CLASS XII

ENGLISH

The last lesson

Q1. Why was Franz tempted to play truant from school?

Q2. What was unusual about the school that Franz noticed when he entered the school?

Q3. Why was it the last lesson? How did Franz react to it?

Q4.What reasons did Mr. Hamel give for their lack of interest in learning French?

Q5. Why did not M Hamel want the people to forget French?

Q6.Describe how M Hamel conducted the last lesson.

Q7.What was the mood in the classroom when M Hamel gave his last French lesson?

Q8. What was more tempting to Franz rather than going to school?

Q9. What did M. Hamel say about French language?

Q10. Why were the villagers seated on the back benches?

LOST SPRING

Q1. What does the title "Lost Spring" convey?

Q2. Do you think Saheb was happy to work at the tea stall? Give reasons.

Q3. Is it possible for Mukesh to realise his dream? Justify your answer.

Q4. What does the writer mean when she says, 'Saheb is no longer his own master'?

Q5.Seemapuri is a place on the periphery of Delhi yet miles away from it metaphorically. Justify this statement.

Q6.Through the years rag picking has acquired the 'proportion of a fine art' in Seemapuri. Justify the statement.

Q7.Why was not Saheb happy on getting a job?

Q8.Why don't the bangle makers of Firozabad organise themselves?

Q9."Saheb is no longer his own master", says the writer. What does she mean?

Q10.What trade does the family of Mukesh follow? Why does the writer feel that it will be difficult for Mukesh to break away from this tradition?

My Mother at Sixty-*Six*

Q1. What did the poet realise looking at her mother in the car?

Q2. How was the scene outside the moving car different from the inside one?

Q3. How does the poet describe her mother?

Q4. What is the old familiar ache the poet felt?

Q5. Why has the mother been compared to the late winter's moon?

Q6. What do the poet's parting words to her mother and smile signify?

Q7. Why has the poet brought in the image of the merry children 'spilling out of their homes'?

Q8. What do the poet's parting words to her mother signify?

Q9. What is the kind of pain and ache that the poet feels?

Q10. What does the poet do to shrug off the painful thought of her mother's approaching end?

MATHEMATICS

1.If A is the set of students of a school then write, which of following relations are. (Universal, Empty or neither of the two).

$R1 = \{(a, b) : a, b$ are ages of students and $|a - b| 0\}$

$R2 = \{(a, b) : a, b$ are weights of students, and $|a - b| < 0\}$

$R3 = \{(a, b) : a, b$ are students studying in same class$\}$

2. If $f : \{1, 3\} \to \{1, 2, 5\}$ and $g : \{1, 2, 5\} \to \{1, 2, 3, 4\}$ be given by $f = \{(1, 2), (3, 5)\}$, $g = \{(1, 3), (2, 3), (5, 1)\}$
Write down gof.

3. Show that the relation R defined by $(a, b) R(c, d) \Leftrightarrow a + d = b + c$ on the set $N \times N$ is an equivalence relation.

4. Let A = {0, 1, 2, 3} and define a relation R on A as follows:
R = {(0, 0), (0, 1), (0, 3), (1, 0), (1, 1), (2, 2), (3, 0), (3, 3)}. Is R reflexive? symmetric? transitive?

5. For the set A = {1, 2, 3}, define a relation R in the set A as follows: R = {(1, 1), (2, 2), (3, 3), (1, 3)}. Write the ordered pairs to be added to R to make it the smallest equivalence relation.

6. Let R be a relation on the set **N** of natural numbers defined by nRm if n divides m. Discuss on the nature of R .

7. Let L denote the set of all straight lines in a plane. Let a relation R be defined by lRm if and only if l is perpendicular to $m \; \forall \; l, m \in L$. Then R is ?

8. Let A = {1, 2, 3, ... 9} and R be the relation in A x A defined by $(a, b) R (c, d)$ if $a + d = b + c$ for $(a, b), (c, d)$ in A x A. Prove that R is an equivalence relation. And also obtain the equivalent class [(2, 5)].

9. Consider the non-empty set consisting of children in a family and a relation R defined as aRb if a is brother of b. Then R is ?

10. Discuss on the empty relation on a non empty set A.

11. Find the value of $\sin (2 \cot^{-1}(-\frac{5}{12}))$.

12. Evaluate tan (arc tan(– 4)).

13. Find value of $\tan (\cos^{-1} x)$ and hence evaluate $\tan(\cos^{-1} \frac{8}{17})$

14. Prove that cot–1(7) + cot–1(8) + cot–1(18) = cot–1(3)

15. Which is greater, tan 1 or tan–1 (1)?

16. Find the values of x which satisfy the equation sin–1 (x)+ sin–1 (1 – x) = cos–1 (x).

17. Find the domain of $\sin^{-1} 2x$.

18. If B be a 4 × 5 type matrix, then what is the number of elements in the third column.

19. Area of a triangle with vertices (k, 0), (1, 1) and (0, 3) is 5 unit. Find the value (s) of k.

20. If A is a square matrix of order 3 and $|A| = -2$, find the value of $|-3A|$.

21. If $A = 2B$ where A and B are square matrices of order 3 × 3 and $|B| = 5$, what is $|A|$?

22. What is the number of all possible matrices of order 2 × 3 with each entry 0, 1 or 2.

23. If A is a non-singular matrix of order 3 and $|A| = -3$ find $|adj\ A|$.

24. Given a square matrix A of order 3 × 3 such that $|A| = 12$ find the value of $|A\ adj\ A|$.

25. If A is a square matrix of order 3 such that $|adj\ A| = 8$ find $|A|$.

26. Test the consistency of the following system of equations by matrix method : $3x - y = 5; 6x - 2y = 3$.

27. The sum of three numbers is 2. If we subtract the second number from twice the first number, we get 3. By adding double the second number and the third number we get 0. Represent it algebraically and find the numbers using matrix method.

28. Using matrix method, solve the following system of linear equations :
$2x - y = 4, 2y + z = 5, z + 2x = 7$.

29. If A is a matrix of order 3 × 3, then number of minors in determinant of A are ?

30. Show that the product of two non null matrix gives a null matrix .

31. Find a vector of magnitude 11 in the direction opposite to that of $\overrightarrow{PQ}$ where P and Q are the points (1, 3, 2) and (–1, 0, 8), respectively.

32. Find a vector of magnitude $3\sqrt{2}$ units which makes an angle of $\pi/4$ and $\pi/2$ with y and z - axes, respectively.

33. The 2 vectors $\hat{j} \Box \Box \hat{k}$ and $3i + \Box \hat{j} \Box \Box 4\hat{k}$ represents the two sides AB and AC, respectively of a $\Box \triangle ABC$. The length of the median through A is ?

34. A vector has magnitude 14 and direction ratios 2, 3, − 6. Find the direction cosines and components of *the vector* given that it makes an acute angle with *x*-axis.

35. Prove that in any triangle ABC, $Cos\ A = \frac{b^2+c^2-a^2}{2bc}$, where *a*, *b*, *c* are the magnitudes of the sides opposite to the vertices A, B, C, respectively.

36. The number of vectors of unit length perpendicular to the vectors $2\hat{i} + \hat{j} + 2\hat{k}$ and $\hat{j} + \hat{k}$ is ?

37. If $\vec{a}$ and $\vec{b}$ are adjacent sides of a rhombus, then find their scalar product .

38. What is the point of trisection of *PQ* nearer to *P* if positions of *P* and *Q* are $3\hat{i} + 3\hat{j} - 4\hat{k}$ and $9\hat{i} + 8\hat{j} + 10\hat{k}$ respectively?

39. What is the projection of the vector $\hat{i} - \hat{j}$ on the vector $\hat{i} + \hat{j}$?

40. Write a unit vector in *xy*-plane, making an angle of 30° with the +ve direction of *x*–axis.

41. The *x*-coordinate of a point on the line joining the points Q (2, 2, 1) and R (5, 1, −2) is 4. Find its *z*-coordinate.

42. Find the distance of the point whose position vector is $(2\hat{i} + \hat{j} - \hat{k})$ from the plane $\vec{r}. (\hat{i} - 2\hat{j} + 4\hat{k}) = 9$.

43. Find the coordinates of the point where the line through (3, − 4, − 5) and (2, −3, 1) crosses the plane passing through three points (2, 2, 1), (3, 0, 1) and (4, −1, 0) .

44. Find the angle between the lines whose direction cosines are given by the equations: $3l + m + 5n = 0$ and $6mn - 2nl + 5lm = 0$.

45. Find the co-ordinates of the foot of perpendicular drawn from the point A (1, 8, 4) to the line joining the points B (0, −1, 3) and C (2, −3, −1).

46. Find the equations of the line passing through the point (3,0,1) and parallel to the planes $x + 2y = 0$ and $3y - z = 0$.

47. Show that the points $(\hat{i} - \hat{j} + 3\hat{k})$ and $3(\hat{i} + \hat{j} + \hat{k})$ are equidistant from the plane $\vec{r}.(5\hat{i} + 2\hat{j} - 7\hat{k}) + 9 = 0$ and lies on opposite side of it.

48. If the foot of perpendicular drawn from the origin to a plane is (5, − 3, − 2), then what is the equation of plane ?

49. What is the distance of (2,1,-3) from y axis and z axis .

50. Show that the straight lines whose direction cosines are given by $2l + 2m - n = 0$ and $mn + nl + lm = 0$ are at right angles.

51**. Determinants** : Solve Questions from page 141 − 143 : Misc exercise of Chap. 4 from NCERT part I.

PHYSICS

1. What is the force between two small charged spheres having charges of 2 x 10^{-7}C and 3 x 10^{-7}C placed 30 cm apart in air?

2. Derive expression for relation between electric intensity and electric potential ?

3. The electrostatic force on a small sphere of charge 0.4 μC due to another sphere of charge -0.8 μC in air 0.2N.
   (a) What is the distance between the two spheres?
   (b) What is the force on the second sphere due to the first?

4. Derive field due to an infinity long straight uniformly charged wire?

6. Derive expression for electric field intensity on equatorial line of electrical dipole?

7. (a) Explain the meaning of the statement 'electric charge of a body is quantised'
   (b) Why can one ignore quantisation of electric charge when dealing with macroscopic?
       i.e., large scale charges?

8. Derive expression for Gauss law in electrostatics?

9. When a glass rod is rubbed with a silk cloth, charges appear on both. A similar phenomenon is observed with many other pairs of bodies. Explain how this observation is consistent with the law of conservation of charge.?

10. Derive expression for potential at a point due to an electric dipole?

11. Four point charges $q_{A=}2$ μC, $q_b=-5$μC, $q_c=2$μC, and qD=-5μC are located at the corners of a square ABCD of side 10 cm. What is the force on a charge of 1μC placed at the centre of the square?

12. a) Derive expression for energy stored in a capacitor
    b) Derive expression for energy Density of a capacitor

13. Derive expression for common potential and loss of energy of capacitors by sharing charges?

14. An electric dipole with dipole moment $4x10^{-9}$ coulomb is aligned at 30^0 with the direction of uniform electric field of magnitude 5 x 10^4 N/c. calculate the torque acting on the dipole?

15. Draw the equipotential surface for two identical positive charges separated by a small distance "d"?

16. Two point charges 3μc,-3μc are located 20 cm apart in vacuum.
   A) What is the electric field at the midpoint of the line joining the two charges ?
   b) If negative test charge of magnitude 1.5 x 10^{-19}c is placed at this point, what is the force, Experienced by the test charge?

17. (A) An electrostatic field line is a continuous curve. That is, a field line cannot have sudden breaks. Why not?
     (B) Explain why two field lines never cross each other at any point?

18. Two large, thin metal plates are parallel and close to each other. On their inner faces, the plates have surface charge densities of opposite signs and of magnitude 17.0 x 10^{-22}C/m^2 What is E: (A) in the outer region of the first plate,
   (B) In the outer region of the second plate and
   (C) Between the plates?

19. A system has two charges q_A =2.5 x 10^{-7} C and q_B= -2.5 x 10^{-7}C located at points ,
     A: (0, 0,-15 cm) and B:((0,0, +15 cm)respectively. What are the total charge and
     Electric dipole moment of the system? Find the potential at 4 cm distance from origin along X and Y axis .

20. An infinite line charge produces a field of 9 X 10^4 N/C at a distance of 2 cm.
     Calculate the linear charge density?

21. Suppose the spheres A and B in have charge on each is 6.5x10^{-7} C? Have identical sizes.
     A third sphere of the same size but uncharged is brought in contact with first, and then brought in contact with the second. And finally removed from both.What is the new force of repulsion between A and B?

22. Consider a uniform electric field E=3x10^3 i N/C.
     (A) What is flux of this field through a square of side 10 cm on a face whose plane is parallel to the" yz" plane?
     (B) What is the flux through the same square if the normal to its plane makes a60^0 angle with the x-axis?
     (C)What is the net flux of the uniform electric field of E=3x10^3 i N/C through a cube of side 20 cm oriented so that its faces are parallel to the coordinate planes?

23. An electric dipole is held in a uniform electric field.
   (A) Using suitable diagram show that it does not undergo any translator motion and
   (B)Derive an expression for torque acting on it and specify its directions?
   (C) Derive an expression for the work done in rotating an electric dipole in an Uniform electric field?

24. A point charge of 2.0 μC is at the centre of a cubic Gaussian surface 9.0 cm on edge. What is the net electric flux through the surface?

25. A point charge causes an electric flux of -1.0×10 Nm^2/C to pass through a spherical Gaussian Surface of 10.0 cm radius centred on the charge.

(A) If the radius of the Gaussian surface were doubled, how much flux would pass through the surface?

   (B) What is the value of the point charge?

26.A conducting sphere of radius 10 cm has an unknown charge. If the electric field 20 cm from the centre of the sphere is 1.5×10^3 N/C and points radially inward. What is the net charge on the sphere?

27. A uniformly charged conducting sphere of 2.4 m diameter has a surface charge density of 80.0 $\mu C/m^2$.

   (A) Find the charge on the sphere.

   (B)What is the total electric flux leaving the surface of the sphere?

28. Complete all previously asked questions in CBSE Exam from chapter wise or Exam Idea. For chapters 1,2 and 3.

CHEMISTRY

THE SOLID STATE

1. Account for the following:-

   i) Why does presence of excess of lithium makes LiCl crystal pink ?

   ii) A solid with solid crystal is made up of two elements P&Q .atoms of Q are at the corners of the cube and Pat the body centre .What is the formula of the compound?

2. i) What are n-type semiconductors

   ii) How may the conductivity of an intrinsic semiconductor be increased.

3. Copper crystallises with fcc unit cell. If the radius of copper atom is 127.8pm. Calculate the density of copper metal. (Atomic mass of Cu is 63.55 g)

4. i) Schottky defects lowers the density of related solids .

   ii) Conductivity of silicon increases on dopping with phosphorus.

5. Which stichiometric defect does not change the density of crystyal?

6. a)What change occurs when AgCl is doped with $CdCl_2$?

   b) What type of semiconductor is produced when silicon is doped with Boron .

7. Solid A is very hard electric insulator in solid as well as in molten state and melts at an extremely high temperature .what type of solid is it.

8. KF has ccp structure .calculate the radius of unit cell .if the side of the cube is edge length is 400 pm .how many F- ions and octahedral voids are there in this unit cell .Why is frankel defect found in AgCl.

9. An element X with aqn atomic mass 60 g/mol .has density of 6.23 g cm-3 .if the edge length of its cubic unit cell is 400 pm .identify the cubic unit cell .

10. In a crystalline solid anion B are arranged in ccp .A are equally distributed between octahedral and tetrahedral voids .if all the octahedral voids are occupied .what is the formula of the solid .
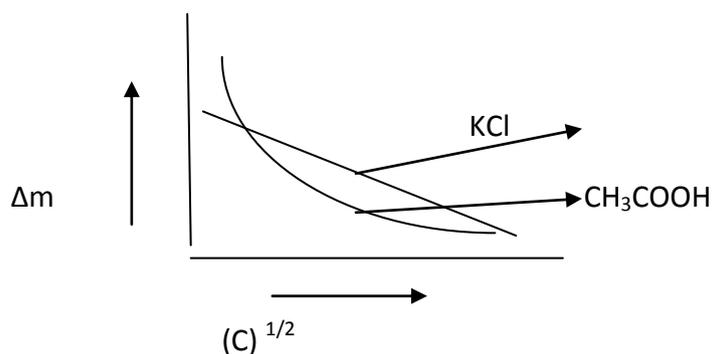
SOLUTION

1. Explain the following:

   i) Henry's Law about dissolution of a gas in a liquid.

   ii) Boiling point elevation constant for a solvent.

2. The molecular masses of polymers are determined by osmotic pressure method and not by measuring other colligative properties. Give two reasons.

3. Differentiate between molarity and molality for a solution. What is the effect of change in temperature on molarity and molality values.

4. Explain the following:

   i) Azeotropes   ii) Reverse osmosis

5. A solution of glycerol ($C_3H_8O_3$) in water was prepared by dissolving some glycerol in 500g of water this solution has a boiling point of 100.42◦C ,what mass of glycerol was dissolved to make this solution?
   (kb for water = 0.512Kkg mol^{-1})

6. The vapor pressure of pure liquids a and B are 450 and 700 mm Hg Respectively at 350k. Find out the composition of the liquid mixture if total vapour pressure is 600 mm hg. Also find the composition of the vapour phase.

7. Calculate the boiling point of the one molar aqueous solution (density 1.06g/ml) of KBr.[Given: kb for H_2O = 0.52K kg mole^{-1}, atomic masses of k=39.Br=80]

8. At 300K, 36g of glucose, $C_6H_{12}O_6$ present per liter in its solution has an osmatic pressure of 4.98 bar . If the osmotic pressure of another glucose solution is 1.52 bar at the same temperature, calculate the concentration of the other solution.

9. I) if the van't Hoff factor of $CaCl_2$ is 1.5, calculate the degree of dissociation of $CaCl_2$.

   II) At high altitude, people suffer from a disease called anoixia , in this disease , they become weak and cannot think clearly.

10. 2g of benzoic acid (C_6H_5COOH) dissolved in 25g of benzene shows a depression in f.p equal to 1.62k. Molar depression constant for benzene is 4.9Kkg mole^{-1}. What is the percentage association of acid if it forms dimer in Solution.

ELECTROCHEMISTRY

1. How much electricity is required in coulomb for the oxidation of 1mole of H_2O to O_2.

2. Define the following:-
   i) i Molar conductivity   ii)Secondary batteries

3. Calculate ΔG^O for the reaction,
   i) $Mg(s)+Cu^{2+}(aq)\rightarrow Mg^{2+}(aq) +Cu(s)$
   Given E^Ocell= +2.71V, 1F=96500 C mol^{-1}

4. Define the following terms:-
   i) Fuel cells   ii) Limiting molar conductivity (Λ_m^o)

5. Express the relation among cell constant,resistance of the solution in the cell and conductivity of the solution. How is molar conductivity of a solution related to its conductivity.

6. The molar conductivity of a1.5 M solution of an electrolyte is found to be 138.9Scm^{2}mol$^-$^{1}.Calculate the conductivity of the solution .

7. The Emf of a cell corresponding to the relation
   $Zn(s)+2H^+\rightarrow Zn^{2+}(0.1m) +H_2$ (1atm) is 0.28V at 25°C .
   i) Write symbolic representation of the cell.
   ii) Calculate the pH of the solution .

8. If a current of 0.5 amp. Flows through a metallic wire for two hours ,then how many electrons would flow through the wire .

9. Write the reaction taking place during discharge and recharge of a lead storage battrery.

10. Using Kohlrausch's law how can you determine the limiting molar conductivity of water (Λ_m^o).

11. Define the term molar conductivity.How it is related to conductivity of given solution.

12. How much electricity in terms of Faraday is required to produce.

13. i)20g of Ca from molten $CaCl_2$.
    ii)25g of Al from molten Al_2O_3.   iii)1M of $Cr_2O_7^{2-}$ to Cr^{3+}

14. In the cell used in watches following reaction takes place.
    $Zn(s) + Ag_2O + H_2O \longrightarrow Zn^{2+}(aq) + 2Ag(aq) + OH^-(aq)$
    Determine E^ocell, ΔG^o and K_C for the reaction.
    $E^oAg^+/Ag =0.34V$ and $E^oZn^{2+}/Zn =-0.76V$.

15. a) Describe the construction of H_2O_2 fuel cell and the reaction taking place in it .
    b)StateKohlrausch's law of independent migration of ions .Write an expression for the molar conductivity of acetic acid at infinite dilutionaccording toKohlrausch law.

16. The following reaction occurs in electrochemical cell :-
    $Mg(s)+ 2Ag^+(0.0001m) \longrightarrow Mg^{2+}(0.130m)+2Ag(s)$
    Given, $E^O Mg^{2+}/Mg =-2.36V$ and $E^OAg^+/Ag=0.80V$
    a)Write symbolic representation of half cells, net cell reaction and cell representation.
    b)Calculate E cell.

17. An aqueous solution ofcoppersulphate,was electrolysed between platinum electrodes using a current of 0.1287ampere for 50 minutes.Calculate mass of copper deposited at cathode
    ($1F=96500Cmol^{-1}$,Mass of $Cu=63.5gmol^{-1}$).

18. Conductivity of 0.00241m acetic acid is $7.896 \times 10^{-5}s\ cm^{-1}$. Calculate its molar conductivity, if Λ_m^O for acetic acid is $390.5scm^2mol^{-1}$.Find out its dissociation constant.

19. Explain type of cell which was used in Appolo space programme for providing electrical power.

20. The following curve is obtained when molar conductivity is plotted against the square root of concentration $C^{1/2}$ for two electrolytes A & B.
    a) What can you say about the nature of two electrolytes A &B.b) How do they vary when the concentration of the electrolyte in the solution decreases.

The electrical resistance of column of 0.05m NaOH solution of diameter 1 cm & length 50 cm is 5.55×10^3ohm.Calculate its resistivity ,conductivity and molar conductivity.
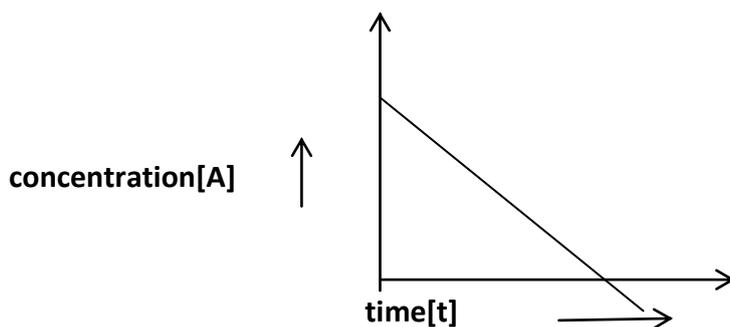
CHEMICAL KINETICS

20. a) A reaction is 50% complete in 2 hours and 75% complete in 4hours. What is the

order of the reaction?

b) A reaction is of second order with respect to a reactant. How is the rate of reaction affected if the concentration of the reactant is reduce to half?

21.

For a general reaction A→ B, plot of concentration of A vs time is given in the above figure. Now answer the following.

    a) What is the order of the reaction?
    b) What is the slope of the curve?
    c) What is the unit of rate constant?

23. Explain the terms
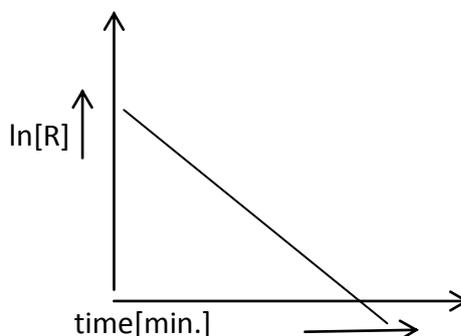
    a) Order of a reaction
    b) Molecularity of a reaction
    c) Activation energy.
    b) Write the differences between order and molecularity

24. a) The rate constant for a first order reaction is $60 \ S^{-1}$. How much time will it take to reduce the initial concentration of the reactant to its 1/16 th value?
   b) The decomposition of a hydrocarbon follows the equation
    $k=(4.5 \times 10^{11} S^{-1}) e^{-(28000k)/T}$. Calculate E_a.

OR

For a chemical reaction variation in concentration, ln[R] vs time(min.) plot is shown below:

    a) What is the order of the reaction?
    b) What are units of rate constant, K for the reaction?

c) If initial concentration of the reactant is half of the original concentration, how will $T_{1/2}$ change?

d) Draw the plot of $\log[R_0]/[R]$ vs time(s).

25. The rate constant for the decomposition of N_2O_5 at various temperature is given below:

T^0C	0	20	40	60	80
$10^5 x k/s^{-1}$	0.0787	1.70	25.7	178	2140

Draw a graph between ln k and 1/T and calculate the values of A and E_a.

Predict the rate constant at 30^0C and 50^0C.

BIOLOGY

Q1. Define juvenile phase, reproductive phase, senescent phase

Q2. Identify each part in a flowering plant and write whether it is haploid(n) or diploid(2n)

i) ovary ii) anther iii) egg iv) pollen v) male gamete vi) zygote

Q3. Differentiate between self pollination and cross pollination with examples.

Q4. Explain microsporogenesis with well labelled diagram

Q5. Explain megasporognesis with help of diagram

Q6. Differentiate between chasmogamous and cleistogamous flowers.

Q7. Describe the events in sexual reproduction in general.

Q8. Explain the packaging of DNA in eukaryotes.

Q9. Write a note on chargaff's rule.

Q10. If the sequence of one strand in DNA is

5' ATGCATGCATGCATGCATGCATGC 3'

a) Write down the complementary strand 5'→3' direction.

Q11. Describe the process of formation of nucleotides

Q12. Briefly describe Griffith's experiment on bacterial transformation.

Q13. Explain central dogma.

COMPUTER SCIENCE

Chapter 1

Short Answer Questions

Do Q18,Q19,Q20,Q21,Q22,Q23,Q24,Q25,Q26,Q31,Q32

Chapter 2

Discuss OOP concepts. How are these implemented in software terms in C++?

Chapter 3

Short Answer Questions

Do Q1,Q4,Q5

Chapter 4

Long Answer Questions

Do Q1,Q2,Q3,Q4,Q5,Q6,Q7,Q8