bc \\ a^2+ac & -ac & c^2+ac \\ a^2+ab & b^2+ab & -ab \end{vmatrix} = (ab+bc+ca)^3 \quad [5]$$

(b) If $A = \begin{pmatrix} -3 & 6 & -1 \\ 2 & 5 & -1 \\ 2 & 4 & -1 \end{pmatrix}$ and $B = \begin{pmatrix} -1 & 2 & -1 \\ 0 & 5 & -5 \\ -2 & 24 & -27 \end{pmatrix}$ find AB hence or otherwise solve the

following linear equations by matrix method:

$$-3x + 6y - z = 7$$

$$2x + 5y - z = 14$$

$$2x + 4y - z = 11$$

[5]

Question 3

[5]

(a) Verify Lagrange's Mean Value Theorem for the given function:

$$f(x) = x(x+3)(x-2) \text{ on } [-1, 4]$$

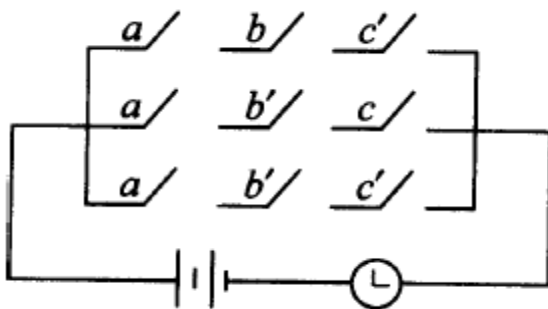
(b) Find the foci and equation of the directrices of the hyperbola

$$9x^2 - 16y^2 + 18x + 64y = 199.$$

Question 4

(a) Prove that $\cos^{-1}\left[\frac{2+3\cos x}{3+2\cos x}\right] = 2\tan^{-1}\left(\frac{1}{\sqrt{5}}\tan\frac{x}{2}\right)$. [5]

(b) (i) Write the Boolean expression corresponding to the switching circuit given below: [5]



(ii) Simplify the expression and construct the switching circuit for the simplified expression.

Question 5

- (a) If $y = \sin(2 \sin^{-1} x)$ show that $(1 - x^2) \frac{d^2 y}{dx^2} - x \frac{dy}{dx} + 4y = 0$. [5]
- (b) Find the dimensions of the rectangle of greatest area that can be inscribed in a semi-circle of radius $10\sqrt{2}$ meters. [5]

Question 6

- (a) Evaluate $\int \frac{x^2 + 1}{x^4 + 1} dx$. [5]
- (b) Find the area of the region bounded between the curves $x = y^2$ and $x = 3 - 2y^2$ [5]

Question 7

- (a) Ten students got the following percentage of marks in Mathematics and Physics:

Marks in Mathematics	56	64	75	85	85	87	91	95	97	98
Marks in Physics	66	72	56	66	74	78	74	88	90	89

Calculate Spearman's coefficient of rank correlation and comment on r. [5]

- (b) For the data given below, find the regression equation of X on Y. Using the equation, calculate the value of X when Y = 15. [5]

X	20	25	30	35	40	45
Y	12	14	16	20	22	25

Question 8

- (a) Two numbers are selected randomly from the first fifteen natural numbers. If the sum of the numbers selected is even, find the probability that both numbers are even. [5]
- (b) In bag A there are 6 white and 4 red balls, while in bag B there are 7 white and 8 red balls and in the bag C, there are 4 white and 3 red balls. One ball is taken out at random from each bag. Find the probability that all the three balls are of the same colour. [5]

Question 9

- (a) Solve : $(1+y^2)dx = (\tan^{-1} y - x)dy$. [5]
- (b) Find the locus of z if $\text{Amp}\left[\frac{z-1}{z+1}\right] = \frac{\pi}{4}$. [5]

SECTION B

Question 10

- (a) With usual notations using vector method prove that in a triangle ABC

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C} \quad [5]$$

- (b) Find the volume of the parallelepiped whose three coterminus edges are

$$2i-3j+4k, i+2j-k \text{ and } 3i-j+2k . \quad [5]$$

Question 11

- (a) Determine the equations of the line passing through the point (1,3,-8) and perpendicular to

the lines $\frac{x-2}{1} = \frac{y-5}{2} = \frac{z-1}{3}$ and $\frac{x+2}{-3} = \frac{y-1}{2} = \frac{z+3}{5}$. [5]

- (b) Find the equation of the plane passing through the point $2i - 2j + 2k$ and parallel to the plane $r.(2i - 4j + 2k) = 5$

[5]

Question 12

- (a) The overall percentage of passes in a certain examination is 75. If five candidates from a certain town appear in the examination, what is the probability that at least four pass the examination? [5]

- (b) A consulting firm rents cars from three agencies such that 20% of the cars are rented from agency A, 30% from agency B and 50% from agency C. It is known that 70% of the cars from A, 80% of the cars from B and 90% of the cars from C are in good condition. If a car taken on rent is in good condition, what is probability that it is from agency B? [5]

SECTION C

Question 13

- (a) A furniture firm manufactures chairs and tables, each requiring the use of three machines A, B and C. Production of one chair requires 2 hours on machine A, 1 hour on machine B and 1 hour on machine C. Each table requires 1 hour each on machine A and B and 3 hours on machine C. The profit obtained by selling one chair is Rs. 30 while by selling one table the profit is Rs. 60. The total time available per week on machine A is 70 hours, on machine B is 40 hours and on machine C is 90 hours. How many chairs and tables should be made per week so as to maximize profit? Formulate the problem as L.P.P. and solve it graphically. [5]

- (b) A man borrowed some money and paid it back in three equal quarterly installments of Rs. 9261 each. If the first installment is to be paid one year after the date of borrowing and rate of interest charged was 20% pa compounded quarterly, find the sum he borrowed. Find also total interest charged. [5]

Question 14

- (a) A bill for Rs.56,100 is drawn on 22-1-90 at 11 months and is discounted on 13.10.90 at the rate of 10% . Find the Bankers gain. [5]
- (b) A radio manufacturer finds that he can sell x radios per week at Rs p each, where $p = 2(100 - \frac{x}{4})$. His cost of production of x radios per week is Rs. $(120x + \frac{x^2}{2})$. Find the value of x when marginal cost function and marginal revenue function are equal. [5]

Question 15

- (a) Find the cost of living index number for the year 2005 with 2000 as base from the following data, using weighted average of price relatives: [5]

Commodity	Weights	Price(inRs)	
		2000	2005
Rice	3	15	20
Wheat	3	6	10
Pulses	2	32	40
Milk	1	12	18
Clothing	1	150	200

- (b) Find four quarterly moving average: [5]

Year	Jan-March	April - June	July-Sept.	Oct - Dec.
1980	45	56	39	30
1981	39	49	45	41
1982	46	56	49	40

COMPUTER SCIENCE

Paper – 1

(THEORY)

Three hours

(Candidates are allowed additional 15 minutes for **only** reading the paper.
They must **NOT** start writing during this time)

Answer **all** questions in Part I (compulsory) and **seven** questions from Part-II, choosing **three** questions from Section-A, **two** from Section-B and **two** from Section-C.

All working, including rough work, should be done on the same sheet as the rest of the answer.

The intended marks for questions or parts of questions are given in brackets [].

PART I

Answer **all** questions

While answering questions in this Part, indicate briefly your working and reasoning, wherever required.

Question 1

- (a) Draw the truth table to prove the propositional logic expression. [2]
 $a \leftrightarrow b = (a \Rightarrow b) \cdot (b \Rightarrow a)$
- (b) Determine if following wff is valid, satisfiable or unsatisfiable: [2]
 $(p \rightarrow q) \Rightarrow [\sim q \rightarrow (\sim p \wedge \sim q)]$
- (c) Differentiate between a tautology and a contradiction. [2]
- (d) Convert the following expression $F(X,Y,Z) = XY + Y'Z$ into minterms. [2]
- (e) Minimise $F = AB + (AC)' + AB'C$ using Boolean laws. [2]

Question 2

- (a) What is dynamic binding? [2]
- (b) Convert the following infix notation to postfix : [2]
 $A*(B/C)/((E*F)+G)$
- (c) Define the terms Best-Case and Average-Case in complexities. [2]
- (d) Each element of an array `arr[15][20]` requires 'W' bytes of storage. If the address of `arr[6][8]` is 4580 and the Base Address at `arr[1][1]` is 4000, find the width 'W' of each cell in the array `arr[][]` when the array is stored as **Column Major Wise**. [2]
- (e) Define an abstract class. [2]

Question 3

- (a) The following function **comb()** and **combi()** are a part of some class. Give the output when the function **combi()** is called. Show the dry run/working. [5]

```
void combi ( )
{
    for (int i=0 ; i<5 ; i++)
    {
        for (int j=0 ; i<i+1 ; j++)
            System.out.print ( " " + comb ( i , j ) );
        System.out.println ( );
    }
}
long comb (int n , int k)
{
    long c = 1;
    for (int i = 1; i<=k ; i++ , n--)
        c = c*n/i;
    return c;
}
```

- (b) The following function **find()** and **perform ()** are part of some class. Show the dry run / working:

```
int find ( int n, int p)
{
    if ( n == 0 )
        return p;
    else
        return find ( p % n , n );
}
void perform ( int m )
{
    int q = 14;
    int x = find ( q++, ++m);
    System.out.println(x);
}
```

- (i) What will the function **find (12, 8)** return? [2]
(ii) What will be the output of the function **perform ()** when the value of **m** is 20. [2]
(iii) In one line state what the function **find ()** is doing, apart from recursion. [1]

PART – II

Answer *seven* questions in this part, choosing *three* questions from Section A, *two* from Section B and *two* from Section C.

SECTION - A

Answer any *three* questions

Question 4

- (a) Given $F(A,B,C,D) = \Sigma (0,2, 6,8,10,11,14,15)$
- (i) Reduce the above expression by using 4 - Variable K-Map , showing the various groups (i.e octal , quads and pairs). [4]
 - (ii) Draw the Logic gate diagram of the reduced expression using NAND Gate only. [1]
- (b) Given $F(A,B,C,D) = \pi (5,7,8,10,12,14,15)$.
- (i) Reduce the above expression by using 4 - Variable K-Map , showing the various groups (i.e octal , quads and pairs). [4]
 - (ii) Draw the Logic gate diagram of the reduced expression using NOR Gate only. [1]

Question 5

- (a) Draw the logic diagram and Truth table to Encode the hexadecimal lines (A – F). Briefly explain the working of the logic diagram. [5]
- (b) Simplify the equation and draw the gate for the reduced expression.
 $F = A'B + AB'C + A$ [2]
- (c) Define maxterms and minterms. Give one example of each. [3]

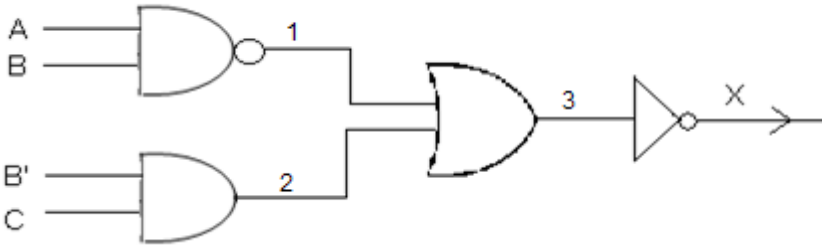
Question 6

- (a) Draw a truth table with a 3 input combination which outputs 1 if there are odd number of 0's. Also derive an S-O-P expression for the same. Reduce the S-O-P expression using K-map. [3]
- (b) State the principal of duality. Give one example. [2]
- (c) How many select lines does an 8 : 1 multiplexer have? Briefly explain the working of a 4 : 1 multiplexer. Also draw the logic diagram of a 4 : 1 multiplexer. [5]

Question 7

(a) How does Half adder differ from Full adders? Draw truth table for both the adders. Also derive expression for full adder and simplify the same. [5]

(b) From the given logic diagram :



Derive Boolean expression and also draw the truth table. [3]

(c) Verify the following :
 $\Sigma (0,2,7,6) = \pi (1,3,4,5)$ [2]

SECTION – B

Answer any two questions

Each program should be written in such a way that it clearly depicts the logic of the problem. This can be achieved by using mnemonic names and comments in the program.

(Flowcharts and Algorithms are **not** required)

The programs must be written in Java

Question 8 [10]

Design a class **Prime** to fill an array of order [m x n] where the maximum value of both m and n is 20, with the first [m x n] prime numbers Row wise .The details of the members of the class are given below :

Class name : **Prime**

Data members /instance variables :

- arr[][] : Two dimensional integer array.
- r : integer to store the number of rows.
- c : integer to store the number of columns.

Member functions :

- Prime() : to accept the size of the array .
- int isprime(int p) : return 1 if number is prime and 0 if not prime .
- void fill () : to fill the elements of the array with the first (m x n) prime numbers.
- void display() : displays the array in a matrix form.

Specify the class **Prime** giving details of the **constructor** and member functions **int isprime (int)**, **void fill()** and **void display()** with **main()** function to create an object and call the function accordingly.

Question 9

[10]

Design a class **Alpha** which enables a word to be arranged in ascending order according to its alphabets.

The details of the members of the class are given below :

Class name : **Alpha**

Data members /instance variables:

Str : to store a word

Member functions :

- Alpha() : default constructor
- void readword() : to accept the inputted word
- void arrange () : to arrange the word in alphabetical order using any standard sorting technique.
- void disp() : displays the word .

Specify the class **Alpha** giving details of the **constructor** and the member functions **void readword()**, **void arrange()**, **void disp ()** and defining the **main ()** function to create an object and call the function in order to execute the class by displaying the original word and the changed word with proper message.

Question 10

[10]

The Combination function $C(n, k)$ gives the number of different (unordered) K – elements Subsets that can be found in a given set of n elements. The function can be computed from the formula:

$$C(n, k) = \frac{n!}{k!(n-k)!}$$

Design a class **Combination** to implement this formula. Some of the data members and member functions are given below.

Class name : **Combination**

Data members /instance variables :

n : integer number

k : integer number

Member functions :

Combination () : to initialize the data members $n = 0$ and $k = 0$

void read () : to accept the value of the data members

int fact(int) : return the factorial of a number using **recursion technique**.

void compute () : calculate the combination value

void display () : to show the result

Specify the class **Combination**, giving details of the **Constructor** and member functions **void read()**, **int fact(int)**, **void compute()** and **void display()** with the **main()** function to create an object and call the member function according to enable the task .

SECTION – C

Answer any *two* questions

Each Program / Algorithm should be written in such a way that it clearly depicts the logic of the problem step wise. This can also be achieved by using pseudo codes .

(Flowcharts are **not** required)

Programs to be written in Java.

The Algorithm must be written in general/standard form.

Question 11

[10]

A class Personal contains employee details and another class Retire calculates the employee's Provident Fund and Gratuity. The details of the two classes are given below:

Class name : **Personal**

Data Members:

Name	:	stores the employee name
Pan	:	stores the employee PAN number
basic_pay	:	stores the employee basic salary (in decimals)
acc_no	:	stores the employee bank account number

Member functions:

Personal(....)	:	parameterized constructor to assign value to data members
void display()	:	to display the employee details

Class name : **Retire**

Data Members:

Yrs	:	stores the employee years of service
Pf	:	stores the employee provident fund amount (in decimals)
Grat	:	stores the employee gratuity amount (in decimals)

Member functions:

Retire (....)	:	parameterized constructor to assign value to data members of both the classes.
void provident()	:	calculates the PF as (2% of the basic pay) * years of service.
void gratuity()	:	calculates the gratuity as 12 months salary, if the years of service is more than or equal to 10 years else the gratuity amount is nil.
void display1()	:	Displays the employee details along with the PF (Provident Fund) and gratuity amount.

Specify the class **Personal** giving details of the **constructor** and member functions **void display()**. Using the **concept of inheritance**, specify the class **Retire** giving details of **constructor**, and the member functions **void provident()**, **void gratuity()** and the **void display1()**. The main function need **not** be written.

Question 12

Chain is an entity which can hold at the most 50 integers. The chain enables the user to add and remove integers from both the ends i.e. front and rear. Define a class Chain with the following details:

Class name : **Chain**

Data Members:

ele[] : the array to hold the integer elements.
cap : stores the maximum capacity of the array.
front : to point the index of the front.
rear : to point the index of the rear.

Member functions:

Chain(int max) : constructor to initialize the data cap = max, front = rear = 0 and to create the integer array.
void pushfront(int v) : to add integers from the front index if possible else display the message("full from front").
int popfront() : to remove the return elements from front. If array is empty then return-999.
void pushrear(int v) : to add integers from the front index if possible else display the message("full from rear").
int poprear() : to remove and return elements from rear. If the array is empty then return-999.

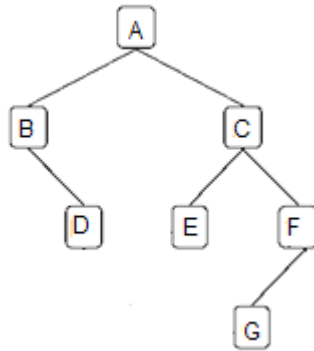
- (a) Specify the class **Chain** giving details of the **constructor** and member function **void pushfront(int)**, **int popfront()**, **void pushrear(int)** and **int poprear ()**. The main function need **not** be written. [9]
- (b) What is the common name of the entity described above? [1]

Question 13

(a) Link Lists are linear data structure . Create Algorithms for the following operations :

- (i) Insertion of a Node at the beginning in a Link List. [4]
- (ii) Deletion of the first Node in a Link list.

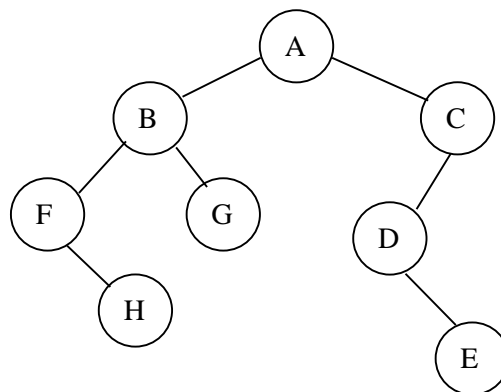
(b) Answer the following from the diagram of a Binary Tree given below:



- 1. Name the leaves of the tree. [1]
- 2. Write the path between A to G. [1]
- 3. State the level of node E . [1]

(c) For the given Binary Tree write the: [3]

- 1. Postorder Sequence.
- 2. Inorder Sequence.
- 3. Preorder Sequence.



COMPUTER SCIENCE

Paper – 2

(PRACTICAL)

(Reading Time : 15 minutes)

(Planning Session AND Examination Session : Three Hours)

The total time to be spent on the Planning session and the Examination session is Three hours.

After completing the Planning Session, the candidate may begin with the Examination Session.

A maximum of 90 minutes is permitted for the Planning Session.

However, if candidates finish earlier, they are to be permitted to begin the Examination Session.

(Maximum Marks : 80)

As it is a practical examination the candidate is expected to do the following :

1. Write an algorithm for the selected problem.
(Algorithm should be expressed clearly using any standard scheme such as pseudo code or in steps which are simple enough to be obviously computable) [10]
2. Write a program in **JAVA** language. The program should follow the algorithm and should be logically and syntactically correct. [20]
3. Document the program using mnemonic names / comments, identifying and clearly describing the choice of data types and meaning of variables. [10]
4. Code / Type the program on the computer and get a printout (Hard Copy). Typically, this should be a program that compiles and runs correctly. [10]
5. Test run the program on the computer using the given sample data and get a printout of the output in the format specified in the problem. [10]
6. Viva-Voce on the **Selected Problem** . [20]

Solve any **one** of the following Problems.

Question 1

Design a program which inputs a date in six digit number format i.e. 141296 . Test the validity of the date and print the date in full form . If date is invalid then print a message as “ Invalid Date“

1. Example :

INPUT : 141296
OUTPUT : 14th December , 96
: VALID DATE

2. Example :

INPUT : 230488
OUTPUT : 23rd April , 88
: VALID DATE

3. Example :

INPUT : 300284
OUTPUT : INVALID DATE

Question 2

Write a program to fill in a two dimensional array in a circular fashion with natural numbers from 1 to N^2 , given N as input.

Example : if $N = 4$, $N^2 = 16$, then the array will be :

1	2	3	4
12	13	14	5
11	16	15	6
10	9	8	7

Question 3

Accept a paragraph of text consisting of sentences that are terminated by either “.”, “,”, “!” or a “?” followed by a space. Assume that there can be a maximum of 05 sentences in a paragraph.

Design a program to perform the following :

- Arrange the sentences in alphabetical order of words, sentence by sentence.
- Separate the words which begin with a vowel.

Sample data 1:

INPUT: HELLO ! HOW ARE YOU ? WHEN ARE YOU COMING ? HOPE TO SEE YOU SOON.

OUTPUT: HELLO ! ARE HOW YOU ? ARE COMING WHEN YOU ? HOPE SEE SOON TO YOU.

VOWELS: ARE

Sample data 2 :

INPUT : THE QUICK BROWN FOX JUMPED OVER THE LAZY DOG.

OUTPUT : BROWN DOG FOX JUMPED LAZY OVER QUICK THE THE.

VOWELS: OVER

PHYSICS

Paper – 1

(THEORY)

(Three hours)

(Candidates are allowed additional 15 minutes for **only** reading the paper.
They must NOT start writing during this time)

Answer **all** questions in **Part I** and **six** questions from **Part II**, choosing **two** questions from **each** of the Sections **A, B** and **C**.

All working, including rough work, should be done on the same sheet as, and adjacent to, the rest of the answer.

The intended marks for questions or parts of questions are given in brackets [].

(Material to be supplied: Log tables including Trigonometric functions)

A list of useful physical constants is given at the end of this paper.

PART I

Answer all questions

Question 1

[5]

A. Answer **all** questions by choosing the correct option A, B, C or D.

- (i) Three identical point charges, each of Q Coulomb, are kept at the three vertices of an equilateral triangle having each side = a . [See figure 1]. Electro-static potential energy of the system is:

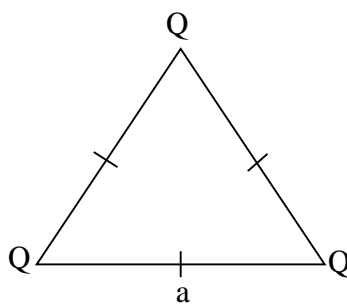


Figure 1

- (A) $\frac{1}{4\pi\epsilon_0} \frac{Q^2}{a}$ (B) $\frac{1}{4\pi\epsilon_0} \frac{3Q^2}{a}$ (C) $\frac{1}{4\pi\epsilon_0} \frac{3Q^2}{a^2}$ (D) $\frac{1}{4\pi\epsilon_0} \frac{Q^2}{a^2}$
-

- (ii) Four cells E_1 , E_2 , E_3 and E_4 are connected as shown in Figure 2. Emf of the battery so formed is:

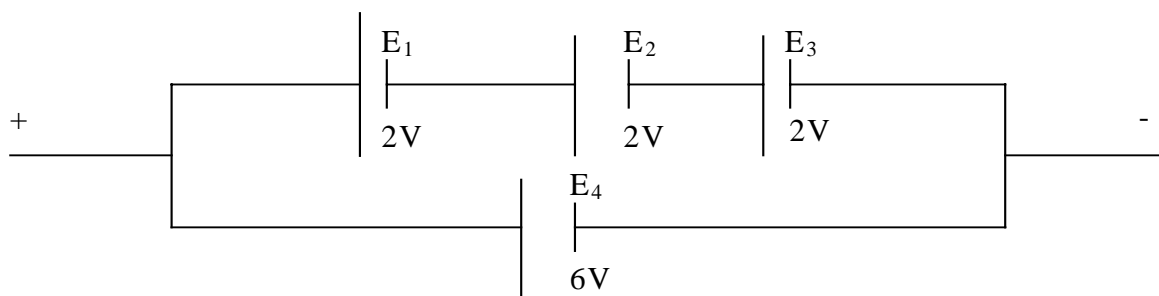


Figure 2

- (A) 6V (B) 12V (C) 4V (D) Zero
- (iii) A 50Ω non-inductive resistor is connected to a source which generates an emf e which is given by
- $e = 200 \sin(120 \pi t)$ Volt. Peak value of current flowing through the resistor is:
- (A) 0.25 A (B) 2.5 A (C) 4.0 A (D) $4\sqrt{2}$ A
- (iv) A thin converging lens of focal length 25 cm is kept in contact with a thin diverging lens of focal length 20 cm. Focal length of the combination is:
- (A) + 100 cm (B) -100 cm (C) 45 cm (D) 5 cm
- (v) Photo electric threshold wavelength of a certain metal is 198 nm. Its work function is:
- (A) 1×10^{-18} J (B) 1×10^{-19} J (C) 1×10^{-16} J (D) 1×10^{-17} J

B. Answer all questions briefly and to the point:

[15]

- (i) An oil drop weighing 1×10^{-15} N and carrying a charge of 8×10^{-19} C is found to remain at rest in a uniform electric field of intensity 'E'. Find 'E'.
- (ii) Which conservation principle is involved in Kirchoff's second law?
- (iii) State any one difference between Joule effect and Peltier's effect.

- (iv) Two thin, infinitely long conductors, X and Y, carrying currents I_1 and I_2 are kept parallel to each other, at a distance 'a', in vacuum [See figure 3].

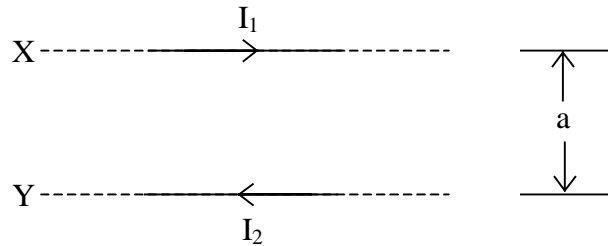


Figure 3

How much force acts on a 1m span of wire Y due to current flowing through X?

- (v) Alternating current I flowing through a device lags behind the potential difference V across it by 90° or $\frac{\pi}{2}$ radian. Is this electrical device a resistor, an inductor or a capacitor?
- (vi) An electro magnetic wave has a frequency of 1 MHz. On which part of the electro magnetic spectrum does this wave lie?
- (vii) What kind of source produces a cylindrical wave front?
- (viii) Plot a labelled graph showing variation of relative intensity with respect to distance, in a single slit diffraction experiment.
- (ix) State any one method by which chromatic aberration produced by a convex lens can be minimized.
- (x) Give any one reason why giant telescopes all over the world are of reflecting type.
- (xi) Figure 4 below is a graph showing variation of relative intensity I of X rays Vs its wavelength λ , when X ray tube is operated at a tube potential of 20 KV.

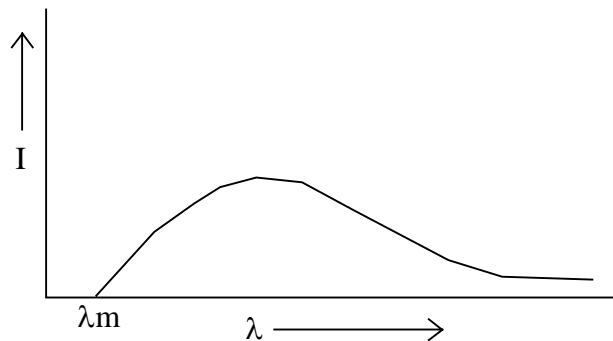


Figure 4

Redraw this graph in your answer book and on same axes, draw another such graph when tube potential is raised to 30 KV.

- (xii) Write down the relation between mean life τ of a radioactive substance and its half life $T_{1/2}$.
- (xiii) According to the modern view, matter and energy are inter-convertible. Give one example where energy is converted to matter.
- (xvi) Draw graphs to show input and output voltages of an ideal amplifier.
- (xv) Write down the truth table of a NAND gate.

PART II

*Answer **six** questions in this part, choosing **two** questions from **each** of the Sections **A**, **B** and **C**.*

SECTION A

*(Answer any **two** questions)*

Question 2

- (a) Figure 5 (a) below shows a parallel plate air capacitor whose capacitance is $2 \mu\text{F}$. [4]

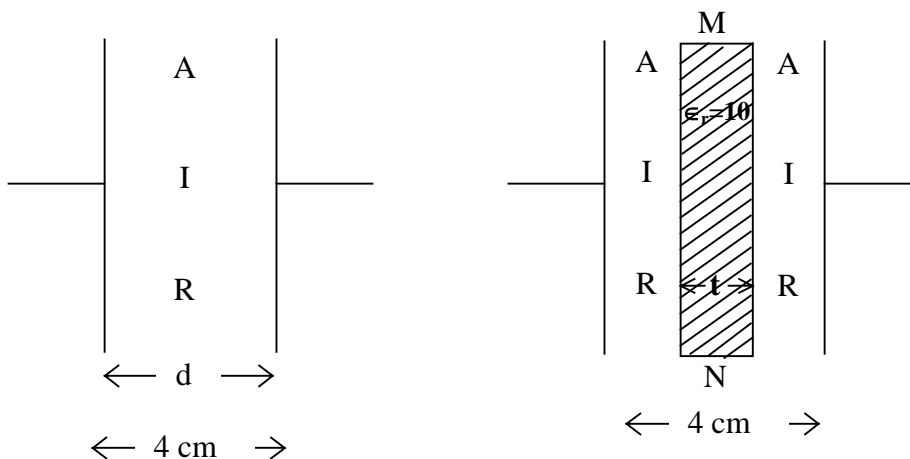


Figure 5 (a)

Figure 5 (b)

A dielectric slab MN of thickness $t = 2 \text{ cm}$ and having dielectric constant (relative permittivity) $= 10$ is now introduced between the two plates (See figure 5 (b))

Find the new capacitance of the system.

- (b) Using Gauss' Theorem, calculate intensity of electric field at a point at a radial distance of 3 cm from an infinite line charge having linear charge density of $5 \times 10^{-6} \text{ Cm}^{-1}$. [2]
- (Statement of Gauss' Theorem or derivation not required).
- (c) What is meant by temperature coefficient of resistance? Write down Ohm's Law in vector form, stating the meaning of every symbol used. [3]

Question 3

- (a) Draw a labelled diagram of a balanced Wheat Stone bridge. Using either Ohm's Law or Kirchoffs' Laws, obtain the relation between four resistors forming the bridge. [3]
- (b) Figure 6 below shows a potentiometer circuit. When the jockey is pressed on the slide wire AB at a point C such that $AC = 2.9\text{m}$, the galvanometer 'G' shows no deflection. Find the emf of the cell X. [3]

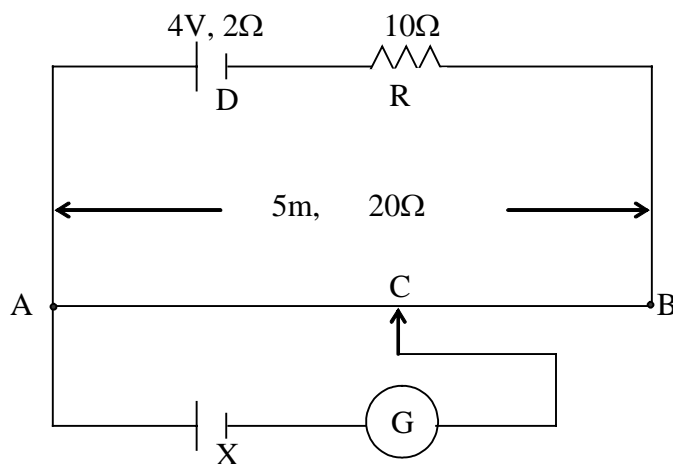


Figure 6

[Slide wire AB is 5m long and has a resistance of 20Ω .]

- (c) Figure 7 below shows three resistors: $R_1 = 10\Omega$, $R_2 = 20\Omega$ and $R_3 = 90\Omega$. When a current I enters the circuit, heating power developed in R_1 is found to be 90 W. Calculate the heating power developed in R_3 . [3]

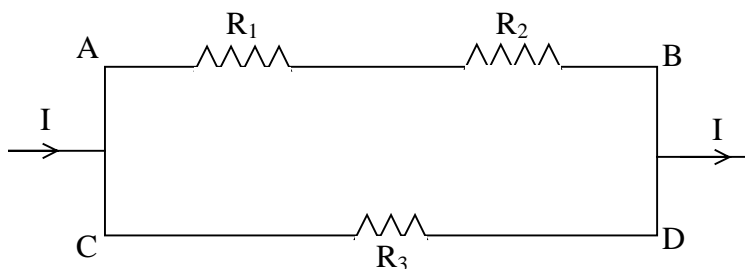


Figure 7

Question 4

- (a) Using Ampere's circuital law, obtain an expression for magnetic flux density 'B' at a point 'P' near an infinitely long straight conductor carrying a current 'I'. [3]
- (b) Show graphically how a d.c current flowing through an LR circuit varies with time when the key is put (i) on (ii) off. What is meant by time constant of an LR circuit? [3]
- (c) A $(\frac{25}{\pi^2})\mu F$ capacitor 'C' and a $50\ \Omega$ resistor 'R' are connected in series to a 220V, 50Hz a.c supply. It is desired to have a current of 2A in phase with supply voltage. Find the value/s of additional component/s to be connected in series with C and R. [3]

SECTION B

(Answer any two questions)

Question 5

- (a) Which electro-magnetic wave is longer than a light wave but shorter than a micro-wave? How can it be detected? Name only one detector. [2]
- (b) In Young's double slit experiment, what is the effect of the following changes on the interference pattern: [3]
- Distance between the two slits is decreased.
 - One of the slits is covered with a thin mica sheet.
 - Monochromatic light is replaced by white light.
- (c) Ordinary light i.e. unpolarized light is incident on a glass slab (refractive index = 1.6) at a polarizing angle θ_p as shown in figure 8 below. [3]

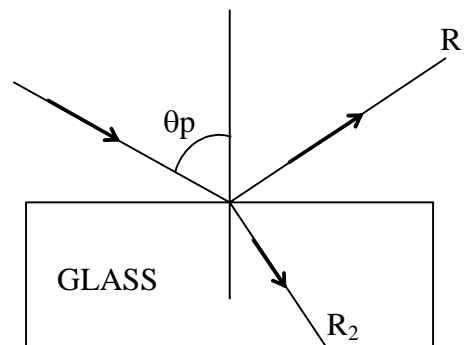


Figure 8

- Find the value of angle θ_p .
- What is the angle between the reflected ray R_1 and the refracted ray R_2 ?
- What is the difference between the incident light and the reflected light, as far as their electric vectors are concerned?

Question 6

- (a) An air bubble 'A' is trapped inside a glass sphere of radius $CP = 10$ cm at a distance of 4.0 cm from its centre 'C'. Where does it appear to an observer O (See figure 9) who is looking at it along the diameter from the side to which it is nearest? [3]

(Refractive Index of glass = 1.5)

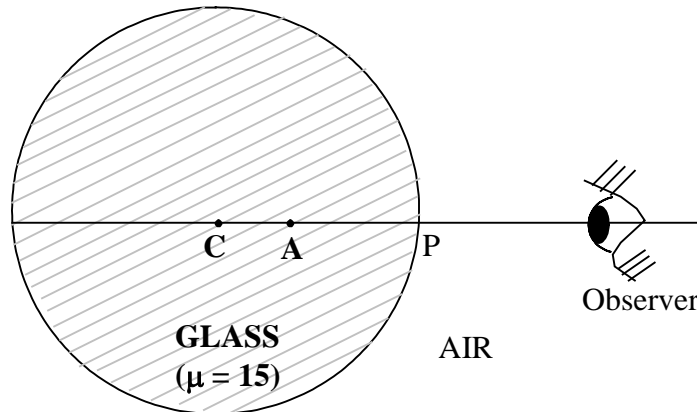


Figure 9

- (b) A beam of light converges to a point X. A convex lens of focal length 30 cm is now introduced in its path in order to intercept the rays, at a distance of 30 cm from X. The rays of light now meet at a point Y. Draw the ray diagram showing the position of X & Y and calculate the distance XY. [3]
- (c) What are Fraunhofer lines? Explain how they are formed. [2]

Question 7

- (a) Explain the statement: "Angular magnification of an astronomical telescope in normal adjustment is 20". What is meant by resolving power of a telescope? [3]
- (b) Draw a labelled ray diagram of an image formed by a Compound Microscope in normal use. Write down an expression for its magnifying power in terms of focal lengths of the two lenses used. [3]
- (c) When a narrow and parallel beam of monochromatic light is incident normally on a rectangular slit of width 1×10^{-6} m, angular width of central maxima in the diffracted light was found to be 60° . Find the wave length of the incident light. [2]

SECTION C

(Answer any **two** questions from the following)

Question 8

- (a) In Millikan's oil drop experiment, charge q on an oil drop is given by [3]

$$q = \frac{K}{E} \sqrt{V_1} (V_1 - V_2).$$

- (i) What is the difference between V_1 and V_2 ?
- (ii) What is meant by the term: "Quantisation of charge"?
- (b) When UV radiation of wavelength 198.0 nm is incident on a Caesium photo cell, a negative potential difference of 4.2V has to be applied to just cut off the photo-current. Calculate threshold frequency for metal Caesium. [3]
- (c) (i) Find angular momentum of an electron in Bohr's III orbit. [2]
- (ii) What is the radius of IIIrd orbit of an electron in hydrogen atom?

Question 9

- (a) Explain the terms: [2]
- (i) Mass defect.
- (ii) Binding energy of a nucleus.
- (b) (i) In Nuclear Physics, what is the use of a cyclotron ? [2]
- (ii) In a nuclear reactor, what is the function of a moderator ?
- (c) (i) State Mosley's Law. [4]
- (ii) What is a neutrino?
- (iii) Half life of a certain radio active element is 6 hours. If you start with 32g of this element, how much of it would disintegrate in one day?

Question 10

- (a) Draw labelled energy band diagram for each of the following: [3]
- (i) A semi-conductor.
 - (ii) An insulator.
 - (iii) A good conductor.
- (b) Draw a labelled circuit diagram of a full wave rectifier using two junction diodes. [3]
You must show clearly where input voltage is applied and where output voltage is taken.
- (c) Show how an OR gate can be obtained using NAND gates. [2]

USEFUL CONSTANTS

- | | | | | | |
|----|---|---|----------------------------|---|----------------------------------|
| 1. | Speed of light in vacuum | : | c | = | $3 \times 10^8 \text{ ms}^{-1}$ |
| 2. | Planck's constant | : | h | = | $6.6 \times 10^{-34} \text{ Js}$ |
| 3. | Constant of proportionality for Coulomb's Law | : | $\frac{1}{4\pi\epsilon_0}$ | = | $9 \times 10^9 \text{ mF}^{-1}$ |
| 4. | Bohr radius | : | a_0 | = | $5.3 \times 10^{-11} \text{ m}$ |
| 5. | Charge of a proton | : | e | = | $1.6 \times 10^{-19} \text{ C}$ |
| 6. | Constant of proportionality for Biot Savart Law | : | $\frac{\mu_0}{4\pi}$ | = | 10^{-7} Hm^{-1} |

CHEMISTRY

Paper – 1

(THEORY)

(Three Hours)

(Candidates are allowed additional 15 minutes for **only** reading the paper.
They must NOT start writing during this time)

Answer **all** questions in **Part I** and **six** questions from **Part II**, choosing **two** questions from Section A, **two** from Section B and **two** from Section C.

All working, including rough work, should be done on the same sheet as, and adjacent to, the rest of the answer.

The intended marks for questions or parts of questions are given in brackets [].

Balanced equations must be given wherever possible and diagrams where they are helpful.

When solving numerical problems, all essential working must be shown.

In working out problems use the following data:

Gas Constant $R = 1.987 \text{ cal deg}^{-1} \text{ mol}^{-1} = 8.314 \text{ JK}^{-1} \text{ mol}^{-1} = 0.0821 \text{ dm}^3 \text{ atm K}^{-1} \text{ mol}^{-1}$

$1 \text{ l atm} = 1 \text{ dm}^3 \text{ atm} = 101.3 \text{ J}$. $1 \text{ Faraday} = 96500 \text{ Coulombs}$.

PART I

Answer **all** questions

Question 1

(a) Fill in the blanks by choosing the appropriate word/words from those given in brackets: [5]

(electron, proton, neutron, decreases, increasing, lowering, one, two, acidic, basic, anion, cation, paramagnetic, Lewis acid, Lewis base, carbonic acid, sulphurous acid, sulphuric acid, ammonium carbonate, sodium bicarbonate, six, increases)

- (i) A positive catalyst _____ the rate of a reaction by _____ the activation energy.
 - (ii) Human blood is a buffer solution of _____ and _____.
 - (iii) BF_3 is a _____ since it is an _____ deficient molecule.
 - (iv) Oxygen is _____ due to the presence of _____ unpaired electrons.
 - (v) A solution of FeCl_3 is _____ due to _____ hydrolysis.
-

(b) Complete the following statements by selecting the correct alternative from the choices given:

[5]

- (i) $[\text{Co}(\text{NH}_3)_5\text{Br}] \text{SO}_4$ and $[\text{Co}(\text{NH}_3)_5\text{SO}_4] \text{Br}$ exhibit
1. Coordination isomerism.
 2. Ionisation isomerism.
 3. Hydrate isomerism.
 4. Geometrical isomerism.
- (ii) Cannizzaro's reaction is given by:
1. Formaldehyde.
 2. Acetaldehyde.
 3. Acetone.
 4. Ethanol.
- (iii) Out of the following solutions, the one having the highest boiling point will be:
1. 0.01 M Na_2SO_4 .
 2. 0.01 M KNO_3 .
 3. 0.01 M Urea.
 4. 0.01 M Glucose.
- (iv) The bond angle of water is:
1. 90°
 2. 105°
 3. 107.3°
 4. 120°
- (v) The co-ordination number of each ion in copper crystals is:
1. 4
 2. 12
 3. 14
 4. 8

(c) Answer the following questions:

[5]

- (i) The depression of freezing point caused by a 1M NaCl solution is 0.0123°C . What will be the depression of freezing point caused by a 1 M glucose solution?
- (ii) What happens to the pH of a solution containing equimolar amount of acetic acid and sodium acetate when a few drops of dilute HCl is added? Give reason.
- (iii) Express the relationship between molar conductivity and specific conductivity of a solution. What is the unit of molar conductivity?
- (iv) Give the electrode reactions of the galvanic cell in which the reaction $\text{Zn}(\text{s}) + 2 \text{Ag}^+(\text{aq}) \rightarrow \text{Zn}^{+2}(\text{aq}) + 2 \text{Ag}(\text{s})$ takes place.
- (v) How is the free energy change related to the enthalpy and entropy change of a substance?

- (d) Match the following: [5]
- | | |
|------------------------------|--------------------------|
| (i) Buffer solution | (a) Co-ordinate bond |
| (ii) Co-ordination compounds | (b) Raoult's Law |
| (iii) Dilute solution | (c) Warner's Theory |
| (iv) Ammonium ion | (d) Faraday's Law |
| (v) Electrolysis | (e) Henderson's equation |

PART II

Answer **six** questions choosing **two** from Section A, two from Section B and two from Section C.

SECTION A

Answer any **two** questions

Question 2

- (a) (i) The vapour pressure of pure benzene at a certain temperature is 640 mm Hg. When a non-volatile and non-electrolyte solid weighing 2.175 g is added to 39.0 g of benzene, the vapour pressure of the solution is 600 mm Hg. What is the molecular mass of the solid substance? [3]
- (ii) Calculate the standard enthalpy change for a reaction [3]
 $\text{CO}_2(\text{g}) + \text{H}_2(\text{g}) \rightarrow \text{CO}(\text{g}) + \text{H}_2\text{O}(\text{g})$. Given that
 ΔH_f° for $\text{CO}_2(\text{g})$, $\text{CO}(\text{g})$ and $\text{H}_2\text{O}(\text{g})$ are -393.5 , -110.5 , and $-244.8 \text{ KJ mol}^{-1}$ respectively.
- (b) Give reasons for the following:
- (i) A solution of copper sulphate is acidic in nature. [2]
- (ii) The boiling point of p-nitrophenol is more than that of o - nitrophenol. [2]

Question 3

- (a) (i) An element crystallizes in a structure having F.C.C. unit cell of an edge 200 pm. Calculate its density if 200g of this element contains 24×10^{23} atoms. [3]
- (ii) Draw the electron dot structure of perchloric acid clearly distinguishing between the electrons of each atom. [1]
- (b) (i) What is the activation energy of a reaction? How is the rate constant of a reaction related to the activation energy? How can activation energy be calculated from this relationship? [3]

- (ii) Consider the following data for the reaction $A + B \rightarrow \text{Products}$. [3]

Conc. of A (mol l ⁻¹)	Conc. of B (mol l ⁻¹)	Initial rate (mol l ⁻¹ s ⁻¹)
0.1	0.1	4.0×10^{-4}
0.2	0.2	1.6×10^{-3}
0.5	0.1	1.0×10^{-2}
0.5	0.5	1.0×10^{-2}

Calculate:

- (1) The order with respect to A and B for the reaction.
- (2) The rate constant of the reaction.

Question 4

- (a) (i) What is the type of hybridization in PCl_5 molecule? Explain why PCl_5 is very reactive in nature. [2]
- (ii) If 100 ml. of 0.1 M CH_3COOH is mixed with 200 ml of 0.5 M CH_3COONa , what will be the pH of the resulting mixture? [3]
- (b) Give reasons why: [5]
- (i) Aluminium trichloride exists as a dimer.
 - (ii) When H_2S is passed through a solution of acidified copper nitrate and zinc nitrate, only copper is precipitated as sulphide.

SECTION B

Answer any **two** questions

Question 5

- (a) Explain how fluorine is prepared by the electrolysis of potassium hydrogen fluoride. [3]
- (b) Give balanced equations for each of the following reactions:
- (i) Fluorine and dilute NaOH.
 - (ii) Ozone and aqueous potassium oxide. [2]

Question 6

- (a) Name the following compounds according to I.U.P.A.C. rules:
- (i) $[\text{Co}(\text{NH}_3)_6] \text{Cl}_3$
 - (ii) $\text{K}[\text{Pt} \text{Cl}_3(\text{NH}_3)]$ [2]
- (b) Explain why an aqueous solution of potassium hexacyanoferrate(II) does not give a test for ferrous ion. [1]

- (c) Draw the geometrical isomers of the compound $[\text{Co}(\text{NH}_3)_2\text{Cl}_2]$ [1]
- (d) Write the formula of potassium trioxalatoferrate (III). [1]

Question 7

- (a) Write the steps involved in the preparation of potassium dichromate from chromite ore. [3]
- (b) Explain why transition metals form many co-ordination complexes. [2]

SECTION C

Answer any **two** questions

Question 8

- (a) How can the following conversions be brought about?
- Methyl amine to ethylamine. [2]
 - Propanol to isopropyl alcohol. [2]
 - Acetaldehyde to Acetone. [2]
- (b) Name the organic compounds which have the same molecular formula $\text{C}_2\text{H}_6\text{O}$. [3]
Write the reactions of these two compounds with PCl_5 .
- (c) An alkyl halide having the molecular formula $\text{C}_4\text{H}_9\text{Cl}$ is optically active. What is its structural formula? [1]

Question 9

- (a) Identify the compounds A, B, C and D. [2]

$$\text{CH}_3\text{COOH} \xrightarrow{\text{LiAlH}_4} \text{A} \xrightarrow{\text{red P, I}_2} \text{B} \xrightarrow{\text{Alc. KCN}} \text{C} \xrightarrow{\text{H}^+, \text{H}_2\text{O}} \text{D}$$
- (b) Give one good chemical test to distinguish between the following pairs of compounds: [2]
- Benzoic acid and phenol.
 - Formaldehyde and Acetaldehyde.
- (c) Fill in the blanks and name the following reactions. [3]
- $\text{C}_6\text{H}_5\text{NH}_2 + \text{CHCl}_3 + 3\text{KOH}_{(\text{alc.})} \xrightarrow{\Delta} \text{_____} + \text{KCl} + 3\text{H}_2\text{O}$
 - $\text{C}_6\text{H}_5\text{COCl} + \text{H}_2 \xrightarrow{\text{Pd/BaSO}_4} \text{_____} + \text{HCl}$
 - $$\text{C}_6\text{H}_5\text{OH} + \text{C}_6\text{H}_5\text{COCl} \xrightarrow{\text{OH}^-} \text{_____} + \text{HCl}$$

- (d) Give reasons for the following: [3]
- (i) Phenol is acidic but ethanol is not.
 - (ii) Acetaldehyde does not give Cannizzaro's reaction but formaldehyde and benzaldehyde give the reaction.

Question 10

- (a) What are proteins? How are they formed? What is the primary structure of proteins? [3]
- (b) Give the monomers of: [2]
- (i) Bakelite.
 - (ii) Nylon – 66.
- (c) An organic compound (A) on treatment with acetic acid in the presence of Sulphuric acid produces an ester (B). (A) on mild oxidation gives (C). (C) reduces Tollen's reagent to give silver mirror and (D). (D) on reacting with Phosphorous pentachloride followed by ammonia gives (E). (E) on dehydration produces methyl cyanide. Identify (A), (B), (C), (D) and (E) and write the relevant reactions. [5]

BIOLOGY

Paper 1

(THEORY)

(Botany and Zoology)

(Three hours)

(Candidates are allowed additional 15 minutes for **only** reading the paper.
They must **NOT** start writing during this time)

Answer **all** questions in Part I and **five** questions in Part II, choosing **three** questions from Section A and **two** questions from Section B.

All working including rough work, should be done on the same sheet as, and adjacent to, the rest of the answer.

The intended marks for questions or parts of questions are given in brackets [].

PART I

Answer **all** questions

Question 1

- (a) Mention *one* significant difference between each of the following: [5]
- (i) Vaccination and Sterilization.
 - (ii) Renin and Rennin.
 - (iii) Aeroponics and Hydroponics.
 - (iv) Yellow Spot and Blind Spot.
 - (v) Collenchyma and Sclerenchyma
- (b) Give reasons for the following: [5]
- (i) Nerve impulses on a neuron travel only in one direction.
 - (ii) Erythrocytes perform anaerobic respiration only.
 - (iii) Endosperm in Castor seed is triploid.
 - (iv) Man can live without food for several days but cannot live without oxygen for even a few minutes.
 - (v) Transpiration is a necessary evil.

- (c) Give scientific terms for the following: [3]
- (i) Removal of pituitary gland.
 - (ii) The kind of conduction of nerve impulse along a myelinated nerve fibre.
 - (iii) Morphological or physiological changes in an organism either due to genetic or environmental reasons.
 - (iv) Stiffening of muscles after death.
 - (v) Failure of seed to germinate even in the presence of necessary favourable environmental conditions.
 - (vi) Surgical removal of part of an oviduct.
- (d) Mention the most significant function/role of the following: [3]
- (i) Heparin.
 - (ii) Pons varoli.
 - (iii) Leydig cells.
 - (iv) Nostoc.
 - (v) Leghaemoglobin.
 - (vi) Mast cells.
- (e) State the best-known contribution of the following Scientists: [2]
- (i) Julius Sach.
 - (ii) Robert Hill.
 - (iii) Ronald Ross.
 - (iv) Blackman.
- (f) Elaborate the following: [2]
- (i) NMEP
 - (ii) BCG
 - (iii) NMR
 - (iv) SCID

PART II
SECTION A

Answer any three questions.

Question 2

- (a) Describe the Histogen theory. [4]
- (b) Describe the development of the male gametophyte in angiosperms. [4]
- (c) What are fleshy fruits ? Explain with the help of an example. [2]

Question 3

- (a) Discuss the major events in Calvin cycle. [4]
- (b) Describe the carbonic acid exchange theory for absorption of mineral salts in plants. [3]
- (c) Give the differences between photoperiodism and vernalisation. [3]

Question 4

- (a) Draw a neat and fully labelled diagram of the Vertical Section of the human eye. [4]
- (b) Describe the ABO system of blood groups. [4]
- (c) Give four differences between *Sympathetic and Parasympathetic* Nervous System. [2]

Question 5

- (a) Describe the events that take place during the ovulatory and secretory phase of menstrual cycle. [4]
- (b) Explain the cause and symptoms of following: [3]
 - (i) Uremia.
 - (ii) Jaundice.
 - (iii) Gout.
- (c) Name the 10th, 11th and 12th cranial nerves and write their functions. [3]

Question 6

- (a) Before the proteins can enter the blood stream, they need to be processed. Describe the treatment received by proteins in the alimentary canal. [4]
- (b) Explain the stomatal movements based on K^+ ion transport mechanism. [4]
- (c) Define regeneration. Explain reparative regeneration. [2]

SECTION B

Answer any **two** questions

Question 7

- (a) Give an account of the Oparin – Haldane theory of Origin of life. [4]
- (b) How can one justify that Cromagnon man could have been the direct ancestor of man of today? [4]
- (c) Write two disadvantages of using pesticides. [2]

Question 8

- (a) Write two uses of each of the following: [4]
 - (i) *Azadirchta*.
 - (ii) *Cinchona calisaya*.
 - (iii) *Ocimum sanctum*.
 - (iv) *Withana somnifere*.
- (b) Explain Integrated Pest Management. [4]
- (c) What is *ultrasound imaging*. Give one use of ultrasound imaging. [2]

Question 9

- (a) Write a short note on AIDS, its transmission and control measures. [4]
- (b) What are stem cells? Why have stem cells become so important these days? [3]
- (c) Explain three causes of mental illness. [3]

Question 10

- (a) What are the general activities of community health services? [4]
- (b) What are the reasons for drug addiction. [4]
- (c) Write one symptom each of - [2]
 - (i) Down syndrome.
 - (ii) Filariasis.

BIOLOGY

Paper - 2

(Practical)

(Three hours)

(Candidates are allowed additional 15 minutes for **only** reading the paper.
They must NOT start writing during this time)

Answer **all** questions.

All working including rough work, should be done on the same sheet as the rest of the answer.

The intended marks for questions or parts of questions are given in brackets[].

Question 1

[5]

- (a) Cut the floral head (capitulum) of specimen **D-41** into two equal (longitudinal) halves. From one of the halves isolate one outer flower (ray floret) and one central or inner flower (disc floret). Put these florets on a wet filter paper. Examine the two florets carefully with the hand lens and describe the general floral characters of each in botanical terms.
- (b) Make large drawings of the ray floret and also the disc floret. Label the parts.
- (c) Split open the corolla tube of a disc floret with a fine needle and spread the corolla to expose the androecium and the upper part of the gynoecium. Study with a hand lens the structure and position of stamens in relation to the style, stigma and petals. Make a neat labeled drawing of the parts found above the ovary.
- (d) Draw the floral diagram of each floret.
- (e) Write the floral formula of each floret.
- (f) To which family does D-41 belong ?
- (g) Name three floral characteristic of the specimen which places it the family mentioned in (f).
- (h) Write the botanical names of two plants belonging to the said family.

Question 2**[6]**

- (a) Measure and pour 50 ml of solutions S₁, S₂ and S₃ into three petri dishes provided for the experiment, and label them accordingly.
- (b) Cut 3 strips of a peeled potato measuring approximately 10 cms × 0.5 cm × 0.5 cm.
- (c) Place the strips on a moist filter paper to prevent drying. Measure and record the exact length of each strip and fully immerse one in each of the three solutions S₁, S₂ and S₃. Cover the petri dishes and leave them as such for 30 minutes. Show the three petri dishes to the visiting examiner.
- (d) After 30 minutes, remove the strips from the three solutions and dry them on a filter paper.
- Measure and record their lengths fully in a tabulated form.
- (e) Mention any other change that might have taken place in each strip.
- (f) Explain these changes (if any).
- (g) From your observations, suggest the nature of solutions S₁, S₂ and S₃.
- (h) State situations found in the body of an animal and a plant which are similar to those found with regards to the potato strips in S₁ and S₃.

Question 3**[4]**

- (a) Cut thin sections of D-42 provided with a sharp razor or blade. Cut numerous sections and then select a good section. Stain it with safranin. Mount it in glycerine. Then observe it under the lower power of microscope and show your slide to the visiting examiner.
- (b) Make a neat fully labeled drawing of the section.
- (c) (i) Identify the section.
- (ii) Give two reasons in support of your answer in c (i)

Question 4**[5]**

Identify the given specimens A to E. State two reasons to support your answer in each case. Draw a neat labelled diagram of each specimen.

You will not be allowed to spend more than three minutes at each spot. You will hand over your answer sheets to the supervisor after the last observation, as this question will be attempted on separate continuation sheets.

Question 5

Show the following to the Visiting Examiner for assessment: -

Project [7]

Biology Practical File [3]

D-41: Capitulum or head of Sunflower OR Cosmos, OR Marigold of single ray florets.

D-42 : Preserved piece of dicot. Stem.

S₁ : 30% sucrose solution. S₂ : 5% sucrose solution. S₃ : Distilled water.

Spots: A : T.S. of ovary of mammal

B : Potato osmoscope

C : T.S. of spinal cord

D : T.S. of dicot. Leaf

E : V.S. of kidney

ECONOMICS

(Three hours)

(Candidates are allowed additional 15 minutes for **only** reading the paper.
They must NOT start writing during this time)

Answer **Question 1** (compulsory) from Part I and **five** questions from Part II.
The intended marks for questions or parts of questions are given in brackets [].

PART I

Question 1

Answer briefly each of the questions (i) to (xv)

[15 x 2 = 30]

- (i) Explain how 'Micro Economics' and 'Macro Economics' are inter dependent.
- (ii) Differentiate between *movement along the demand curve* and *shift of the demand curve* with the help of a diagram.
- (iii) Distinguish between *fixed cost* and *variable cost*.
- (iv) Differentiate between 'Stock' and 'Supply'.
- (v) Define 'internal economics'. Give two examples.
- (vi) (a) Explain equilibrium price with the help of a diagram.
(b) What will happen if price is less than equilibrium price?
- (vii) State two methods of debt redemption.
- (viii) How is national income different from gross national product at market price?
- (ix) Define quasi rent.
- (x) What is *pure profit* ? How is it different from *normal profit* ?
- (xi) Define corporation tax. How does taxation affect the level of circular flow of income?
- (xii) Discuss the "Canon of Equity" given by Adam Smith.
- (xiii) Mention two merits of international trade.
- (xiv) State the relationship between *Balance of current account* and *Balance of capital account*.
- (xv) Define surplus budget.

PART II

Answer any *five* questions

Question 2

- (a) What is the relationship between *Total Utility* and *Marginal Utility*? Use a diagram to show the relationship. [4]
- (b) State the law of diminishing marginal utility with the help of a diagram. [4]
- (c) Explain *three* main assumptions of law of diminishing marginal utility and *three* main assumptions of consumer's equilibrium. [6]

Question 3

- (a) State four features of monopoly. [4]
- (b) Why is the price of a firm under perfect competition equal to average revenue and marginal revenue? [4]
- (c) Describe with the help of a diagram, the supernormal profit earned by a perfectly competitive firm in equilibrium in the short run. [6]

Question 4

- (a) Show the various money and real flows in a closed economy with a diagram. [4]
- (b) State the steps used in calculating national income by expenditure method. [4]
- (c) Calculate NNP at factor cost and NNP at market price from the following data:

	Rs. (in crores)	
(i) Wages & Salaries	500	
(ii) Royalty	20	
(iii) Interest	40	
(iv) Indirect tax	100	
(v) Rent	50	
(vi) Profit after tax	100	
(vii) Corporation tax	20	
(viii) Subsidy	30	
(ix) Net factor income earned from abroad	(-) 5	[6]

Question 5

- (a) Define transfer earning and economic rent. [4]
- (b) Why is the supply curve of labour backward bending? Explain with the help of a diagram. [4]
- (c) What is collective bargaining? Differentiate between real wage and nominal wage. [6]

Question 6

- (a) Distinguish between *international and inter regional trade*. [4]
- (b) Mention four export promotion measures. [4]
- (c) Explain the comparative cost theory of international trade in terms of opportunity cost approach. [6]

Question 7

- (a) State two sources each of revenue of the State Government and the Central Government. [4]
- (b) Differentiate between indirect and direct taxes. [4]
- (c) Account for the growth of public expenditure in recent times. [6]

Question 8

- (a) Explain the following types of public debt: [4]
Redeemable – irredeemable, funded – unfunded.
- (b) State the need for a government budget. [4]
- (c) Discuss how stability and growth can be achieved through fiscal policy. [6]

Question 9

- (a) State the relationship between average cost and marginal cost using a diagram. [4]
- (b) State the law of variable proportions. Give two assumptions of this law. [4]
- (c) Derive the long run average cost curve from short run average cost curve. [6]

ACCOUNTS

(Three hours)

*(Candidates are allowed additional 15 minutes for **only** reading the paper.
They must NOT start writing during this time)*

*Answer **Question 1** (compulsory) and **Question 2** (compulsory) from Part I
and any other **five** questions from Part II.*

The intended marks for questions or parts of questions are given in brackets [].

Transactions should be recorded in the answer book.

All calculations should be shown clearly.

*All working, including rough work, should be done on the same sheet as, and adjacent to,
the rest of the answer.*

PART I

Question 1

[10 × 2]

Answer each of the following questions briefly:

- (i) Define Prime Cost.
- (ii) Explain FIFO method of stock valuation.
- (iii) What do you mean by the term non-recurring expenses in joint venture?
- (iv) What is the purpose of opening a joint bank account for joint venture?
- (v) State two advantages of self-balancing system.
- (vi) Why is a profit and loss appropriation account necessary in a partnership firm?
- (vii) Why is there a need for revaluation of assets and liabilities of a firm if there is a change in profit-sharing ratio of partners?
- (viii) Explain 'pro-rata allotment of shares' by means of a suitable example.
- (ix) State two differences between 'current assets' and 'current liabilities'.
- (x) Mention two uses of ratio analysis.

Question 2**[10]**

Winston was allotted 100 equity shares of Rs.100 each by Diplod Ltd. originally issued at a discount of 6% per share. He failed to pay the final call at Rs.35. These shares were forfeited and out of these, 50 shares were re-issued to Morgan at Rs.90 each as fully paid up. Journalise the transactions in respect of forfeiture and re-issue of shares only.

PART II**Question 3****[14]**

Trading and Profit and Loss Account of Myers Ltd. for the year ended 31st March 2007.

<u>Particulars</u>	<u>Rs.</u>	<u>Particulars</u>	<u>Rs.</u>
To opening stock	15,250	By sales	1,00,100
To purchases	63,050	By closing stock	19,600
To carriage	400		
To wages	1,000		
To Profit and Loss A/c	40,000		
	<u>1,19,700</u>		<u>1,19,700</u>
To Administrative expenses	20,200	By Trading A/c	40,000
To salaries	2,400	By non operating income	1,200
To financial expenses	1,400		
To Non-operating expenses	400		
To Balance c/d	16,800		
	<u>41,200</u>		<u>41,200</u>

Balance Sheet of Myers Ltd. As at 31st March, 2007.

<u>Liabilities</u>	<u>Rs</u>	<u>Assets</u>	<u>Rs.</u>
Share capital	70,000	Fixed assets	60,100
Reserves	1,200	Stock	19,000
Profit and Loss A/c	16,800	Debtors	9,000
Creditors	3,700	Bank	3,600
	<u>91,700</u>		<u>91,700</u>

From the above, calculate the follow ratios:

- (i) Gross Profit ratio (%)
- (ii) Net Profit ratio (%)

- (iii) Stock turnover ratio.
- (iv) Proprietary ratio
- (v) Current ratio
- (vi) Quick ratio.
- (vii) Working capital turnover ratio.

Question 4

[14]

The following are the Balance Sheets of Jardine Ltd. as on 31st December 2006 and 2007:-

<u>Liabilities</u>	<u>2006</u>	<u>2007</u>	<u>Assets</u>	<u>2006</u>	<u>2007</u>
Share capital	5,10,000	5,50,000	Goodwill	25,000	20,000
Loan	2,50,000	1,50,000	Building	2,10,000	3,30,000
General reserve	1,00,000	1,00,000	Machinery	3,00,000	4,00,000
Profit and Loss A/c	55,000	95,000	Stock	1,25,000	1,05,000
Provision for taxation	20,000	55,000	Debtors	1,50,000	1,20,000
Creditors	25,000	20,000	Cash	1,50,000	12,000
Bills payable	10,000	15,000	Preliminary expenses	15,000	10,000
Provision for doubtful debts.	5,000	12,000			
	<u>9,75,000</u>	<u>9,97,000</u>		<u>9,75,000</u>	<u>9,97,000</u>

Additional information:-

- (i) During the year, a part of the machinery costing Rs.2,500 was sold for Rs.1,500.
- (ii) Dividend of Rs.50,000 was paid during the year.
- (iii) Income tax of Rs.25,000 was paid during the year.
- (iv) Depreciation provided during the year on Building Rs.5,000 and Machinery Rs.25,000.

From the above, you are required to prepare a cash flow statement as per Accounting Standard - 3.

Question 5**[14]**

The following is the trial balance of Martin Ltd. as on 31st March 2007:-

<u>Debits</u>	<u>Rs.</u>	<u>Credits</u>	<u>Rs.</u>
Opening stock	75,000	Purchase returns	10,000
Purchases	2,45,000	Sales	3,40,000
Wages	30,000	Discount	3,000
Carriage	950	Profit and Loss A/c	15,000
Furniture	17,000	Share capital	1,00,000
Salaries	7,500	Creditors	17,500
Rent	4,000	General reserve	15,500
Trade expenses	7,050	Bills payable	7,000
Dividend paid	9,000		
Debtors	27,500		
Plant and Machinery	29,000		
Cash at Bank	46,200		
Patents	4,800		
Bills receivable	5,000		
	5,08,000		5,08,000

Additional information:

- (i) Stock as on 31.3.2007 – Rs.88,000
- (ii) Depreciate plant and machinery at 15%, furniture at 10% and patents at 5%
- (iii) The Board recommends payment of a dividend @ 15% p.a.

From the above information, you are required to prepare the Profit and Loss account for the year ended 31.3.2007 and a Balance Sheet as on that date.

Question 6**[14]**

Show by means of journal entries, how would you record the following issues in the books of Charles Ltd. Also show how would they appear in their respective Balance Sheets:-

- (i) A debenture issued at Rs.95 repayable at Rs.100.
- (ii) A debenture issued at Rs.95 repayable at Rs.105.

[NOTE: Face value of each debenture is Rs.100]

Question 7**[14]**

Robert and Smith were partners sharing profits and losses in the ratio of 3 : 2 .

On the date of dissolution, their capitals were:

Robert – Rs.7,650 and Smith – Rs.4,300

The Creditors amounted to Rs.27,500. The balance of cash was Rs.760. The assets realised Rs.25,430. The expenses on dissolution were Rs.1,540.

All the partners are solvent.

Close the books of the firm showing the realisation, capital and cash accounts.

Question 8**[14]**

Johnson Ltd. kept bought and sales ledger on self-balancing principles. From the following particulars, prepare the necessary adjustment accounts for the year 2007 in the two ledgers:-

Sundry Debtors (1.1.2007)	12,400
Sundry Creditors (1.1.2007)	5,000
Credit purchases	20,600
Credit sales	26,800
Cash received from debtors	15,600
Returns inward	600
Acceptances given	8,000
Returns outward	500
Debtors acceptances dishonoured	1,000
Discount allowed	200
Bad debts written off	400

Question 9**[14]**

S, T and W having agreed to share profits and losses equally, entered into a joint venture to construct a building at a price of Rs.10,00,000. A joint bank account was thus opened where S paid Rs.4,00,000, T – Rs.2,00,000 and W – Rs.3,00,000.

Expenses incurred on behalf of the joint venture were as follows:

Materials – Rs.2,00,000; wages Rs.1,50,000 and expenses Rs.1,25,000.

Materials supplied by S from his stock amounted to Rs.1,25,000.

Finally, the venture was closed by T taking the closing stock at a valuation of Rs.1,00,000.

From the above, you are required to prepare the joint venture account, co-ventures' accounts and the joint bank account.

Question 10**[14]**

The following figures were extracted from the records of Alfred Engineering Company Ltd. for the year ended 31.3.2007.

Opening stock of raw materials	40,000
Opening stock of work-in-progress	12,000
Opening stock of finished goods	30,000
Closing stock of raw materials	50,000
Closing stock of work-in-progress	30,000
Closing stock of finished goods	80,000
Raw materials purchased	4,00,000
Direct wages	2,00,000
Factory insurance	90,000
Carriage inwards	4,000
Dock charges	10,000
Cost of rectifying raw materials	20,000
Hire of special tools for manufacturing.	1,00,000
Cost of factory supervision	11,000
Wages paid to works gatemen	20,000
Sale of finished products	15,00,000

Selling and distribution overhead – 1% of sales.

From the above, you are required to prepare a cost sheet for the year ended 31st March 2007.

HISTORY

(Three Hours)

*(Candidates are allowed additional 15 minutes for **only** reading the paper.*

They must NOT start writing during this time)

Answer **Question 1** (Compulsory) from **Part I** and **five** questions from **Part II**, choosing **two** questions from **Section A**, **two** questions from **Section B** and **one** question from **either Section A or Section B**.

The intended marks for questions or parts of questions are given in brackets [].

PART I

Answer **all** questions

Question 1

[20]

- (i) What were the two ulterior motives behind Curzon's decision to partition Bengal in 1905?
- (ii) State any two reasons for the growth of revolutionary dispositions in India at the turn of the 20th century.
- (iii) Name the leaders of the Home Rule League in India.
- (iv) State any two reasons to explain the decision of the Congress to support the British in the First World War.
- (v) Why was the Simon Commission sent to India in 1927? Why did the Congress boycott it?
- (vi) State one fundamental difference between the No-changers and the Pro-changers.
- (vii) What was the most damaging feature of the Communal Award (1932) introduced by Ramsay MacDonald?
- (viii) What was the basis of Jinnah's two-nation theory?
- (ix) Name any one outstanding nationalist leader among women, during the Civil Disobedience Movement (1930-34).
- (x) Name the leader who played a vital role in the reorganisation and integration of states in post-independence India.
- (xi) Who introduced the "Battle of Wheat" Campaign? What was its primary objective?
- (xii) Why and by whom was the "Final Solution" policy implemented?
- (xiii) What adverse effects did the French occupation of the Ruhr have on Germany?
- (xiv) Name the signatories of the Anti-Comintern Pact (1936).

- (xv) Mention any two reasons to explain why the Russian victory at Stalingrad proved catastrophic for the Germans.
- (xvi) Give one example to show that the “thaw” in US-Soviet relations after 1953 was not consistent.
- (xvii) What is the significance of the Tonkin Gulf incident?
- (xviii) How did the “Uniting for Peace Resolution” enhance the powers of the General Assembly?
- (xix) What was Britain’s main objection to joining the EEC in its early years?
- (xx) Name the organisation established and led by Yasser Arafat.

PART II
SECTION A

Question 2

Disillusionment with the principles and methods of the Moderate leadership led to a strong demand for aggressive political methods and actions. In this context discuss the following:

- (a) Recognition of the true nature of the economic and political policies of the British government. [8]
- (b) Contribution of Tilak to the rise of radical nationalism in India. [4]
- (c) Reasons for the split in the Congress at its Surat Session in 1907. [4]

Question 3

- (a) Discuss the role of Sir Sayyid Ahmad Khan and the Aligarh School in the growth of communalism in India. [6]
- (b) Give a brief account of the British Government’s attitude towards the Muslim League. [4]
- (c) Examine the significance of the Lucknow Session of the Congress (1916) and show how it reflected the political maturity of Indian nationalist leaders. [6]

Question 4

- (a) Evaluate the significance of the Lahore Session (1929) of the Congress. [6]
- (b) Give a brief account of the Civil Disobedience Movement under the leadership of Gandhiji from 1930 to 1934. [10]

Question 5

The 1930s witnessed several important political developments. In this context discuss:

- (a) Kisan Sabha Movement. [4]
- (b) States Peoples' struggles. [6]
- (c) Participation of women in the national movement. [6]

Question 6

- (a) Give an account of the origin of the Indo-Pak dispute over [8]
 - (i) Kashmir.
 - (ii) River waters.
- (b) State the main aims of the Non-Aligned Movement. Why did India follow a policy of non-alignment after independence? [8]

SECTION B

Question 7

- (a) Discuss the economic problems that brought the Weimar Republic to the verge of collapse. [8]
- (b) Hitler and the Nazi party seemed to promise an attractive alternative to the ineffective Weimar Government. Explain. [8]

Question 8

Mussolini believed that there was more to be gained from friendship with Germany than with Britain and France. In this context discuss:

- (a) The change in Mussolini's foreign policy from 1934 to 1940. [10]
- (b) Mussolini's involvement in World War- II leading to his downfall and the collapse of Fascism. [6]

Question 9

- (a) State the main aims of Hitler's foreign policy. [4]
- (b) Explain how he achieved his aims with reference to the following:
- (i) The reintroduction of conscription (1935) and reoccupation of the Rhineland (1936). [6]
 - (ii) The Anschluss with Austria (1938). [6]

Question 10

- (a) Give an account of (i) the Berlin Blockade (1948 – 49) and (ii) the Cuban Missile Crisis (1962) and explain the significance of each. [8]
- (b) State the reasons for the détente in international relations in the 1970s. [8]

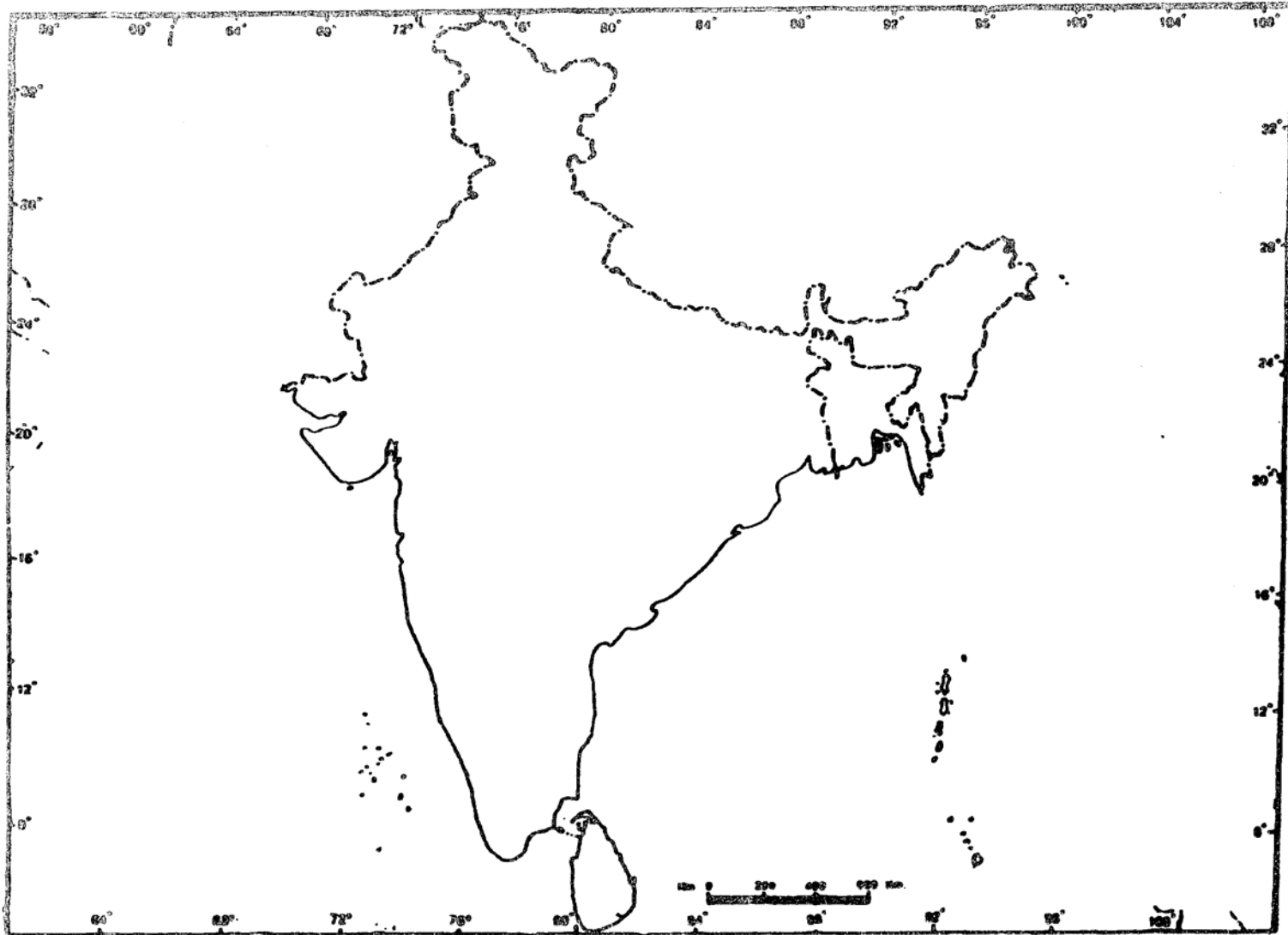
Question 11

- (a) Give an account of the conflict in Palestine after the First World War and explain how it led to the outbreak of the Arab-Israel War in 1948. [8]
- (b) With reference to the Camp David Accord discuss President Sadats' efforts to negotiate a peaceful settlement with Israel. [8]

NAME INDEX NO.

(This map must be fastened with all other answers)

MAP FOR Q. No.2 (MAP OF INDIA)



GEOGRAPHY

Paper 1

(THEORY)

(Three Hours)

(Candidates are allowed additional 15 minutes for only reading the paper).

(They must NOT start writing during this time)

Answer Questions 1 and 2 from Part I which are compulsory.

Answer any four questions from Part II.

Sketch maps and diagrams should be drawn wherever they serve to illustrate your answer.

The intended marks for questions or parts of questions are given in brackets [].

PART I (Compulsory)

Answer all questions

Question 1

[20]

- (i) With which country does India have the largest border? What is the length of the border?
- (ii) With reference to the extent of India, name (a), (b) and (c) in figure -1 given below:

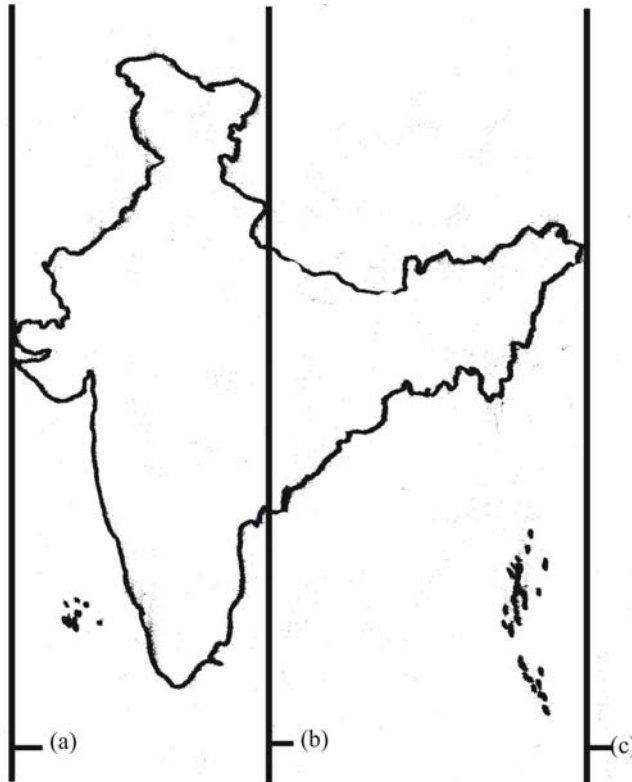


Figure -1

- (iii) Compare the size of India with that of China.
- (iv) Give two reasons why rainfall in India is orographic in nature.
- (v) What do you understand by the term '*sex ratio*'? What is the sex ratio in India as per census 2001?
- (vi) On the sketch map of Japan (figure – 2), name (a), (b) and (c).

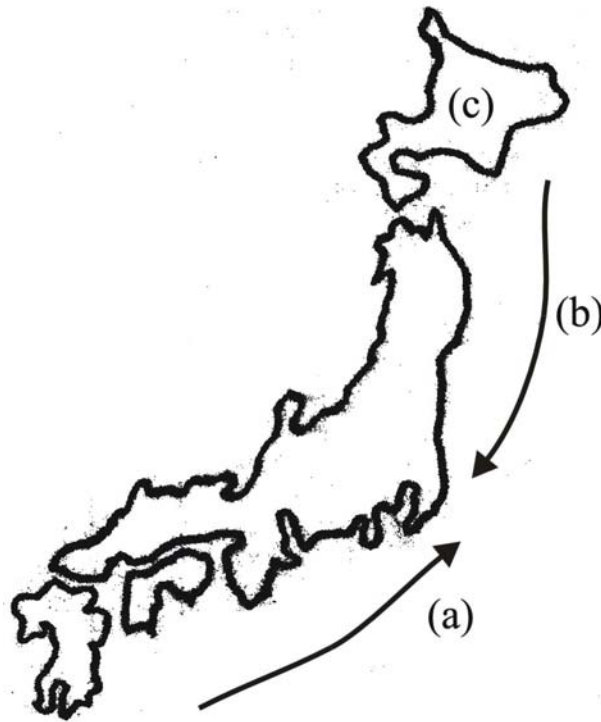


Figure -2

- (vii) Define **Golden quadrilateral** and mention its four sides.
- (viii) Under what soil and climatic conditions (geographical) is Jute grown in India?
- (ix) Name the major mineral resources of Chattisgarh?
- (x) What is 'intensity of cropping'? How is it measured?

Question 2

[10]

On the outline map of India provided:

- (a) Mark and name the Karakoram mountain range.
- (b) Mark and name the coast which gets rainfall in the months of October and November.

- (c) Mark and name the state which has the highest literacy rate in India (as per 2001 census).
- (d) Mark and name the state having the largest area under tank irrigation.
- (e) Print MH over an area of mineral oilfield found on the western coast.
- (f) Mark and name the Northern terminal city of National Highway No.1.
- (g) Mark and name an iron ore exporting port on the west coast.
- (h) Mark and name the river on which Hirakund dam is located.
- (i) Mark and name the oldest mountain range of India.
- (j) Mark and name the city which exports most of India's tea.

PART II

Answer any four questions.

Question 3

- (a) Explain what is the *bhabar* region? [3]
- (b) Describe two major differences between the Himalayan rivers and the rivers of peninsular India. [2]
- (c) Study the climatic data given below for stations **A and B** and answer the following questions: [5]

Location	Months	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
Station A	Mean monthly temperature in C.	12	17	26	32	35	39	34	28	25	24	21	20
	Mean monthly rainfall (mm)	10	23	18	15	23	231	381	363	95	56	13	5
Station B	Mean monthly temperature in C.	24	24	26	28	30	30	27	27	27	28	27	26
	Mean monthly rainfall (mm)	3	3	3	3	18	485	617	340	264	64	13	3

- (i) Which Station has an **inland** and which Station has a **coastal** location?
 - (ii) Calculate the annual rainfall experienced at the Station A and Station B.
 - (iii) Name the wind bringing rain to Station A.
 - (iv) Mention two main features of the climate experienced in Station A.
- (d) What are the two major factors leading to a decrease in forest cover of India?

Question 4

- (a) State the difference between '*arithmetic density of population*' and '*physiological density of population*'. [2]
- (b) What is migration? Name *four streams* of migration. [3]
- (c) Describe the difference between a '*main worker*' and a '*marginal worker*'. [2]
- (d) What is a '*Megalopolis*'? Name two megalopolis in India. [3]

Question 5

- (a) Explain the term 'fallow land'. [2]
- (b) What is the main cause of small holdings in India? How does it affect agricultural productivity? Give one solution for solving the problem. [3]
- (c) Why are wells more popular in the northern part of India, as compared to the southern part? [3]
- (d) What is over-watering? Name one type of irrigation mostly responsible for this problem. [2]

Question 6

- (a) What are '*fibre crops*'? Give two examples. [2]
- (b) Suggest any three measures to conserve the fish stock in India. [3]
- (c) State any two ways in which renewable sources of energy are better than non-renewable sources of energy. [2]
- (d) Describe the drawbacks of nuclear power as a source of energy. [2]
- (e) What is Bauxite? [1]

Question 7

- (a) How are roads classified in India? Name them. [2]
- (b) Differentiate between a port and a harbour. [2]

- (c) Give two reasons to explain why '*air transport is more popular in Australia*'?. [2]
- (d) What do you mean by mass-communication? Name two main components of mass communications. [2]
- (e) Name the different gauges used in Indian railways. [2]

Question 8

- (a) Mention the three major problems faced by the sugar industry. [3]
- (b) Explain why most of the oil refineries in India are located near the coastal areas. [2]
- (c) Name the iron and steel plant in India which is located away from the main coal areas. What is its source of energy in the absence of coal? [2]
- (d) Differentiate between mini steel plants and integrated steel plants. [2]
- (e) What is understood by 'industrial cluster'? [1]

Question 9

- (a) Draw a sketch and show the location of Haldia port. What was the main objective of constructing the Haldia port? [3]
- (b) Which city is known as 'silicon valley of India'? Explain why. Give two important reasons for the growth of this city. [4]
- (c) What are the major agricultural products of Chattisgarh? Why is agriculture very important to the state? [3]

PSYCHOLOGY

(Three hours)

(Candidates are allowed additional 15 minutes for **only** reading the paper.
They must NOT start writing during this time)

Answer **Question 1** from **Part I** and **five** questions from **Part II**, choosing
two questions from **Section A** and **three** questions from **Section B**.

The intended marks for questions or parts of questions are given in brackets [].

PART I (Compulsory)

Question 1

[20]

Answer briefly all the questions (i) to (xx).

- (i) Define *aptitude*.
- (ii) What is meant by *Psychotherapy*?
- (iii) Who put forward the model of intellect?
- (iv) Explain the term *modelling* as a Psychotherapeutic method.
- (v) What is an *achievement test*?
- (vi) Explain the concept *fully functioning person*.
- (vii) What is meant by *cognitive appraisal of stress*?
- (viii) Name one personality inventory.
- (ix) Write the full form of GAS.
- (x) Explain the term *burnout*.
- (xi) What is *bulimia*?
- (xii) Mention any one role of a clinical psychologist.
- (xiii) Give one cause of *prejudice*.
- (xiv) Give one characteristic of *catatonic schizophrenia*.
- (xv) What is meant by *crystallized intelligence*?
- (xvi) Explain the term *phobia*.
- (xvii) What is *social norm*?
- (xviii) Define *attitude*.
- (xix) Write two characteristics of a criminal.
- (xx) What is meant by the term *maturation*?

PART II
SECTION A

Answer any two questions

Question 2

- (a) Describe the Raven's Progressive Matrices Test of intelligence. [5]
- (b) Discuss any one information processing theory of intelligence. [5]

Question 3

- (a) Discuss in detail the Strong Campbell Interest Inventory. [5]
- (b) Explain the GATB. [5]

Question 4

- (a) Discuss the Post Freudian approach towards personality. [6]
- (b) Explain the TAT as a measure of personality. [4]

SECTION B

Answer any three questions

Question 5

- (a) Discuss the cognitive changes taking place in a developing child during childhood. [5]
- (b) What are the factors influencing the development in adolescence? [5]

Question 6

- (a) What are *stressors*? Give an account of the different types of stressors. [5]
- (b) Discuss how stress affects the health of an individual. [5]

Question 7

- (a) Discuss any four personality disorders. [6]
- (b) Describe the behaviour therapies based on classical and operant conditioning. [4]

Question 8

- (a) Discuss conformity with the help of Solomon Asch's experiment. [4]
- (b) Describe the process through which people try to understand the reasons for others' behaviours (attribution). [6]

Question 9

Write short notes on *any two* of the following:

- (a) Application of Psychology in schools. [5 × 2]
- (b) The role of a Psychologist in understanding criminals and rehabilitating them.
- (c) The role of persuasion in attitude change.