

SUBJECT : PHYSICS (SET-I)

Time : 3 Hrs.

M.M.: 70

General Instructions :

- (i) All the questions are compulsory.
- (ii) Question nos. 1 to 8 are very short answer type questions carrying 1 mark each.
- (iii) Question nos. 9 to 16 are short answer type questions carrying 2 marks each.
- (iv) Question nos. 17 to 25 are also short answer type questions carrying 3 marks each.
- (v) Question nos. 26 is also short answer type question carrying 4 marks.
- (vi) Question nos. 27 and 29 are long answer type questions carrying 5 marks each.
- (vii) There are no overall choice. However an internal choice has been provided in one question of two marks, one question of three marks and all three questions of five marks each. You have to attempt only one of the given choices in such questions.
- (viii) Use of calculators is not permitted.
- (ix) You may use the following values of physical constant wherever necessary :

$$c = 3 \times 10^8 \text{ m/s}$$

$$h = 6.63 \times 10^{-34} \text{ Js}$$

$$e = 1.6 \times 10^{-19} \text{ C}$$

$$\mu_0 = 4\pi \times 10^{-7} \text{ TmA}^{-1}$$

$$m_e = 9.1 \times 10^{-31} \text{ Kg}$$

$$\frac{1}{4\pi\epsilon_0} = 9 \times 10^9 \text{ Nm}^2\text{C}^{-2}$$

- Q1. Calculate the charge carried by 12.5×10^{18} electrons. (1)
- Q2. Force between two point electric charges kept at a distance d apart in air is 1200 N. If these charges are kept at the same distance in water how does the force between them change? Dielectric constant of water = 80. (1)
- Q3. The storage battery of a car has an emf of 12V. If the internal resistance of the battery is 0.4 ohm, what is the maximum current that can be drawn from the battery? (1)

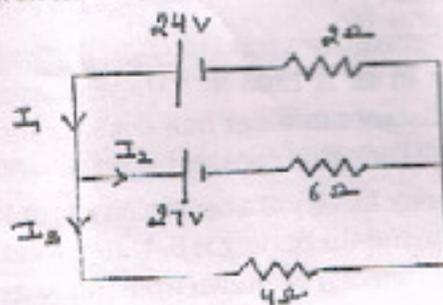
- Q4. In a circular coil of radius 'R' current 'I' is flowing and in another coil of radius '2R' current '2I' is flowing. Find the ratio of the magnetic fields produced by them at the centre. (1)
- Q5. If the ratio of the horizontal component of earth's magnetic field to the resultant magnetic field at a place is 1:2 what is the angle of dip at that place? (1)
- Q6. Why is a spark produced in the switch of a fan, when it is switched off? (1)
- Q7. What is the peak value of 220V ac? (1)
- Q8. Draw a graph showing the variation of reactance of an inductor with frequency of the applied voltage. (1)
- Q9. In the given figure, $Q_1 = 10\mu\text{C}$ and $Q_2 = -40\mu\text{C}$ separated by 100 cm. Find the position of the point at which the net electric field is zero. (2)



OR

An electric dipole with moment $3 \times 10^{-8} \text{ cm}$ placed with its axis making an angle of 30° with a uniform electric field experiences a torque of $1.2 \times 10^3 \text{ N}$. Calculate magnitude of electric field. (2)

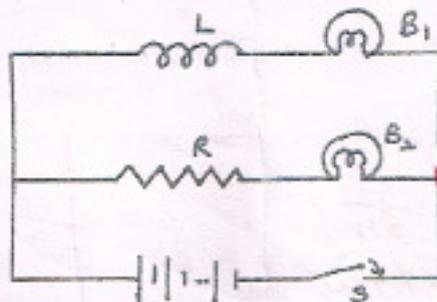
- Q10. Verify Coulomb's law using Gauss Theorem. (2)
- Q11. A wire is redrawn so that its radius is halved. Its original resistance is 2Ω . What is its new resistance? (2)
- Q12. Using Kirchhoff's laws determine the currents I_1 , I_2 and I_3 for the given network. (2)



Q13. An electron in an atom revolves around the nucleus in an orbit of radius 0.53×10^{-10} m. Calculate the equivalent magnetic moment if the frequency of revolution of the electron is 6.8×10^9 MHz. (2)

Q14. Given figure shows an inductor L and a resistor R connected in parallel to a battery through a switch. The resistance of R is same as that of the coil that makes L. Two identical bulbs are put in each arm of the circuit. (2)

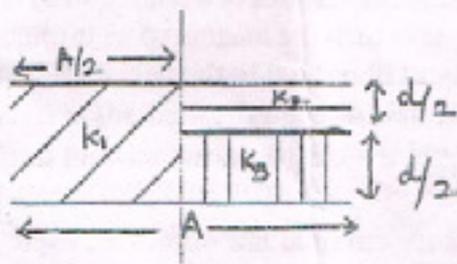
- (i) Which of the bulbs light up brighter when S is closed?
 (ii) Will the two bulbs be equally bright after some time?



Q15. Obtain the expression for the magnetic energy stored in a solenoid in terms of magnetic field B, area A and length l of the solenoid. Compare this energy with the electrostatic energy stored in a capacitor. (2)

Q16. A magnetic field of flux density 10T acts normal to a 50 turn coil of 100cm^2 area. Find the emf induced in it if the coil is removed from the field in $1/20$ s. (2)

Q17. Calculate the capacitance of the capacitor shown in the given figure. (3)



Q18. An infinite number of charges each of charge q are placed along x-axis at $x=1, x=2, x=4, x=8, \dots$ and so on. Find

the potential at $x = 0$ due to this set of charges. What will be the potential if in the above set up the consecutive charges have opposite sign? (3)

Q19. Three point charges of $3 \times 10^{-7} \text{C}$ are arranged at the three vertices of an equilateral triangle of side 30cm. Calculate the electrostatic potential energy of the system. (3)

Q20. State the principle of a potentiometer. With the help of a circular diagram, describe a method to compare the emf's of two given primary cells. (3)

Q21. Define the term electrical resistivity of a material. Show graphically the variation of resistivity with temperature for nichrome. Explain the variation. (3)

Q22. A bar magnet of magnetic moment 1.5 J/T lies aligned with the direction of a uniform magnetic field of 0.22 T

(a) What is the amount of work required by an external torque to turn the magnet so as to align its magnetic moment (i) normal to the field direction (ii) opposite to the field direction?

(b) What is the torque on the magnet in the above two cases? (3)

Q23. Using Ampere circuital law obtain an expression for the magnetic field along the axis of a current carrying solenoid of length ' l ' and having ' N ' number of turns. (3)

OR

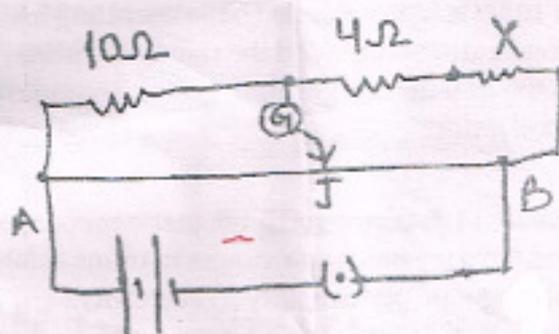
State principle of a moving coil galvanometer. Write the factors on which current sensitivity depends. How will you convert a galvanometer into a voltmeter to read a maximum potential difference of V volts.

Q24. Give reasons :

- A charged particle, after coming out of a uniform magnetic field undergoes no change in its kinetic energy.
- A solenoid tends to contract when current is switched on through it.
- Poles of the magnet in moving coil galvanometer are concave. (3)

Q25. In the given metre bridge set up, find the value of X which gives the null point at 60 cm from A.

What will happen to the value of balancing length, if X is connected in parallel to the 4Ω resistor? (3)



- Driver of a car uses a battery charger of his friend to charge the battery of his car. He connects the red lead of battery charger to negative terminal of the battery and black to positive terminal. His friend tells him to reverse the leads. Why? What are the values shown by him?
- Three equal resistances connected in series across a source of emf consumes 20W. If the same resistance

are connected in parallel across the same source of emf what will be the power dissipated? (4)

- Q27. Give principle of working of a Van De Graaff generator. With the help of a labeled diagram describe its construction and working. How is the leakage of charge from the generator minimized? (5)

OR

Derive an expression for the energy stored in a parallel plate capacitor. Show that there is always a loss of energy when two charged conductors having different capacities and different potentials are joined.

- Q28. With the help of a labeled diagram explain the principle, construction and working of an a.c. generator. (5)

OR

What is meant by impedance? Give its unit using a phasor diagram derive an expression for the impedance of a series LCR circuit. Find the expression for the resonant frequency.

- Q29. Explain the principle and working of a cyclotron with the help of a labeled diagram. A cyclotron's oscillator frequency is 10 MHz. What should be the operating magnetic field for accelerating protons? If the radius of its dees is 60cm what is the kinetic energy of the proton beam produced by the accelerator? (5)

OR

Distinguish between the magnetic properties of dia, para and ferro magnetic substances in terms of (a) susceptibility (b) magnetic permeability (c) coercivity.

Give one example of each of these materials. Also draw the field lines due to an external magnetic field near a diamagnetic, a paramagnetic and a ferromagnetic substance.

SUBJECT : CHEMISTRY (SET-II)

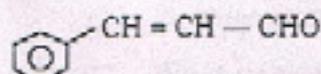
Time : 3 Hrs.

M.M.: 70

General Instructions :

- (i) All questions are compulsory.
- (ii) Question numbers 1 to 8 are very short answer type questions and carry 1 mark each.
- (iii) Question numbers 9 to 18 are short answer type questions and carry 2 marks each.
- (iv) Question numbers 19 to 27 are also short answer type questions and carry 3 marks each.
- (v) Question numbers 28 to 30 are long answer type questions and carry 5 marks each.
- (vi) Use log tables, if necessary. Use of calculators is not allowed.

Q1. Write the IUPAC name of the following organic compound :



Q.2 There are two $-NH_2$ groups in semicarbazide. However, only one is involved in the formation of semicarbazone. Explain.

Q3. What are ambident nucleophiles? Give an example.

Q4. In NaCl crystal, Cl^- ions are in fcc arrangement. Calculate the number of Cl^- ions in its unit cell.

Q5. Why is boiling point of water increased on addition of sodium chloride into it.

Q6. Write the structure of the compound having IUPAC name : 3-Cyclohexylpentan-3-ol

Q7. Aniline does not undergo Friedel-Crafts reaction. Explain.

Q.8 The reactions of Grignard reagent are done under anhydrous conditions. Why?

Q9. Account for the following :

- (i) pK_b of aniline is more than that of methylamine.
- (ii) Although amino group is ortho and para directing in aromatic electrophilic substitution reactions, aniline on nitration gives a substantial amount of m-nitroaniline.

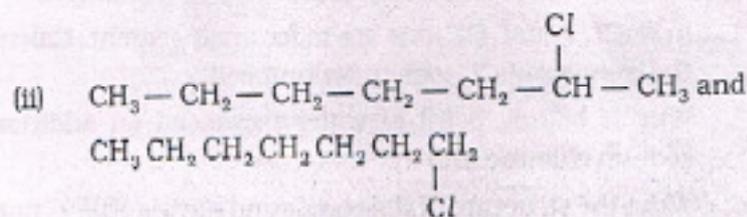
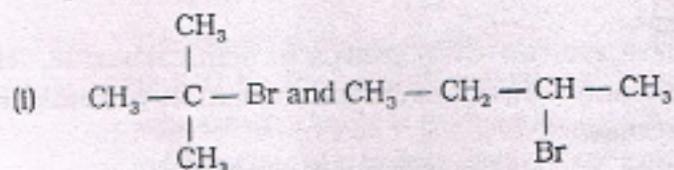
Q10. A cubic solid is made of two elements P and Q. Atoms of Q are at the corners of the cube and P at the body centre. What is the formula of the compound. What are the coordination numbers of P and Q?

Q11. Name the reagents used in the following reactions :

- (i) Bromination of phenol to 2, 4, 6-tribromophenol
- (ii) Oxidation of primary alcohol to carboxylic acid.

Q12. Explain with diagram why some of the non-ideal solutions show positive deviation from ideal solution.

Q13. In the following pairs of halogen compounds, which compound undergoes faster S_N1 reaction?

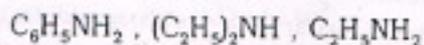


Q14. State Henry's law for solubility of a gas in a liquid. At the same temperature, the K_H of hydrogen is more than nitrogen. Which of them will be more soluble in water?

Q15. Arrange the following :

- (i) In decreasing order of basic strength in gas phase :
 $\text{C}_2\text{H}_5\text{NH}_2$, $(\text{C}_2\text{H}_5)_2\text{NH}$, $(\text{C}_2\text{H}_5)_3\text{N}$ and NH_3

(ii) In increasing order of solubility in water :



Q16. Calculate the efficiency of packing in case of a metal crystal for simple cubic arrangement.

OR

(a) Name the parameters that characterise a unit cell.

(b) What is meant by the term coordination number?

Q17. Although, chlorine is an electron withdrawing group, yet it is ortho, para directing in electrophilic aromatic substitution. Why?

Q.18 How will you bring about the following conversions?

(a) Methanol to Ethanoic acid

(b) Benzene to m-Bromophenol

Q19. Rohan had drunk from a local wine shop. He complained of blurred vision, started losing his eyesight slowly and died in a couple of days.

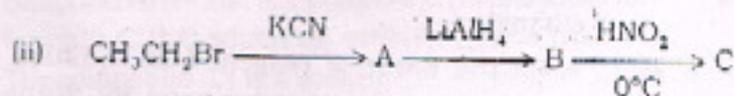
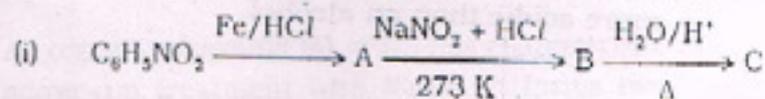
(i) What could be the reason for his death?

(ii) Give IUPAC name of the main component of wine.

(iii) What values can be derived from the above incident?

Q20. Calculate the molar mass of a substance 1.3g of which when dissolved in 169 g of water gave a solution boiling at 100.025°C at a pressure of one atmosphere. (Given : K_b for water = 0.52 km°)

Q21. Give the structures of A, B and C in the following reactions:



Q.22 Explain the following

- (a) Tanks used by scuba divers are filled with air diluted with Helium.
- (b) The osmotic pressure method is the best for determining the molar masses of solutes.
- (c) Solubility of gases in liquid decreases with increase in temperature.

Q23. (a) Haloalkanes react with KCN to form alkylcyanides as main product while AgCN forms isocyanides as the chief product. Explain.

(b) Explain why the dipole moment of chlorobenzene is lower than that of cyclohexyl chloride?

Q24. Sodium has a bcc structure with nearest neighbour distance 365.9 pm. Calculate its density. (Atomic mass of sodium = 23)

Q25. (a) How will you bring about the following conversions :

- (i) Benzoic acid to Benzaldehyde
- (ii) Ethanoic acid to Propanoic acid
- (iii) Aniline to benzylalcohol

OR

Giving an example for each describe the following reactions:

- (i) Aldol condensation
- (ii) Hell-Volhard-Zelinsky reaction
- (iii) Etard reaction

Q.26 (a) Explain how does the -OH group attached to a carbon of benzene ring activates it towards electrophilic substitution reaction.

(b) Give a chemical reaction to prove that phenol is more acidic than an alcohol.

Q27. (a) Explain the mechanism of hydration of ethene to yield ethanol.

(b) Write the name of reagent and equation for the preparation of ethoxybenzene by Williamson's synthesis.

Q.28 (a) Analysis shows that Nickel oxide has the formula $\text{Ni}_{0.98}\text{O}_{1.00}$.
What fraction of Ni exists as Ni^{2+} and Ni^{3+}

(b) Explain the following with suitable examples

(i) Ferromagnetism

(ii) Paramagnetism

(i) What is the length of the of its unit cell?

(ii) How many unit cells are there in 1.00 cm^3 of Al?

OR

(a) Aluminium crystallizes in ccp structure. Its metallic radius is 125pm.

(i) What is the length of the of its unit cell?

(ii) How many unit cells are there in 1.00 cm^3 of Al?

(b) Explain the following with suitable examples

(i) Antiferromagnetism

(ii) F-centres

(c) Frenkel defect

Q.29. (a) Give a chemical test to distinguish between the following pairs of organic compounds :

(i) Propanal and Propanone

(ii) Benzoic acid and Ethylbenzoate

(iii) Phenol and Benzaldehyde

(b) Explain for the following observations :

(i) Benzoic acid is a weaker acid than 4-Nitrobenzoic acid.

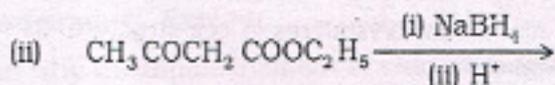
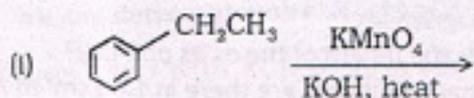
(ii) Ketones are less reactive than aldehydes towards nucleophilic addition reaction.

OR

(a) An organic compound (A) which has characteristic odour, on treatment with NaOH, it forms two components (B) and (C). Compound (B) has molecular formula $\text{C}_7\text{H}_8\text{O}$ which on oxidation gives back (A). The compound (C) is a sodium salt of an acid. When (C) is treated with soda lime it yields an aromatic

hydrocarbon (D). Deduce the structures of (A), (B), (C) and (D). Write the sequence of reactions involved.

- (b) Complete each synthesis by giving missing starting material, reagent or products :



- Q30. (a) Phenol associates in benzene to a certain extent to form dimer. A solution containing 2.0×10^{-2} kg of phenol in 1.0 Kg of benzene has its freezing point decreased by 0.69 K. Calculate the degree of association of phenol. (K_f for benzene = $5.12 \text{ K Kg mol}^{-1}$)
- (b) What is meant by minimum and maximum boiling azeotropic mixtures?

OR

- (a) The vapour pressure of a pure liquid 'A' is 40mm Hg at 310 K. The vapour pressure of this liquid in solution with liquid B is 32 mm of Hg. Calculate the mole fraction of A in the solution if the mixture obeys Raoult's law.
- (b) State Raoult's Law for the solutions containing two volatile components. Also give mathematical expression for the law.

SUBJECT : BIOLOGY

Time : 3 hrs.

M.M. : 70

General Instructions :

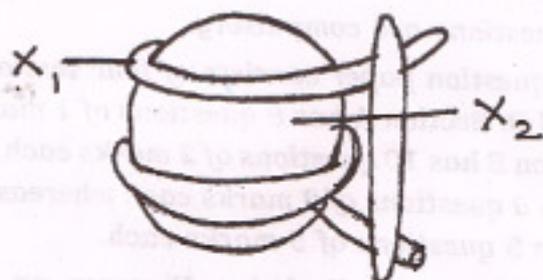
- (i) All questions are compulsory.
- (ii) This question paper consists of four sections A, B, C and D. Section A has 8 questions of 1 mark each, Section B has 10 questions of 2 marks each, Section C has 9 questions of 3 marks each whereas Section D has 3 questions of 5 marks each.
- (iii) There is no overall choice. However, an internal choice has been provided in one question of 2 marks, one question of 3 marks and two questions of 5 marks weightage. A student has to attempt only one of the alternatives in such questions.
- (iv) Wherever necessary, the diagrams drawn should be neat and properly labelled.

SECTION-A (1x8=8)

- Q1. An anther with malfunctioning tapetum often fails to produce viable male gametophytes. Give reason. (1)
- Q2. When do oogenesis and spermatogenesis initiate in human females and males respectively. (1)
- Q3. Name the respective pattern of inheritance where F₁ phenotype
(a) Does not resemble either of the two parents and is in between the two.
(b) Resembles only one of the two parents. (1)
- Q4. Why is coconut plant referred to as monoecious? (1)
- Q5. When and at what end does the 'tailing' of hnRNA take place? (1)
- Q6. Name the common ancestor of the great apes and man. (1)

Q7. What is unusual about flowering in bamboo species? (1)

Q8. Label 'X₁' and 'X₂' in the figure of a nucleosome given below : (1)

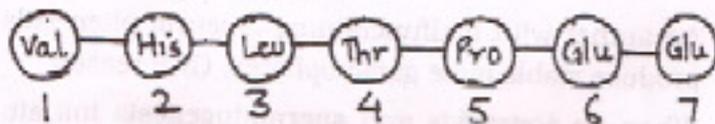


SECTION-B

Q9. How are chromosomal disorders different from Mendelian disorders? (2)

Q10. Describe lactational amenorrhoea as a method of birth control. (2)

Q11. A relevant portion of β -chain of haemoglobin of a normal human is given below :



The codon for the sixth amino acid is GAG. The sixth codon mutates to GAA as a result of mutation 'A' and into GUG as a result of mutation 'B'. Haemoglobin structure did not change due to mutation 'A' whereas it changed because of mutation 'B' leading to sickle shaped RBCs. Explain giving reasons how could mutation 'B' change the haemoglobin structure and not mutation 'A'. (2)

Q12. What is filiform apparatus? What is its function? (2)

Q13. The flower of brinjal is referred to as chasmogamous while that of beans as cleistogamous. How are they different from each other? (2)

- Q14. Why is apple called a false fruit? Which part(s) of the flower forms the fruit? (2)
- Q15. Why are both the strands of DNA not copied during transcription? (2)

OR

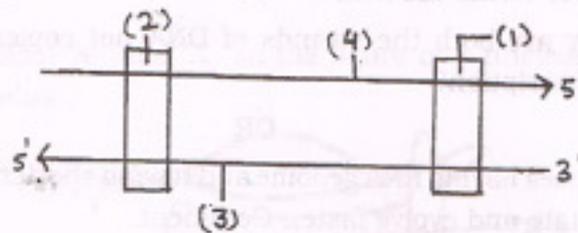
Viruses having RNA genome and having shorter life span mutate and evolve faster. Comment. (2)

- Q16. Give reasons :
- (a) Male gametes are produced several thousand times of female gametes. (2)
 - (b) Pollen grains are well preserved as fossils. (2)
- Q17. Who proposed that the first form of life came from pre-existing non-living organic molecules? What kind of conditions were prevalent on the primitive earth? (2)
- Q18. What is divergent evolution? Explain taking an example of plants. (2)

SECTION-C

- Q19. Chemical insecticides remain useful only for a limited time. Explain with reference to evolution with a suitable example. (3)
- Q20. Draw a well labelled diagram to show the structure of human sperm. (3)
- Q21. How is Hugo deVries 'Theory of mutation' different from Darwinian theory of 'Natural Selection'? (3)
- Q22. Trace the development of the embryo after syngamy in a dicot plant. (3)
- Q23. Recently a baby girl has been reported to suffer haemophilia. How is it possible? Explain with the help of a cross. (3)
- Q24. Enumerate the events in the uterus and ovary of a human female during menstrual cycle in : (3)
- (a) Follicular phase
 - (b) Luteal phase

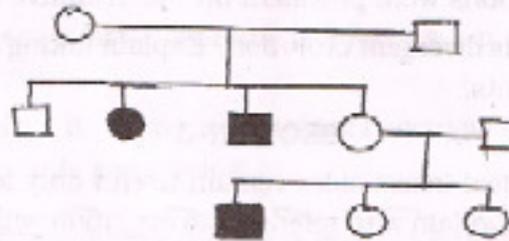
Q25. In the following diagram the two DNA strands represented are ready for transcription



- Label the parts marked 1 to 4
- Which one of the two strands of DNA has nucleotide sequence similar to the mRNA that will be transcribed and why?

OR

Study the given pedigree chart and answer the questions that follow :



- Is the trait recessive or dominant?
- Is the trait sex-linked or autosomal?
- Give the genotypes of the parents in generation I and of their third and fourth child in generation II. (3)

Q26. Describe an experiment to show that DNA and not protein is the genetic material in bacteriophages. (3)

Q27. (a) One of the codons on mRNA is AUG. Draw the structure of tRNA adapter molecule for this codon.

(b) Name the RNA polymerase that transcribes tRNA in eukaryotes.

(c) What is unique about the amino acid this tRNA binds with? (3)

(4)

SECTION-D

- Q28. (a) Who proposed the concept of lac operon?
(b) Draw a well labelled schematic representation of lac operon.
(c) Explain how does this operon get switched 'on' and 'off'.

OR

- (a) A true breeding pea plant homozygous for axial violet flowers is crossed with another pea plant with terminal white flowers (aavv). Work out a cross to show that phenotypes and genotypes of the F_1 and F_2 generation along with the ratios.
(b) State the law that Mendel proposed on the basis of such a cross. (5)
- Q29. (a) Draw a well labelled diagram of an anatropous ovule.
(b) Where would you look for the coleoptile and coleorhiza? What function do they perform?

OR

- (a) Draw a well labelled diagram to show the T.S. of a seminiferous tubule.
(b) Explain the role of any two accessory glands in human male reproductive system. (5)
- Q30. A child suffering from Thalassemia is born to a normal couple. But the mother is being blamed by the family for delivering a sick baby.
- (a) What is Thalassemia?
(b) How would you counsel the family not to blame the mother for delivering a child suffering from this disease? Explain.
(c) List the values your counselling can propagate in the family. (5)

OR

(5)

(a) Describe the Hershey --Chase experiment.
Write the conclusion they arrived at after
the experiment. (5)

SUBJECT : COMPUTER SCIENCE (SET-1)

Time : 3 Hrs.

M.M.: 70

General Instructions :

i) All questions are compulsory.

ii) Programming Language : C++

Q1. (a) What is prototype? Write the prototype of a function named Area, which take a float as value parameter and return a double type value. The parameter should have a default value 5.2 (2)

(b) Which C++ header file(s) are essentially required to be included to run/execute the following C++ source code (Note : Do not include any header file, which is/are not required) (2)

```
void main ()  
{  
    char T [] = "Any Thing";  
    int n = 100;  
    cout << "Remaining SMS Chars : " << strlen (Text) - 3  
    << endl;  
    cout << setw (5) << pow (n, 2);  
}
```

(c) Rewrite the corrected code for the following program. Underline each correction (if any) (2)

```
# include <iostream.h>  
struct Club  
{  
    int memnumber;  
    char memname [20];  
    char memtype [20];  
}  
void main ()
```

(1)

```

    {
        Club c1, c2;
        cin >> "Member number";
        cin >> "memnumber.c1";
        cout << "Member name:";
        cin >> c1.Membername;
        c1.memtype = "HIG";
        c2 = c1;
        cout << "Member number : " << c2.memnumber;
        cout << "Member name : " << c2.memname;
        cout << "Member number : " << c2.memtype;
    }

```

(d) Find the output of the following program : (3)

```

#include <iostream.h>
class train
{
    int mno, tripno, passengercount;
public:
    train (int tmno = 10)
    {
        mno = tmno;
        tripno = 0;
        passengercount = 0;
    }
    void trip (int pc = 30)
    {
        tripno++;
        passengercount += pc;
    }
    void statusshow ()
    {
        cout << mno << " : " << tripno << " : "
        << passengercount << endl;
    }
};

void main ()
{
    train m(15), t;
    m.trip ();
}

```

(2)

```

t.trip (25);
m.statusshow ();
m.trip (50);
t.statusshow ();
m.statusshow ();

```

- (e) Give the output of the following program segment (Assuming all required header files are included in the program) : (2)

```

#include <iostream.h>
void RIDDLE (int * N, int c)
{
    for (int i = 1; i < c; i++)
        * (N + i - 1) = *(N + i) + 1;
}
void main ()
{
    int p[] = {6, 9, 8}, q[] = {4, 3, 1}, r[] = {50, 80};
    clrscr ();
    RIDDLE (p, 3);
    RIDDLE (q, 3);
    RIDDLE (r, 2);
    for (int i = 0; i < 3; i++)
        cout << p [i] << "-";
    cout << endl;
    for (i = 0; i < 3; i++)
        cout << q [i] << "%";
    cout << endl;
    for (i = 0; i < 2; i++)
        cout << r [i] << "_";
    cout << endl;
}

```

- (e) What is encapsulation?

(1)

- Q2. (a) What is class and Objects? (2)
 (b) Reusability of classes is one of the major properties of OOP. How is it implemented in C++? (2)
 (c) Given the following C++ code answer the question (i) to (iv). (4)

```
class Factory
{ private :
  char Name [30];
  int worker;
public :
  Factory () //function1
  {strcpy (Name, "Blank");
  worker = 0;}
  void Details () //function2
  {cout << Name << endl << worker << endl;}
  Factory (char * Fact_name, int No); //function3
  Factory (Factory & F); //function 4
};
```

- (i) In object Oriented programming what is Function1 referred as and when does it get invoked/called?
 (ii) In OOP's what is Function2 referred as and when does it get invoked/called?
 (iii) In OOP's what is Function3 referred as and write the definition of function3.
 (iv) In OOP's what is Function4 referred as and when does it get invoked/called?
- (d) Define a class Account in C++ with the following description : (5)

Private Members
 ICode of type integer (Item Code)
 Item of type string (Item Name)

Price of type float (Price of each item)

Qty of type Integer (quantity in stock)

Discount of type float (Discount percentage on the item)

A member function FindDisc () to calculate discount as per the following rule :

- | | |
|----------------------|----------------|
| If Qty <= 100 | Discount is 0 |
| If Qty (101 and 200) | Discount is 15 |
| If Qty > 200 | Discount is 20 |

Public Members :

A constructor to assign all values with 0 for ICode, Price, Qty and Discount and null for item respectively.

A function Buy () to allow user to enter values for ICode, Item, Price, Qty and call function FindDisc () to calculate the discount.

A function ShowAll () to allow user to view the content of all the data members.

- Q3. (a) What are the significance of Destructor? (2)
(b) Answer the questions (i) to (vii) based on the following code : (7)

```
class CEO
{ double Turnover;
protected :
    int Noofcomp;
public :
    CEO ();
    void INPUT (int);
    void OUTPUT ();
};
class Director : public CEO
{ int Noofemp;
public :
    Director ();
    void Indata ();
```

```

void Outdata ();
protected :
    float Funds;
};
class Manager : public Director
{ float Expenses;
public :
    void Display ();
    Manager ();
}

```

- (i) Which constructor will be called first at the time of declaration of an object of class Manager?
 - (ii) How many bytes will an object belonging to class Manager require?
 - (iii) Name the member function(s), which are directly accessible from the object of class Manager.
 - (iv) Is the data member Funds accessible by the object of the class Manager and why?
 - (v) If the class Manager is derived in protected mode in place of public then, give the names of inherited members in the protected section only?
 - (vi) Which type of inheritance is implemented in the above example.
 - (vii) Name the base class and derived class of director.
- Q4. (a) Write a function in C++ to print the count of the word "Me" and "My" (ignoring the case) as an independent word in a text file STORY.TXT. (2)
- (b) Assume a text file "coordinate.txt" is already created. Using this file create a C++ function to count the number of lines starting with two letter word. (2)

- (c) Give the difference between the type casting and automatic type conversion. Also, give a suitable C++ code to illustrate both. (2)
- (d) What is the use of typedef? Explain with an example. (2)
- (e) Observe the program segment given below carefully and answer the question that follows : (1)

```
class Team
{
long TId;
char TName [20];
float points;
public :
void Accept ( );
void Show ( );
void PointChange ( );
long R_TId ( ) (return TId);
};
void ReplacePoints (long Id)
{
fstream File;
File.open ("Team.Dat", ios::binary | ios::in | ios::out);
Team T;
int Record = 0, found = 0;
while (!found && File.read((char*)&T, sizeof(T)))
{
if (Id == T.R_TId( ))
{
cout <<"Enter New Points";
T.PointChange ( );
_____ //Statement 1
_____ //Statement2
Found = 1;
}
```

```

}
Record++;
}
if (Found == 1)
cout << "Record Updated";
File.close ();
}

```

Write the statement 1 to position the File Pointer at the beginning of the Record for which the Team's ID matches with the argument passed, and Statement 2 to write the updated record at the Position.

- Q5. (a) What is the difference between the following statements? (2)
- Exam E (90, 70, 80);
Exam E = Exam (90, 70, 80);
- (b) Assuming that you have define a class called complex that implements functionality of complex that implements functionality of complex numbers. Write the prototypes for a set of overloaded function call addcomplex () that perform the following.
- (i) Two complex numbers, returning complex number.
 - (ii) Complex number and integer number, returning complex number.
 - (iii) Float number and integer number, returning float number. (3)
- (c) Explain any three types of inheritance with example. (3)
- Q6. (a) Given a binary file COMPUTER.DAT, containing records of the following type :
- ```

class computer
{ int speed;
char chipset [20]; //chipset as "PIV" or "QUADCORE
//or "DUALCORE"

```

```

public :
void Enter ();//Function to enter the details
void Show ();//Function to display the details
int checkchip (char ct [])
{ return strcmp (Chipset, ct);}
};

```

- (i) Write a function cooy ( ) that would copy only those records having chipset as "DUALCORE" from "COMPUTER.DAT" to "NOTEBOOK.DAT". (3)
- (ii) Write a function append ( ) to append new records to the existing file "COMPUTER.DAT". (3)
- (iii) Write a function Pivdisp ( ) to display only "PIV" chipset information. (3)
- (b) Write any two functions of ifstream class. (1)
- Q7. (a) What is containership? How does it differ from inheritance? (2)
- (b) What is the significance of visibility mode? Explain with an example. (3)
- (c) Study the following program and select the possible output(s) from it : (2)

```

#include<stdlib.h>
#include<jostream.h>
#include<string.h>
void main ()
{
 randomtze ();
 char A [] = "WELCOME";
 int ToGo;
 for (int I = 0; I<strlen(A); I++)
 {

```

```
ToGo = random (sizeof (ToGo)*2) + 1;
cout<<A [ToGo]<<" ";
}
```

}

(i) W : E : L : C : O : M : E :

(ii) E : C : E : E : C : C : E :

(iii) E : C : E : E : C : C : O :

(iv) C : C : C : E : E : C : C :

(d) Find the output of the following program. (2)

```
#include<iostream.h>
void main ()
{
int Number [] = {10, 20, 30, 40};
int * ptr = Numbers;
for (int C = 0; C < 3; C++)
{
cout <<*(ptr+1)-1<<"@";
ptr++;
}
cout<<endl;
for (C = 0; C<4; C++)
{
(*ptr) = (*ptr * 2);
--ptr;
}
for (C = 0; C<4; C++)
cout<<Numbers [C]<<"#";
cout<<endl;
}
```

## SUBJECT : COMPUTER SCIENCE (SET-II)

Time : 3 Hrs.

M.M.: 70

**General Instructions :**i) *All questions are compulsory.*ii) *Programming Language : C++*

Q1. (a) Why we need function prototype? Write the prototype of a function named cube, which take a int as value parameter and return a long type value. The parameter should have a default value 5. (2)

(b) Which C++ header file(s) will be essentially required to be included to run/execute the following C++ source code (Note : Do not include any header file, which is/are not required) (2)

```
void main ()
{
char Text [] = "SomeThing";
int n = 100;
cout <<"Remaining SMS Chars:"<<160-strlen(Text)
<<endl;
cout << setw (5) <<sqrt(n);
}
```

(c) Rewrite the corrected code for the following program. Underline each correction (if any) (2)

```
include <iostream.h>
structure Swimming
{
 int memnumber;
 char memname [20];
 char memtype [] = "LIG";
}
void main ()
{
```

(1)

```

 Swimming per1, per2;
 cout<<"Member number";
 cin>>"memnumber.per1:";
 cout <<"Member name:";
 cin>>per1.Membername;
 per1.memtype = "HIG";
 per2 = per1;
 cout <<"Member number: "<<per2.memnumber:";
 cout <<"Member name:" <<per2.memname;
 cout <<"Member number: "<<per2.memtype:";
 }

```

- (d) Find the output of the following program : (3)

```

#include <iostream.h>
#include<conio.h>
#include<ctype.h>
class Metro
{
int Mno, Tripno, passengerCount;
public :
Metro(int Tmno = 1)
{
Mno = Tmno;
TripNo = 0;
PasengerCount = 0;
}
void Trip (int PC = 20)
{
TripNo++;
PassengerCount += pc;}
void StatusShow ()
{
cout <<Mno<<":"<<TripNo<<":"<<PassengerCount
<<endl;}
};

```

(2)

```

void main ()
{
Metro M(5), T;
M.Trip ();
T.Trip (50);
M.StatuShow ();
M.Trip (30);
T.StatusShow ();
M.StatusShow ();
}

```

(e) Find the output of the following program : (2)

```

#include <iostream.h>
void PUZZLE (int * N, inc c)
{
 for (int i = 1; i < c; i++)
 * (N + i - 1) = *(N + i) + 1;
}
void main ()
{
 int p[] = {8, 9, 6}, q[] = {5, 4, 3}, r[] = {80, 90};
 clrscr ();
 PUZZLE (p, 3);
 PUZZLE (q, 3);
 PUZZLE (r, 2);
 for (int i = 0; i < 3; i++)
 cout << p [i] << " ";
 cout << endl;
 for (i = 0; i < 3; i++)
 cout << q [i] << "%";
 cout << endl;
 for (i = 0; i < 2; i++)
 cout << r [i] << "_ ";
 cout << endl;
}

```

(f) What is abstraction? (1)

(3)

- Q2. (a) What is class and Objects? (2)  
(b) Answer the questions (i) to (iv) after going through the following class : (4)

```
class Travel
{
int PlaceCode; char Place [20]; float Charges;
public: Travel () //Function1
{
PlaceCode=1; strcpy (Place, "DELHI"); Charges=1000;
}
void TravelPlan (Float C) //Function2
{
cout<<PlaceCode<<": "<<Place<<": "<<Charges<<endl;
}
~Travel () //Function3
{
cout<<"Travel Plan Cancelled"<<endl;
}
Travel (int PC, char P [], float C) //Function4
};
```

- (i) In object Oriented programming, what are Function1 and Function4 combined together referred as?  
(ii) In Object Oriented Programming, which concepts is illustrated by Function3 and when does it get invoked/called?  
(iii) In OOP's what is Function2 referred as and when does it get invoked/called?  
(iv) In OOP's what is Function4 referred as and write the definition of Function4.
- (c) Define a class Society with the following specifications. (5)

Data members :  
Private Members :

society\_name char (30)

house\_no integer

no\_of\_members integer

flat char (10)

income float

Member Functions:

Public members:

\* A constructor to assign initial values of society\_name as "Mahavir Nagar", flat as "A Type", house\_no as 56, no\_of\_members as 6, income as 50000.

\* input () - to read data members (society, house\_no, no\_of\_members & income) and call alloc\_flat ().

\* alloc\_flat () - To allocate flat according to income  
income >=500000 - Flat "A Type"

income >=250000 and income < 500000 - Flat "B Type"

income <250000 - Flat "C Type"

\* show () - to display all details.

(d) Reusability of classes is one of the major properties of OOP. How is it implemented in C++? (2)

Q3. (a) What are the significance of Constructor? (2)

(b) Answer the questions (i) to (vii) based on the following code : (7)

```
class Car
{
 char Model [10];
 char Date_of_purchase [10];
 char Company [20];
public:
 Car ();
 void entercardetail ();
 void showcardetail ();
};
class Accessories : public Car
{
```

(5)

```

protected :
 char stereo_tape [30];
 char sheet_cover [20];
public :
 float Price;
 Accessories ();
 void enteraccessoriesdetails ();
 void showaccessoriesdetails ();
};
class Dealer : public Accessories
{
 int No_of_dealers;
 char dealers_name [20];
 int No_of_products;
public :
 Dealer ();
 void enterdetails ();
 void showdetails ();
};

```

- (i) How many bytes will be required by an object of class Dealer?
- (ii) Which type of inheritance is illustrated in the above C++ code?
- (iii) Write names of all the data members which are accessible from the objects of class Dealer.
- (iv) Write names of all the members accessible from member functions of class Accessories.
- (v) Write names of all the member functions which are accessible from objects of class Dealer.
- (vi) Write the base class and derived class name of class Accessories.
- (vii) Which constructor will be called first at the time of declaration of an object of class Dealer?

Q4. (a) Explain any three types of inheritance with example. (3)

(b) What is the difference between the following statements? (2)

Test T (99, 56, 87);

Test T = Test (99, 56, 87);

(c) Assuming that you have define a class called complex that implements functionality of complex numbers. Write the prototypes for a set of overloaded function call multiply ( ) that perform the following.

(i) Two complex numbers, returning complex number.

(ii) Complex number and integer number, returning complex number.

(iii) Float number and integer number, returning float number. (3)

Q5. (a) Observe the program segment given below carefully and answer the question that follows : (1)

```
#include<fstream.h>
class Book
{
 int Bno; char Title [20];
public :
 void EnterVal () {cin>>Bno; cin.getline (Title, 20);}
 void showVal () {cout<<Bno<<"#"<<Title<<endl;}
};
void Search (int RecNo)
{
 fstream File; Book B;
 File.open ("BOOK.DAT", ios::binary | ios::in);
 _____ //Statement1
 File.read ((char*) &B, sizeof (B));
 B.Show (); File.close ();
}
```

```

void Modify (int RecNo)
{
 fstream File; Book B;
 File.open ("BOOK.DAT", ios::binary | ios::in | ios::out);
 B.EnterVal ();

 _____ //Statement2
 File.write ((char*) &B, sizeof (B));
 File.close ();
}

```

\* Write statement1 to position the file pointer to the beginning of the desired record to be read, which is sent as parameter of the function (assuming RecNo 1 stands for the first record)

\* Write statement2 to position the file pointer to the beginning of the desired record to be modified, which is sent as parameter of the function (assuming RecNo 1 stands for the first record).

- (b) Write a function in C++ to count the word "this" (including "This"/"THIS" too) present in a text file "DIARY.TXT". (2)
- (c) Assume a text file "coordinate.txt" is already created. Using this file create a C++ function to count the number of lines starting with 3 letter word. (2)
- (d) Give the difference between the type casting and automatic type conversion. Also, give a suitable C++ code to illustrate both. (2)
- (e) What is the use of #define? Explain with an example. (2)
- Q6. (a) Given a binary file "Train.Dat, containing records of the following class type :

```

class TRAIN
{
 int Tno; // Train Number
 char From [20]; // Train Starting Point
}

```

```

char To [20]; // Train Destination
public :
char * GetFrom (); {return From;}
char * GetTo (); {return To;}
void input () {cin>>Tno>>; gets(From);get(To);}
void show () {cout<<Tno<<": "<<From<<": "<<To<<endl;}
};

```

- (i) Write a function ADDTRAIN ( ) in C++, to add one more record at the end to the file "Train.Dat". (3)
- (ii) Write a function in C++ to search and display details, whose destination is "Delhi" from a binary file "Train.Dat". (3)
- (iii) Write a function TRANSWER ( ) in C++, that would copy all those records which are having To as "Delhi" from "Train.Dat" to "Trainback.Dat". (3)
- (b) Write any two member functions of ofstream class. (1)
- Q7. (a) Observe the following program RANDNUM.CPP carefully. If the value of VAL entered by the user is 10, choose the correct possible output(s) from the options from (i) to (iv) and justify your option. (2)

```

//program RANDNUM.CPP
#include<iostream.h>
#include<stdlib.h>
#include<time.h>
void main ()
{
 randomize ();
 int VAL, Rnd; int n = random (2);
 cin >> VAL;
 Rnd = 8 + random (sizeof (VAL))*1;
 while (n<Rnd)
 {

```

```
cout<<n<<"\t";
n++;
```

Output Options :

(i) 1 2 3 4 5 6 7 8 9 10 11 12 13

(ii) 0 1 2 3 4 5 6 7 8

(iii) 1 2 3 4 5

(iv) 1 2 3 4 5 6 7 8

(b) Find the output of the following program. (2)

```
#include<iostream.h>
void main ()
{
int Number [] = {2, 4, 8, 10};
int * ptr = Numbers;
for (int C = 0; C < 3; C++)
{
cout <<*(ptr+1)-1<<"@";
ptr++;
}
cout<<endl;
for (C = 0; C<4; C++)
{
(*ptr) = (*ptr * 2);
--ptr;
}
for (C = 0; C<4; C++)
cout<<Numbers [C]<<"#";
cout<<endl;
}
```

(c) What is containership? How does it differ from inheritance? (2)

(d) What is the significance of access specifiers in a class? Explain with example. (3)

## SUBJECT : MATHEMATICS (SET-I)

Time : 3 Hrs.

M.M.: 100

## General Instructions :

- (i) All questions are compulsory.
- (ii) The question paper consists of 29 questions
- (iii) Section-A comprises of 10 questions of 1 mark each.
- (iv) Section-B comprises of 12 questions of 4 marks each.
- (v) Section-C comprises of 7 questions of 6 marks each.
- (vi) Use of calculator is not permitted.

## SECTION-A

- Q1. What is the range of the function  $f(x) = \frac{|x-1|}{x-1}$ ,  $x \neq 1$ ?
- Q2. Using principal values, find the value of  $\cos^{-1}\left(\cos \frac{13\pi}{6}\right)$
- Q3. If  $\tan^{-1}\sqrt{3} + \cot^{-1}x = \frac{\pi}{2}$ , find  $x$ .
- Q4. Write the value of  $x - y + z$  from the following equation
- $$\begin{bmatrix} x+y+z \\ x+z \\ y+z \end{bmatrix} = \begin{bmatrix} 9 \\ 5 \\ 7 \end{bmatrix}$$
- Q5. For what value of  $x$ ,  $A = \begin{bmatrix} 2(x+1) & 2x \\ x & x-2 \end{bmatrix}$  is a singular matrix?
- Q6. Find the value of  $\begin{vmatrix} a-b & b-c & c-a \\ b-c & c-a & a-b \\ c-a & a-b & b-c \end{vmatrix}$

- Q7. Find the maximum and minimum value of the function  $f(x) = 3 - 2 \sin x$ .
- Q8. Differentiate  $y = \sin(\tan^{-1} e^x)$  with respect to  $x$ .
- Q9. If the radius of a sphere is measured as 9 cm with an error of 0.03 cm, then find the approximate error in calculating its volume.
- Q10. Find the slope of the normal to the curve  $y^2 = 4ax$  at  $\left(\frac{a}{m^2}, \frac{2a}{m}\right)$ .

#### SECTION-B

- Q11. Let  $Z$  be the set of all integers and  $R$  is the relation on  $Z$  defined as  $R = \{a, b\}; a, b \in Z$  and  $a - b$  is divisible by 5. Prove that  $R$  is an equivalence relation.
- Q12. Consider  $f: R_+ \rightarrow (0.5, \infty)$  given by  $f(x) = 9x^2 + 6x - 5$ , show that  $f$  is invertible with  $f^{-1}(y) = \left(\frac{\sqrt{y+6}-1}{3}\right)$ .

Q13. Prove that  $\tan^{-1}\left(\frac{\cos x}{1 + \sin x}\right) = \frac{\pi}{4} - \frac{x}{2}, x \in \left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$

- Q14. Express the following matrix as a sum of a symmetric and a skew-symmetric matrix and verify your result;

$$A = \begin{bmatrix} 3 & -2 & -4 \\ 3 & -2 & -5 \\ -1 & 1 & 2 \end{bmatrix}$$

- Q15. Using properties of determinants, prove that

$$\begin{vmatrix} x+y+2z & x & y \\ z & 2x+y+z & y \\ z & x & x+2y+z \end{vmatrix} = 2(x+y+z)^3$$

Q16. Find all the points of discontinuity of  $f$ , where  $f$  is defined

$$\text{as follows : } f(x) = \begin{cases} |x|+3 & ; \quad x \leq -3 \\ -2x & ; \quad -3 < x < 3 \\ 6x+2 & ; \quad x \geq 3 \end{cases}$$

Q17. If  $y = (\cot^{-1}x)^2$ , then show that

$$(x^2 + 1)^2 \frac{d^2y}{dx^2} + 2x(x^2 + 1) \frac{dy}{dx} = 2$$

Q18. If  $x = a(\cos \theta + \theta \sin \theta)$  and  $y = a(\sin \theta - \theta \cos \theta)$  find  $\frac{d^2y}{dx^2}$

Q19. Find the intervals in which  $f(x) = x^3 - 12x^2 + 36x + 17$  is increasing or decreasing function.

Q20. Sand is pouring from the pipe at the rate of  $12 \text{ cm}^3/\text{s}$ . The falling sand forms a cone on a ground in such a way that the height of cone is always one-sixth of radius of the base. How fast is the height of sand cone increasing when the height is 4 cm?

Q21. Find the equation of the tangent to the curve  $x^2 + 3y = 3$ , which is parallel to the line  $y - 4x + 5 = 0$ .

Q22. Differentiate the following function w.r.t.  $x$

$$y = (x)^{\cos x} + (\sin x)^{\tan x}$$

#### SECTION-C

Q23. (a) Let  $A = N \times N$  and  $*$  be a binary operation on  $A$  defined by  $(a, b) * (c, d) = (a + c, b + d)$ . Show that  $*$  is commutative and associative. Also, find identity element for  $*$  on  $A$ , if any.

(b) If  $f: \mathbb{R} \rightarrow \mathbb{R}$  and  $g: \mathbb{R} \rightarrow \mathbb{R}$  are given by  $f(x) = \sin x$  and  $g(x) = 5x^2$ , find  $g \circ f$  and  $f \circ g$ .

Q24. (a) Prove that  $\cos \left[ \tan^{-1} \left\{ \sin \left( \cot^{-1} x \right) \right\} \right] = \sqrt{\frac{1+x^2}{2+x^2}}$

(b) Solve for  $x$ ,

$$\tan^{-1}(x+2) + \tan^{-1}(x-2) = \tan^{-1}\left(\frac{8}{79}\right), x > 0$$

Q25. Using elementary transformation, find the inverse of the

$$\text{matrix } A = \begin{bmatrix} -1 & 1 & 2 \\ 1 & 2 & 3 \\ 3 & 1 & 1 \end{bmatrix}$$

Q26. The cost of 4 kg paper carry bags, 3 kg jute carry bags and 2 kg polythene carry bag is ₹ 60. The cost of 2 kg paper carry bags, 4 kg jute carry bags and 6 kg polythene carry bag is ₹ 90. The cost of 6 kg paper carry bags, 2 kg jute carry bag and 3 kg polythene carry bag is ₹ 70. Find the cost of each item per kg by matrix method.

A shopkeeper wants to purchase carry bags, which carry bag you will suggest to buy and why? (any two points).

Q27. If the length of three sides of a trapezium other than the base is 10 cm each, find the area of the trapezium, when it is maximum.

Q28. A dietitian wishes to mix two types of foods in such a way that the vitamin contents of the mixture contains atleast 8 units of vitamin A and 10 units of vitamin C. Food I contains 2 units per kg of vitamin A and 1 unit per kg of vitamin C. Food II contains 1 units per kg of vitamin A and 2 units per kg of vitamin C. It costs ₹ 50 per kg to purchase food I and ₹ 70 per kg to purchase food II. Formulate the problem as a linear programming problem to minimise the cost of such mixture and find the minimise cost graphically? Suggest different ways in which we can avoid wastage of food.

Q29. (a) Verify Rolle's theorem for the function  $f$ , given by

$$f(x) = e^x(\sin x - \cos x) \text{ on } \left[\frac{\pi}{4}, \frac{5\pi}{4}\right]$$

(b) Using differentials, find the approximate value of  $\sqrt{25.2}$

Time : 3 hrs.

M.Marks : 100

**General Instructions :**

1. *This paper is divided into three sections - A, B and C. All the sections are compulsory.*
2. *Separate instructions are given with each question wherever necessary. Read these instructions carefully and follow them meticulously.*
3. *Do not exceed the prescribed word limit while answering the questions.*

**SECTION-A (READING)**

1. Read the following passage carefully :

1. When the early traders from Europe first 'discovered' the monsoon, they realised that its winds would blow their ships eastwards to India and then home again to Europe. They found, too, that the monsoon created remarkable mud banks along the coast of India, which guaranteed safe places to anchor their ships. Thus, these early European traders became regular visitors to one particular part on the south-west coast of India named Cochin. Merchants from the ancient city of Rome traded there.
2. One of their rulers, the Roman Emperor Nero, put Cochin on the Roman map. He wore Indian silk clothing, his bedchamber was decked in Indian pearls, his palace in Indian gems and tortoise shells and he bathed in water made fragrant by rare Indian spices. Following Nero's example, the Roman aristocrats were mad for all these Indian products and many of them began to look like wealthy Indian princes as they went about government business.
3. Vasco da Gama, a famous explorer from Portugal in Europe, had heard about the monsoon and its remarkable effects. He set sail to India and when he was within reach of its Western coast, he engaged the help of a knowledgeable local seaman. Together they sailed in on the favourable monsoon winds, landing at Calicut, a few miles up the coast from Cochin.
4. So there I was, a modern European traveller at Cochin, watching a huge Italian ship heading out of the harbour. Since I wondered what kind of cargo it might be carrying I called in one of the port officials. He informed me that, although Cochin still traded in tea, coffee and certain rich spices, there had been a few changes since the days of earlier merchants: exports, now included seafood and knitwear. There had been an experiment too, in sending frogs legs to France, a delicacy the French love. Unfortunately, government officials had eventually imposed a ban on this practice, because a thriving frog population was needed in order to keep down the numbers of ever-present mosquitoes.
5. Later that day, I learnt at first hand the influence the monsoon can have on Indian life and culture, and experienced the profound climatic and emotional effects of its arrival. At 1 pm, the sky began to darken. Within two hours, racing clouds had extinguished the sun and left everything bathed in an inky violet light. At 4 o'clock, announced by deafening thunderclaps, the monsoon finally swept into Cochin.
6. In the restaurant, the hotel waiters rushed to the windows, clapping and yelling, their customers forgotten. One emerged from the kitchen, bearing a teapot destined for the conference room (where, it was rumoured, some hotel guests were having an important committee meeting). When he glimpsed the extraordinary spectacle outside, he banged the teapot down on my table and ran to join his colleagues, influenced by all this excitement. I heaved open the door and stepped out into the storm.
7. Soaked to the skin within seconds, I felt a wonderful sense of warmth and invigoration, it was, undoubtedly, a little bit like being born again.

8. Then, my eyes, still watering from the impact of the flying flowers, I witnessed an astonishing scene. Two straining waiters held the restaurant door open while a party of men and women filed solemnly into the storm. The men wore smart business suits, the women best quality silk sarees and high-heeled shoes. As they emerged they opened their arms and lifted their faces to the rain. The important committee had come out to greet the monsoon, they walked towards the harbour, strolling, laughing out loud, calling out to each other. In the dark waters of the harbour, there were small boats made for the safety of the jetty and its wooden shed. But soon the jetty itself vanished beneath the wind-driven waves. The members of the important committee stood knee-deep in seething water, while the wind blew gusts of rain over the shed's disintegrating roof and clung to each other with water in their eyes and looks of sublime happiness on their faces.

- (a) On the basis of your reading of the above passage answer the given questions briefly.
- (i) Give one reason for which the monsoon was important for the early traders from Europe. (1)
  - (ii) The Roman government looked like 'wealthy Indian princes'. Explain. (2)
  - (iii) According to the passage, what are the two things that helped Vasco da Gama to sail to Calicut? (2)
  - (iv) Why, according to you, did the author arrange to visit one of the port officials in Cochin? (2)
  - (v) The customers and waiters in the restaurant greeted the members of the important committee with disapproval. Explain. (2)
- (b) Find words from the passage which convey the similar as the following : (3x1=3)
- (i) growing vigorously (para 4)
  - (ii) to give strength or energy to (para 7)
  - (iii) wonderful or amazing (para 8)

2. Read the following passage carefully and answer the questions that follow : (8)

Chocolates make the best gifts and there is a whole industry that is churning out these goodies exclusively for you. But where did chocolate originate from? We'll give you the answer.

The botanical name of the cocoa tree, from which chocolate is made, is *Theobroma Cacao*. The first word is Greek for food of the Gods. Depending on whom you believe, this seductive substance is an effective mood lifter and good for the heart, or the cause of spots, migraine, obesity and stressed out nerves.

Now we learn that chocolate has been around for a lot longer than it was previously thought. Traces of it have been found in pots discovered in Mayan graves in Mexico, some of which date back to 600 BC, which pushes back the earliest chemical evidence of chocolate by more than 1000 years. Chocolate is made from the seeds or 'beans' of the cocoa tree - the leathery cocoa pod contains upto 100 beans. Aztecs in Mexico and Mayans in Belize worshipped the tree and used its beans as a form of currency. They also hit upon the idea of crushing the beans, boiling them in water, then adding spices and drinking the resulting hot, frothy liquid. In the 16 century, Spaniards who landed in Mexico wrote of how the Aztec Emperor Moctezuma drank chocolate 'from pure gold cups with great reverence'.

Gradually, chocolate became a part of European life. Rich aristocrats and the privileged elite adopted the habit of drinking it during the day. Chocolate drink gained in popularity when sugar was added to it and coffee houses began to serve it. Cocoa plantations sprang up all over the world to meet the growing demand and as the export of Cocoa beans increased, chocolate became more easily available to ordinary people in Europe.

The first attempts at making solid chocolate came in the early 1800's when the cocoa beans were ground into a powder, heated, sweetened and pressed into a mould. The resulting product resembled the chocolate buffets we eat today but had a short shelf life.

It was a Dutch chemist and food scientist, Conrad Van Houten, who in 1825 perfected the extraction

of cocoa butter from beans, which enabled the production of solid bars we would recognise as chocolate today, in the 1880's Rudolph Lindt of Switzerland started adding extra cocoa to make a product that melted at 36°C. Around the same time Daniel Peter, a Swiss candy-maker, added condensed milk developed by Henri Nestle to chocolate, making a sweeter and smoother variety of what is now one of the world's favourite foods.

- (a) On the basis of your reading of the above passage make notes on it in points only, using headings and sub-headings. Also use recognizable abbreviations wherever necessary. Also supply a suitable title to it. (5)
- (b) Write a summary of the above passage in about 80 words. (3)

### SECTION-B (ADVANCED WRITING SKILLS)

3. Department of Science and Technology, Government of India is organising a science exhibition in your school. Design an attractive poster announcing the event and inviting the general public to visit it in not more than 50 words.

OR

Your school, A.M. Public School, is organising a cultural evening to collect funds for the slum children. The Education Minister has consented to be the Chief Guest for the occasion. Draft a notice in about 50 words to be displayed on your school notice board. You are the school Head boy/Head girl. (5)

4. Your school organised an Inter School Debate last week on the topic, 'Should ladies be working mothers'. Write a report for the same in about 125 words giving all the necessary details for your school magazine.

OR

It was raining heavily. You were walking towards your house after the school, when suddenly you saw a huge neem tree coming down and falling on the road, thereby hitting a car parked there. The traffic came to a stand still. Describe the chaotic traffic scene in 100-125 words. (10)

5. As a resident of 16 Shivpuri, Morinagar, write a letter to the editor of a national daily regarding the long power cuts that your colony has to face everyday and the other problems arising due to it. (150 words).

OR

You are Anu/Arun, a resident of 13 WEA, Karol Bagh, New Delhi. You feel strongly about the ill-treatment meted out to stray dogs at the hands of callous and indifferent people. Write a letter to the editor of a national daily giving your views on why some people behave in such a manner and how these dogs should be treated. (10)

6. Pizzas and burgers have joyfully robbed the traditional food and other wholesome items from the Indian plate. Little does the younger generation realize the potential hazards they are inviting. As a health conscious individual, invite the attention of the children towards it. Write an article on the topic "Eat healthy in order to stay healthy" in not more than 125-150 words.

OR

You are ABC of class XII. Recently you spent a week in a rural setting, away from the hustle and bustle of the city. Write an article mentioning your experiences on the topic "The joy of living in the lap of nature" in not more than 125-150 words. (10)

### SECTION-C (LITERATURE TEXT BOOKS AND LONG READING TEXTS)

7. Read the lines given below and answer the question that follow : (4)

...On their slag heap, these children  
Wear skins peeped through by bones and  
spectacles of steel  
With mended glass, like bottle bits on stones  
All their time and space are foggy slum.  
So blot their maps with slums as big as doom,

- (i) Which two images are used to describe the slums? (1)  
 (ii) What sort of life do these children lead? (2)  
 (iii) Identify the literary device used in the last line. (1)

OR

..... and  
 looked but soon  
 put that thought away and  
 looked out at young Trees sprinting,  
 merry children spilling out of their homes,.....

- (i) What did the poet realise? How did she feel? (2)  
 (ii) How did the poet 'put' that thought away? (1)  
 (iii) What did she notice in the world outside? (1)
8. Answer any two of the following questions in 30-40 words each : (2x2=4)  
 (a) Why is the poet sad on seeing her mother's face?  
 (b) What freedom does the poet want for slum children?  
 (c) Why does Stephen Spender call Shakespeare wicked and the map a bad example?
9. Answer any six of the following questions in 30-40 words each : (6x2=12)  
 (a) The crofter was a good host. Elaborate.  
 (b) Why did Roger Skunk go in search of the wizard?  
 (c) What was the chief concern of Sadao's father?  
 (d) How did Franz's feelings about M. Hamed and his school change?  
 (e) Shukla was poor but resolute. Explain.  
 (f) What was the forecast made by the astrologer at the birth of the king?  
 (g) How did Douglas clear all the residual doubts about the terror he had?
10. Answer any one of the following questions in 125-150 words : (5)  
 Dreams are often far removed from reality. Discuss with reference to the story, 'Lost Spring'.

OR

What was the base of the story told by Jack to his daughter? Why was the effort futile?

11. Answer of the following question in about 100 words : (5)  
 "The experience had a deep meaning for me, as only those who have known stark terror and conquered it can appreciate. In death there is peace. There is terror only in the fear of death, as Roosevelt knew when he said, "All we have to fear is fear itself". Because I had experienced both the sensation of dying and the terror that fear of it can produce, the will to live somehow grew in intensity."  
 Douglas, notwithstanding his aversion of water and extreme exhaustion, keeps on conquering his fear of water and finally emerges victorious.  
 We all have one fear or another but a few of us are able to overcome it. What innate quality should one possess to succeed and overcome all barriers?
12. Who had left the walking-stick with Sherlock Holmes and Watson? What impression did Holmes and Watson form regarding the owner of the stick? (8)
13. Describe Sir Henry's first journey to Baskerville Hall, undertaken in the company of Dr. Watson in about 125-150 words. (7)

**SUBJECT : PHYSICAL EDUCATION****Time : 3 hrs.****M.M.: 70****General Instructions :**

- (i) All questions are compulsory.
- (ii) Question paper carries Part-A and Part-B.
- (iii) Answer to questions carrying 1 mark should be in approximately 30 words.
- (iv) Answer to questions carrying 2 marks should be in approximately 60 words.
- (v) Answer to question carrying 3 marks should be in approximately 100 words.
- (vi) Answer to question carrying 5 marks should be in approximately 150-200 words.

**PART-A**

- Q1. What does the word 'Tournament' mean? (1)
- Q2. What is Kyphosis. (1)
- Q3. What is Endurance. (1)
- Q4. What is seeding. (1)
- Q5. What are consolation tournaments. (1)
- Q6. Define Environment. (1)
- Q7. What is Knock-Knee? (1)
- Q8. What do you mean by Extramurals. (1)
- Q9. Mention any two principles of physical fitness development in brief. (2)
- Q10. Enlist the committees for organizing sports events and explain any one in detail. (2)
- Q11. What is League tournament? Explain the merits and demerits of league tournament. (2)

- Q12. What do you mean by specific sports programmes? Explain any one in detail. (2)
- Q13. Discuss Rhythmic exercises as means of physical fitness development. (2)
- Q14. Explain any three components of physical fitness. (3)
- Q15. What is the role of an individual in prevention of sports related accidents? (3)
- Q16. Explain the causes of Kyphosis and Loordosis in brief. (3)
- Q17. Discuss the factors affecting physical fitness and wellness in detail. (3)
- Q18. Draw a fixture of 25 teams on Knock out basis. (5)
- Q19. Explain any five essential elements of proper sports environment. (5)
- Q20. Explain the causes, preventions and remedies of Knock-knees. (5)
- Q21. Explain the objectives of Intramural competition and extramural competitions. (5)

#### PART-B

*Answer the questions 22-24 from any one game/sport of your choice only. (Basket Ball, Volley Ball, Cricket, Football, Hockey and Kho-Kho)*

- Q22. Mention two latest changes in general rules of the game/sport of your choice. (2)
- Q23. Write in brief about three fundamental skills of the game/sport. (3)
- Q24. Draw a neat diagram of field/court of the game with all its measurements and specifications. (5)
- Q25. Write the historical development of the game/sport. (2)
- Q26. Explain the soft tissue injuries and their management. (4)
- Q27. Name the important National Sports awards and explain any two of them. (4)