



KRISHNA PUBLIC SCHOOL INTERNATIONAL

Holiday Home Work 2019-20

Class - XII

Subject – Science

English:

1. Collect 5 commercial ads from English newspapers and stick it in your copy.
2. Design invitation card for a function at your home.
3. Read a book of A P J Abdul Kalam Ignited Soul or any other book of your interest and make a book review.

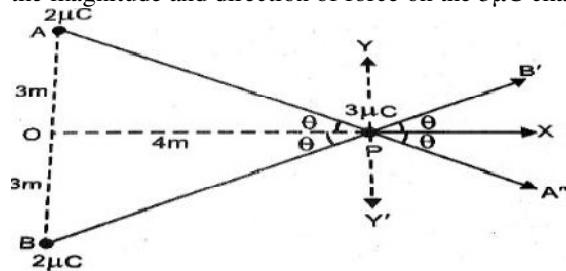
Computer:

1. Write a program to input a number and print its square root.
2. Write a program that asks the user to input number of seconds and then express it in terms of many minutes and second it contains.
3. What is cloud? What is cloud computing?
4. What is Internet of Things?
5. Write a short note on IPv4 & IPV6 addressing?

Physics:

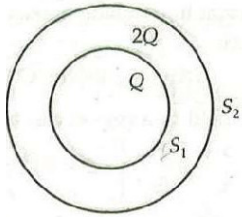
CHAPTER -1: ELECTRIC CHARGES AND FIELDS

1. A free pith-ball A of 8 g carries a positive charge of $5 \times 10^{-8}C$. What must be the nature and magnitude of charge that should be given to a second pith-ball B fixed at 5 cm below the former ball so that the upper ball is stationary?
2. Two equal positive charges each of $2\mu C$ interact with a third positive charge of $3\mu C$ situated as shown. Calculate the magnitude and direction of force on the $3\mu C$ charge.



3. Two fixed point charges $+4e$ and $+e$ units are separated by a distance a . where should the third point charge be placed for it to be in equilibrium?
4. S1 and S2 are two hollow concentric spheres enclosing charges Q and $2Q$ respectively as shown in fig
(i) What is the ratio of the electric flux through S1 and S2 ?

(ii) How will the electric flux through the sphere S_1 change, if a medium of dielectric constant 5 is introduced in the space inside S_1 in place of air ?



5. An electric field is uniform, and in the positive x direction for positive x and uniform with the same magnitude in the negative x direction for negative x . It is given that a right circular cylinder of length 20 cm and radius 5 cm has its centre at the origin and its axis along the x -axis so that one face is at $x = +10$ cm and the other is at $x = -10$ cm

i) What is the net outward flux through each flat face ?

ii) What is the flux through the side of the cylinder ?

iii) What is the net outward flux through the cylinder ?

iv) What is the net charge inside the cylinder

6. Derive an expression of electric field intensity at a point on equatorial axis of an electric dipole.

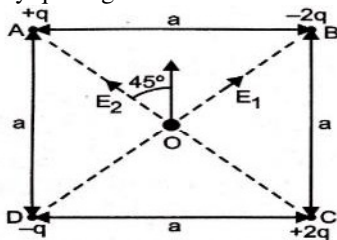
7. Show that the force on each plate of a capacitor has a magnitude equal to $QE/2$, where Q is the charge on the capacitor and E is the magnitude of the electric field between the plates of the capacitor. Explain the origin of factor $1/2$.

8. Two small identical electrical dipoles AB and CD , each of dipole moment ' p ' are kept at an angle of 120° as shown in Fig. What is the resultant dipole moment of this combination? If this system is subjected to electric field (E) directed along $+X$ direction, what will be the magnitude and direction of the torque acting on this.

9. Two small spheres each of mass " m " kg and charge q coulomb are suspended from a point by insulating threads each of 1 metre length, but of negligible mass. If θ is the angle which each string makes with the vertical when equilibrium has been reached, show that $q^2 = 4mgl \sin 2\theta \tan \theta$ ($4\pi\epsilon_0\theta$)

10. Two small charged spheres contain charges $+q_1$ and $+q_2$ respectively. A charge dq is removed from sphere containing charge q_1 and is transferred to the other. Find the charge on each sphere for maximum electric force between them.

11. Two opposite corners of a square carry Q charge each and the other two opposite corners of the same square carry q charge each. If the resultant force on q is zero, how are Q and q related?



12. Two-point charges $+q$ and $-2q$ are placed at the vertices B and C of an equilateral triangle ABC of side a . Obtain the expression for magnitude and direction of resultant electric force at the vertex A due to these two charges.

13. A pendulum bob of mass 80 milligram and carrying a charge of $2 \times 10^{-8} C$ is at rest in a horizontal uniform electric field of $2 \times 10^4 Vm^{-1}$. Find the tension in the thread of the pendulum and the angle it makes with the vertical. What are the magnitude and direction of electric field at centre of the square, if $q = 1.0 \times 10^{-8} C$ and $a = 5cm$?

14. What are the magnitude and direction of electric field at centre of the square in fig, if $q = 1.0 \times 10^{-8} C$ and $a = 5cm$

15. Two charges $-q$ are each fixed separated by a distance $2d$. A third charge q of mass m placed at the midpoint is displaced slightly by x ($x \ll d$) perpendicular to the line joining the two fixed charges. Show that q will perform simple harmonic oscillation of time period

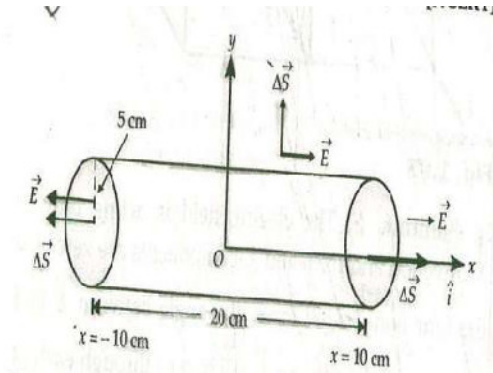
$$T = \left[\frac{8\pi^3 \epsilon_0 m d^3}{q^2} \right]^{1/2}$$

16. State Gauss's Theorem in electrostatics. Using this theorem derive an expression of electric field intensity due to a line charge..

17. (a) Define electric flux .Write its SI units.

(b) Using Gauss's law , prove that the electric field at a point due to a uniformly charges infinite plane sheet is independent of the distance from it.

(c) How is the field directed if (i) the sheet is positively charged , (ii) negatively charged ?



18.Obtain the formula for the electric field due to a long thin wire of uniform linear charge density λ without using Gauss's law. [Hint: use coulombs' law directly and evaluate necessary integral.].

CHAPTER – 2 : ELECTRIC POTENTIAL AND CAPACITANCE

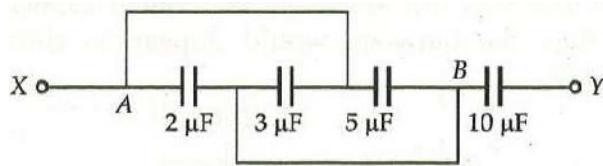
1. Can a metal sphere of radius 1 cm hold a charge of 1 coulomb? Justify your answer ?

2. Is the electrostatic potential necessarily zero at a point where the electric field strength is zero ? Give an example to illustrate your answer

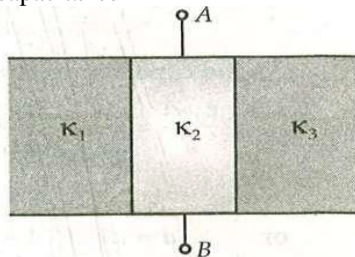
3. Work done by an electrostatic field is independent of the path followed between two points. Justify

4. Define the term polarisation of a dielectric medium. Write its S.I unit.

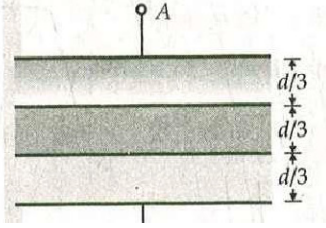
5. Four capacitors are connected as shown in the Fig.. Calculate the equivalent capacitance between the points X and Y.



6. The space between the plates of a parallel plate capacitor of capacitance C is filled with three dielectric slabs of equal thickness as shown in Fig. If the dielectric constants of the three slabs are K_1 , K_2 , and K_3 find the new capacitance



7. The space between the plates of a parallel plate capacitor of capacitance C is filled with three dielectric slabs of equal thickness as shown in Fig. If the dielectric constants of the three slabs are K_1 , K_2 , and K_3 find the new capacitance.



8. Two charges $-q$ and $+q$ are located at point $A(0,0,-a)$ and $B(0,0,+a)$ respectively. How much work is done in moving a test charge from point $P(7,0,0)$ to $Q(3,0,0)$?

9. A capacitor is charged to potential V_1 . The power supply is disconnected and the capacitor is connected in parallel to another uncharged capacitor.

i) Derive the expression for the common potential of the combination of capacitors.

ii) Show that total energy of the combination is less than the sum of the energy stored in them before they are connected.

10. Deduce the expression for the potential energy of a system of two charges q_1 and q_2 located r_1 and r_2 respectively in an external field.

11. A $2\mu\text{F}$ capacitor with a dielectric slab ($K=5$) between its plates is charged to 100V and then isolated .

(i) What will be the p.d if the dielectric is removed ?

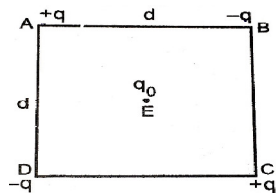
(ii) How much work would be done in removing the dielectric ?

12. Four point charges $+1\mu\text{C}$, $+1\mu\text{C}$, $-1\mu\text{C}$ and $-1\mu\text{C}$ are placed at the corners of A, B, C and D of a square each of side 0.1m

(i) Calculate potential at the centre O of the square

(ii) If E is the middle point of BC, what is the work done in carrying an electron from O to E?

13. Four charges are arranged at the corners of a square ABCD of side d as shown. Find the work required to put together this arrangement. A charge q_0 is brought to the centre E of the square, the four charges being held fixed at the corners. How much extra work is needed to do this?



14. Consider a uniform electric field $E=3 \times 10^3 \hat{i} \text{ NC}^{-1}$. Calculate the flux of this field through a square surface of area 10 cm^2

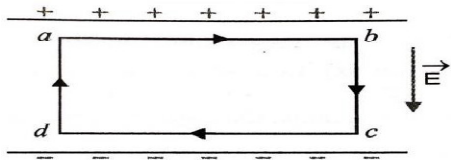
(i) When its plane is parallel to Y-Z plane

(ii) When normal to its plane makes an angle 60° with x axis

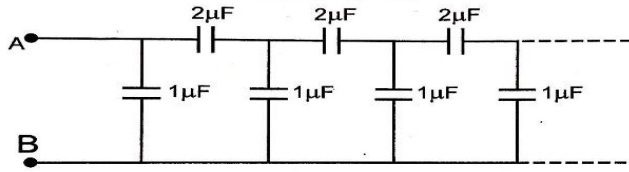
15. An infinitely long positively charged wire has a linear charge density $\lambda \text{ cm}^{-1}$. An electron is revolving around the wire as its centre with a constant velocity in the circular plane perpendicular to the wire. Deduce the expression for KE of the electron. Plot a graph of KE as a function of charge density λ .

16. Two capacitors of unknown capacitances C_1 and C_2 are connected first in series and then in parallel, across a battery of 100V . If the energy stored in the two combinations is 0.045J and 0.25J respectively, determine the values of C_1 and C_2 . Also calculate the charge on each capacitor in parallel combination.

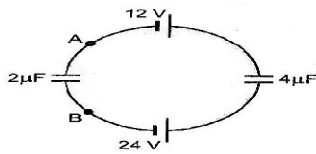
17. The electric field inside a parallel plate capacitor is E . Find the amount of work done in moving a charge q over a closed rectangular loop abcd.



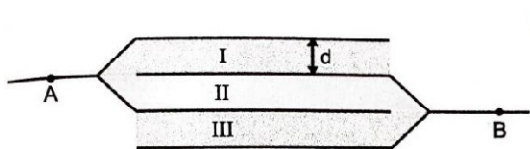
18. Find the equivalent capacitance of the ladder between points A and B.



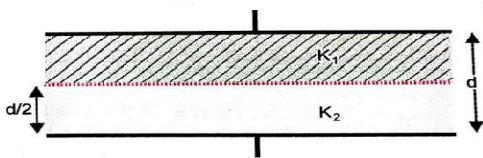
19. Find the p.d between points A and B of arrangement shown in fig.



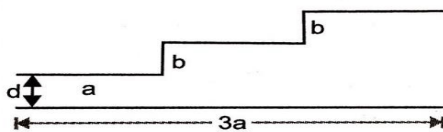
20. What is the capacitance of arrangement of 4 plates each of area A at a distance d in air?



21. A parallel plate capacitor is filled with dielectrics as shown. What is its capacitance?



22. A capacitor is made of a flat plate of area A and a second plate having a stair like structure as shown. The width of each stair is a and b. Find the capacitance of the assembly?

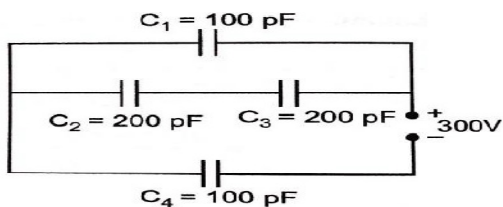


23. A spherical conducting shell of inner radius r_1 and outer radius r_2 has a charge Q.

(a) A charge q is placed at the centre of the shell. What is the surface charge density on the inner and outer surfaces of the shell?

(b) Is the electric field intensity a cavity (with no charge) zero, even if the shell is not spherical but has any irregular shape? Explain.

24. Obtain equivalent capacitance of the following network. For a 300V supply, determine the charge and voltage across each capacitor



1. Complete your project for class XII AISSCE examination.
(Topic given in the class for each student)
2. Read all NCERT questions for P block element .

Chemistry:

ASSIGNMENT 1

VERY SHORT ANSWER TYPE QUESTIONS:

(OF ONE MARK EACH)

1. What do you mean by Colligative Properties?
2. Define osmotic pressure.
3. Why is an increase in temperature observed on mixing Chloroform with Acetone?
4. State Raoult's law for a binary solution containing volatile components.
5. Why is osmotic pressure considered as a colligative property.
6. Out of 1M solution of sugar and 1M solution of urea which will have greater boiling point ?
7. Why do doctors advise gargles by saline water in case of sore throat?
8. Give an example of nearly ideal solution?
9. What are maximum boiling azeotropes? Give one example.
10. Why is the cooking temperature in pressure cooker higher than in open pan?
11. A and B liquids on mixing produced a warm solution .Which type of deviation is there and why?
12. Give reason when 30 ml of ethyl alcohol and 30ml of water are mixed the volume of resulting solution is more than 60ml.
13. When is the value of Vant Hoff factor more than one?
14. Give an example of a compound in which hydrogen bonding results in the formation of a dimer.
15. What are isotonic solutions?

SHORT ANSWER TYPE QUESTIONS: (OF 2 MARKS EACH)

16. Name two factors on which the vapour pressure of the liquid depends.
17. What type of non idealities are exhibited by cyclohexane –ethanol and acetone chloroform mixture? Give reasons for your answer.
18. The solution of a non volatile solute boils at higher temperature than the pure solvent .Show this relationship on a graphic diagram.
19. For determining molar masses of macromolecular substances in solutions the osmotic pressure measurement method is preferred over measurement method of any other colligative property of solution. Give two reasons for it.

20. Explain with a suitable diagram and appropriate examples why some non ideal solutions show positive deviation from ideal behaviour.
21. How is relative lowering of vapour pressure defined for a solution consisting of volatile solvent and non volatile solute? How is this function related to the mole fraction of the solvent and of the solute?
22. Amongst the following compounds, identify which are insoluble, partially soluble and highly soluble in water?

(i) Phenol	(ii) NaClO_4 and Water
(iii) methanol and acetone	(iv) I_2 and CCl_4
(v) acetonitrile (CH_3CN) and acetone ($\text{C}_3\text{H}_6\text{O}$)	
24. 0.6ml of acetic acid (CH_3COOH), having density 1.06 g ml^{-1} , is dissolved in 1 litre of water. The depression in freezing point observed for this strength of acid was 0.0205°C . Calculate the van't Hoff factor and the dissociation constants of acid.
25. Vapour pressure of pure water at 298K is 23.8 mm Hg . 50 g of urea (NH_2CONH_2) is dissolved in 850g of water. Calculate the vapour pressure of water for this solution and its relative lowering.
26. 100g of liquid A (molar mass 140 g mol^{-1}) was dissolved in 1000g of liquid B (molar mass 180 g mol^{-1}). The vapour pressure of pure liquid B was found to be 500 torr. Calculate the vapour pressure of pure liquid A and its vapour pressure in the solution if the total vapour pressure of the solution is 475 torr.
27. Determine the osmotic pressure of a solution prepared by dissolving 25 mg of K_2SO_4 in 2 litres of water at 25°C , assuming that it is completely dissociated.
28. What role does the molecular interaction play in solution of alcohol and water?
29. Why do gases always tend to be less soluble in liquids as the temperature is raised?
30. With the help of suitable diagrams explain positive and negative deviations from Raoult's law?

SHORT ANSWER TYPE QUESTIONS: (OF 3 MARKS EACH)

31. State Henry's law and mention some of its important applications?
32. Why is Ether not miscible in Water?
33. What are Hypertonic and Hypotonic Solutions?
34. What factors are responsible for deviations from Raoult's law?
35. How is osmotic pressure dependent upon number of moles of solute?
36. How is molality of solution different from its molarity?
37. Two liquids X and Y boil at 110°C and 130°C respectively, which of them has higher vapour pressure at 50°C ?
38. Why is the cooking temperature in a pressure cooker higher than in an open pan?
39. State the condition resulting in reverse osmosis?
40. What is antifreeze and also give an example?

LONG ANSWER TYPE QUESTION: (OF 5 MARKS EACH)

41. Explain giving examples the term colligative molality. Why do we sometimes get abnormal molecular masses of the substances using colligative properties of the solution?
42. Phenol associates in benzene to a certain extent to form dimer. A solution contains $20 \times 10^{-3} \text{ kg}$ of phenol in 1kg of benzene has its freezing point decreased by 0.61 K . Calculate the fraction of phenol that has dimerised. (K_f for benzene = 5.512)
43. The osmotic pressure of blood is 8.21 atm at 37°C . How much glucose should be added per litre for an intravenous injection that is at same osmotic pressure as blood?
44. Explain giving examples the term Colligative Molality? Why do sometime we get abnormal molecular masses of substance using colligative property?

45. Vapour pressure of pure Acetone and Chloroform at 328K are 741.8 mm Hg and 632.8 mm Hg respectively. Assuming that they form ideal solution over the entire range of composition whether it is positive or negative deviation from the ideal solution?

Mathematics:

Chapter 1 RELATIONS AND FUNCTIONS

Topic-1 (Relations)

Very Short Answer Type Questions (1 mark each)

- Q.1. If $R = \{(x, y): x + 2y = 8\}$ is a relation on N , write the range of R .
- Q.2. Let $R = \{(a, a^3): a \text{ is a prime number less than } 5\}$ be a relation. Find the range of R .
- Q.3. Let R be the equivalence relation in the set $A = \{0, 1, 2, 3, 4, 5\}$ given by $R = \{(a, b): 2 \text{ divides } (a - b)\}$. Write the equivalence class $[0]$.
- Q.4. State the reason why the relation $R = \{(a, b): a \leq b^2\}$ on the set R of real numbers is not reflexive.
- Q.5. Let $A = \{1, 2, 3, 4\}$. Let R be the equivalence relation on $A \times A$ defined by $(a, b)R(c, d)$ if $a + d = b + c$. Find the equivalence class $[(1, 3)]$.
- Q.6. State the reason for the relation R in the set $\{1, 2, 3\}$ given by $R = \{(1, 2), (2, 1)\}$ not to be transitive.

Short Answer Type Questions (2 marks each)

- Q.1. Define Reflexive Relation. Give one example.
- Q.2. Define Symmetric Relation. Give one example.
- Q.3. Define Transitive Relation. Give one example.
- Q.4. Give one example of a relation which is
- (i) Reflexive, Symmetric and Transitive,
 - (ii) Reflexive, Symmetric and not Transitive.

Long Answer Type Questions-I (4 marks each)

- Q.1. Show that the relation R in the set $N \times N$ defined by $(a, b)R(c, d)$ if $a^2 + d^2 = b^2 + c^2$ $\forall a, b, c, d \in N$ is an equivalence relation.
- Q.2. Let R be the relation defined on the set of natural numbers N as follows :

$$R = \{(x, y): x, y \in N \text{ and } 2x + y = 24\}$$

Find the domain and range of the relation R . Also, find if R is an equivalence relation or not.

Q.3. Let $A = \{1, 2, 3, \dots, 9\}$ and R be the relation in $A \times A$ defined by $(a, b)R(c, d)$ if $a + d = b + c$ for $(a, b), (c, d) \in A \times A$. Prove that R is an equivalence relation. Also obtain the equivalence class $[(2, 5)]$.

Q.4. Let $f: X \rightarrow Y$ be a function. Define a relation R on X given by $R = \{(a, b): f(a) = f(b)\}$. Show that R is an equivalence relation?

Q.5. If Z is the set of all integers and R is the relation on Z defined as $R = \{(a, b): a, b \in Z \text{ and } (a - b) \text{ is divisible by } 5\}$. Prove that R is an equivalence relation.

Q.6. Show that the relation S in the set R of real numbers defined as $S = \{(a, b): a, b \in R \text{ and } a \leq b^3\}$ is neither reflexive nor symmetric nor transitive.

Q. 7. Show that the relation S in set $A = \{x \in Z : 0 \leq x \leq 12\}$ given $S = \{(a, b): a, b \in A, |a - b| \text{ is divisible by } 4\}$ is an equivalence relation. Find the set of all elements related to 1.

Q. 8. Show that the relation S defined on set $N \times N$ by $(a, b)S(c, d) \Rightarrow a + d = b + c$ is an equivalence relation.

Q. 9. If $f: X \rightarrow Y$ is a function. Define a relation R on X given by $R = \{(a, b): f(a) = f(b)\}$. Show that R is an equivalence relation on X .

Q. 10. Prove that the relation R in set $A = \{1, 2, 3, 4, 5\}$ given by $R = \{(a, b): |a - b| \text{ is even}\}$ is an equivalence relation.

Long Answer Type Questions-II (6 marks each)

Q. 1. Let N denote the set of all natural numbers and R be the relation on $N \times N$ defined by $(a, b)R(c, d)$ if $ad(b + c) = bc(a + d)$. Show that R is an equivalence relation.

Q. 2. Show that the relation R in the set $A = \{1, 2, 3, 4, 5\}$ given by $R = \{(a, b): |a - b| \text{ is divisible by } 2\}$ is an equivalence relation. Write all the equivalence classes of R .

Topic-1 (Functions)

Very Short Answer Type Questions (1 mark each)

Q. 1. If $f: R \rightarrow R$ defined as $f(x) = \frac{2x-7}{4}$ is an invertible function, write $f^{-1}(x)$.

Q. 2. If $A = \{1, 2, 3\}$, $B = \{4, 5, 6, 7\}$ and $f = \{(1, 4), (2, 5), (3, 6)\}$ is a function from A to B . State whether f is one-one or not.

Q. 3. If f is an invertible function, defined as $f(x) = \frac{3x-4}{5}$, then write $f^{-1}(x)$.

Q. 4. What is the range of the function $f(x) = \frac{|x-1|}{x-1}$, $x \neq 1$?

Q. 5. If the function $f: R \rightarrow R$ defined by $f(x) = 3x - 4$ is invertible, then find f^{-1} .

Q. 6. If $f: R \rightarrow R$ defined by $f(x) = \frac{3x+5}{2}$ is invertible function, then find $f^{-1}(x)$.

Short Answer Type Questions (2 marks each)

Q. 1. What is mean by one-one function.

Q. 2. $f(x) = x^2$, $x \in R$. Find $\frac{f(2.1)-f(2)}{2.1-2}$.

Q. 3. Draw the graph of function $f(x) = a^x$, $x \in R$.

Long Answer Type Questions-I (4 marks each)

Q. 1. Let $A = R - \{3\}$, $B = R - \{1\}$. Let $f: A \rightarrow B$ be defined by $f(x) = \left(\frac{x-2}{x-3}\right) \forall x \in A$. Then show that f is bijective. Also, find (i) x , if $f^{-1}(x) = 4$ (ii) $f^{-1}(7)$.

Q. 2. Let $f: W \rightarrow W$ be defined as $f(n) = \begin{cases} n + 1, & \text{if } n \text{ is even} \\ n - 1, & \text{if } n \text{ is odd} \end{cases}$

Show that f is invertible. Find the inverse of f , where W is the set of all whole numbers.

Q. 3. Let $A = R - \{2\}$, $B = R - \{1\}$. If $f: A \rightarrow B$ is a function defined by $f(x) = \left(\frac{x-1}{x-2}\right)$, show that f is one-one and onto. Hence find f^{-1} .

Q. 4. Show that the function f in $A = R - \left\{\frac{2}{3}\right\}$ defined as $f(x) = \frac{4x+3}{6x-4}$ is one-one and onto. Hence find f^{-1} .

Q. 5. Consider $f: R_+ \rightarrow [4, \infty)$ given by $f(x) = x^2 + 4$. Show that f is invertible with the inverse f^{-1} of f given by $f^{-1}(y) = \sqrt{y - 4}$, where R_+ is the set of all non-negative real numbers.

Q. 6. Let $f: N \rightarrow N$ be defined as

$$f(x) = \begin{cases} \frac{n+1}{2}, & \text{when } n \text{ is odd} \\ \frac{n}{2}, & \text{when } n \text{ is even} \end{cases}$$

For all $n \in N$. State whether the function f is bijective. Justify your answer.

Q. 7. Show that $f: N \rightarrow N$, given by $f(x) = \begin{cases} x + 1, & \text{if } x \text{ is odd} \\ x - 1, & \text{if } x \text{ is even} \end{cases}$ is both one-one and onto.

Q. 8. Show that a function $f: R \rightarrow R$ given by $f(x) = ax + b$, $a, b \in R, a \neq 0$ is a bijective.

Long Answer Type Questions-II (6 marks each)

Q. 1. Let $f: N \rightarrow N$ be a function defined as $f(x) = 9x^2 + 6x - 5$. Show that $f: N \rightarrow S$, where S is the range of f . Find inverse of f and hence find $f^{-1}(43)$ and $f^{-1}(163)$.

Q. 2. Show that the function $f: R \rightarrow \{x: x \in R, -1 < x < 1\}$ defined by $f(x) = \frac{x}{1+|x|}$, $x \in R$ is one-one and onto function. Hence find $f^{-1}(x)$.

Q. 3. Consider $f: R_+ \rightarrow [-5, \infty)$ given by $f(x) = 9x^2 + 6x - 5$. Show that f is invertible. Find $f^{-1}(x)$, where R_+ is the set of all non-negative real numbers.

Q. 4. Consider $f: R - \left\{-\frac{4}{3}\right\} \rightarrow R - \left\{\frac{4}{3}\right\}$ given by $f(x) = \frac{4x+3}{3x+4}$. Show that f is bijective. Find the inverse of f and hence find $f^{-1}(0)$ and x such that $f^{-1}(x) = 2$.

Q. 5. Let $f: R - 43 \rightarrow R$ be a function defined as $f(x) = \frac{4x}{3x+4}$. Show that, in $f: R - \left\{-\frac{4}{3}\right\} \rightarrow \text{Range of } f$, f is one-one and onto. Hence find f^{-1} . Range $f: R - \left\{-\frac{4}{3}\right\}$.

Q. 6. Consider $f: R^+ \rightarrow [-9, \infty)$ given by $f(x) = 5x^2 + 6x - 9$. Prove that f is invertible with

$$f^{-1}(y) = \left(\frac{\sqrt{54+5y} - 3}{5}\right) \quad [\text{where, } R^+ \text{ is the set of all non-negative real numbers}].$$

Topic-3 (Composite Functions)

Very Short Answer Type Questions (1 mark each)

Q. 1. Let $f: R \rightarrow R$ be defined by $f(x) = 3x^2 - 5$ and $g: R \rightarrow R$ be defined by $g(x) = \frac{x}{x^2+1}$. Find gof .

Q. 2. Let $f: \{1, 3, 4\} \rightarrow \{1, 2, 5\}$ and $g: \{1, 2, 5\} \rightarrow \{1, 3, 4\}$ given by $f = \{(1, 2), (3, 5), (4, 1)\}$

and $g = \{(1, 3), (2, 3), (5, 1)\}$. Write down gof .

Q. 3. If $f: R \rightarrow R$ is defined by $f(x) = 3x + 2$, then define $f[f(x)]$.

Q. 4. Write fog , if $f: R \rightarrow R$ and $g: R \rightarrow R$ are given by $f(x) = 8x^3$ and $g(x) = x^{1/3}$.

Q. 5. If $f: R \rightarrow R$ and $g: R \rightarrow R$ are given by $f(x) = \sin x$ and $g(x) = 5x^2$, then find $gof(x)$.

Q. 6. Write fog , if $f: R \rightarrow R$ and $g: R \rightarrow R$ are given by $f(x) = |x|$ and $g(x) = |5x - 2|$.

Q. 7. If $f(x) = 27x^3$ and $g(x) = x^{1/3}$, then find $gof(x)$.

Q. 8. If $f: R \rightarrow R$ be defined by $f(x) = (3 - x^3)^{1/3}$, then find $fof(x)$.

Short Answer Type Questions (2 marks each)

Q. 1. Let f and g be real valued functions given by $f(x) = \sqrt{x+4}$, $x \geq -4$ and $g(x) = \sqrt{x-4}$, $x \geq 4$. Find the function fg , $\frac{f}{g}$.

Q. 2. Let f and g be real valued functions given by $f(x) = x^2 + 1$, $x \in R$ and $g(x) = 2x + 1$, $x \in R$. Find the value of fog and gof .

Q. 3. Let $A = \{a, b, c\}$ and $B = \{1, 2, 3\}$. Find f^{-1} of the following function f from A to B , if it exists.

(i) $f = \{(a, 3), (b, 2), (c, 1)\}$.

(ii) $f = \{(a, 2), (b, 1), (c, 1)\}$.

Long Answer Type Questions (4 marks each)

Q. 1. Let $f, g : R \rightarrow R$ be two functions defined as $f(x) = |x| + x$ and $f(x) = |x| - x$ for all $x \in R$. Then find $f \circ g$ and $g \circ f$.

Q. 2. If the function $f : R \rightarrow R$ be given by $f(x) = x^2 + 2$ and $g : R \rightarrow R$ be given by $g(x) = \frac{x}{x-1}$, $x \neq 1$, find $f \circ g$ and $g \circ f$ and hence find $f \circ g(2)$ and $g \circ f(-3)$.

Q. 3. If $(x) = \frac{4x+3}{6x-4}$, $x \neq \frac{2}{3}$, then show that $f \circ f(x) = x$ for all $x \neq \frac{2}{3}$. What is the inverse of f ?

Q. 4. Let $f : N \rightarrow R$ be a function defined as $f(x) = 4x^2 + 12x + 15$. Then show that $f : N \rightarrow S$, where S is range of f , is invertible. Also find the inverse of f .

Q. 5. If the function $f : R \rightarrow R$ be defined by $f(x) = 2x - 3$ and $g : R \rightarrow R$ by $g(x) = x^3 + 5$, then find $f \cdot g$ and show that $f \cdot g$ is invertible. Also, find $(f \cdot g)^{-1}$, hence find $(f \cdot g)^{-1}(9)$.

Q. 6. If the function $f : R \rightarrow R$ is given by $f(x) = \frac{x+3}{3}$ and $g : R \rightarrow R$ is given by $g(x) = 2x - 3$, then find

(i) $f \circ g$ (ii) $g \circ f$. Is $f^{-1} = g$?

Q. 7. If the function $f : R \rightarrow R$ is given by $f(x) = x^2 + 3x + 1$ and $g : R \rightarrow R$ is given by $g(x) = 2x - 3$, then find

(i) $f \circ g$ (ii) $g \circ f$

Topic-4 (Binary Operations)

Very Short Answer Type Questions (1 mark each)

Q. 1. Let $*$: $R \times R \rightarrow R$, given by $(a, b) \rightarrow a + 4b^2$ is a binary operation. Compute $(-5) * (2 * 0)$.

Q. 2. Let $*$ be a binary operation, on the set of all non-zero real numbers, given by $a * b = \frac{ab}{5}$, for all $a, b \in R - \{0\}$. Find the value of x , given that $2 * (x * 5) = 10$.

Q. 3. State the reason for the following binary operation $*$, defined on the set of integers Z , to be not commutative. $a * b = ab^3$.

Q. 4. If the binary operation $*$ on the set of integers Z is defined by $a * b = a + 3b^2$, then find the value of $8 * 3$.

Q. 5. Let $*$ be a binary operation on N given by $a * b = LCM(a, b)$ for all $a, b \in N$. Find $5 * 7$.

Q. 6. The binary operation $*$: $R \times R \rightarrow R$, is defined as $a * b = 2a + b$. Find $(2 * 3) * 4$.

Q. 7. If the binary operation $*$ on the set of integers Z is defined by $a * b = a + b - 5$, then write the identity element for the operation $*$ in Z .

Q. 8. If $*$ is a binary operation on the set R of the real numbers defined by $a * b = a + b - 2$, then find the identity element for the binary operation $*$.

Q. 9. Determine whether the binary operation $*$ on the set N of natural numbers defined by $a * b = 2^{ab}$ is associative or not.

Q. 10. If the binary operation $*$ on the set of integers Z is defined by $a * b = 3a + 4b - 2$, then find the value of $4 * 5$.

Q. 11. If the binary operation $*$ on the set of integers Z is defined by $a * b = 2a + b - 3$. Find the value of $3 * 4$.

Q. 12. If the binary operation $*$ on the set of integers Z is defined by $a * b = a + 3b^2$, then find the value of $2 * 4$.

Q. 13. If the binary operation $*$ on the set of rational numbers Q , is defined by $a * b = 2a + b - ab$, for all $a, b \in Q$. Find the value of $3 * 4$.

Q. 14. If the binary operation $*$ on the set of natural numbers N is defined by $a * b = HCF(a, b)$, where $a, b \in N$. Write the value of $22 * 4$.

Q. 15. If the binary operation $*$ on the set of rational numbers Q is defined by $a * b = \frac{ab}{5}$, then

Write the identity for $*$, if any.

Short Answer Type Questions (2 marks each)

Q. 1. Find whether the following operations are binary operation or not

(i) $*$ on N defined by $a * b = a^b$ (ii) $*$ on Z^+ defined by $a * b = a^b$.

Q. 2. Let $*$ be a binary operation on the set R defined by $a * b = a + b + ab$, $a, b \in R$.

Solve the equation: $2 * (3 * x) = 33$.

Q. 3. Which of the following binary operations are commutative?

(i) $*$ on Z defined by $a * b = a^2 + b^2$, (ii) $*$ on Q defined by $a * b = a^2 + 2b$.

Q. 4. If the binary operation $*$ on the set of integers Z is defined by $a * b = 3a + b^2$, then

find the value of : (i) $4 * 3$ (ii) $5 * 2$.

Long Answer Type Questions-I (4 marks each)

Q. 1. Let S be the set of all rational numbers except 1 and $*$ be defined on S by $a * b = a + b - ab$, for all $a, b \in S$. Prove that (i) $*$ is a binary operation on S , (ii) $*$ is commutative as well as associative.

Q. 2. Consider the binary operation $*$ on the set $\{1, 2, 3, 4, 5\}$ defined by $a * b = \min(a, b)$. Write operation table of operation $*$.

Q. 3. If $*$ is a binary operation on Q , defined by $a * b = \frac{3ab}{5}$. Show that $*$ is commutative as well as associative. Also, find its identity, if it exists.

Q. 4. A binary operation $*$ on the set $\{0, 1, 2, 3, 4, 5\}$ is defined as $a * b = \begin{cases} a + b, & \text{if } a + b < 6 \\ a + b - 6, & \text{if } a + b \geq 6 \end{cases}$

Show that zero is the identity for this operation and each element ' a ' of the set is invertible with $6 - a$, being the inverse of ' a '.

Q. 5. Consider the binary operation $*$: $R \times R \rightarrow R$ and \circ : $R \times R \rightarrow R$ defined as $a * b = |a - b|$ and $a \circ b = a$. For all $a, b \in R$. Show that $*$ is commutative but not associative, ' \circ ' is associative but not commutative.

Q. 6. If $A = N \times N$ and $*$ is 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.

Long Answer Type Questions-II (6 marks each)

Q. 1. Let $A = R \times R$ and $*$ be a binary operation on A defined by $(a, b) * (c, d) = (a + c, b + d)$. Show that $*$ is commutative and associative. Find the identity element for $*$ on A . Also find the inverse of every element $(a, b) \in A$.

Q. 2. Show that binary operation $*$ on $A = R - \{-1\}$ defined as $a * b = a + b + ab$ for all $a, b \in A$, is commutative and associative on A . Also, find the identity element of $*$ in A and prove that every element of A is invertible.

Q. 3. Determine whether the operation $*$ define below on Q is binary operation or not. $a * b = ab + 1$. If yes, check the commutative and the associative properties. Also check the existence of identity element and the inverse of all elements of Q .

Q. 4. Let $*$ be a binary operation defined on $Q \times Q$ by $(a, b) * (c, d) = (ac, b + ad)$. Where Q is the set of rational numbers. Determine, whether $*$ is commutative and associative. Find the identity element for $*$ and the invertible elements for $*$ and the invertible elements of $Q \times Q$.

Q. 5. Discuss the commutativity and associativity of binary operation ' $*$ ' defined on $A = Q - \{1\}$ by the rule $a * b = a - b + ab$ for all $a, b \in A$. Also find the identity element of $*$ in A and hence find the invertible element of A .

Q. 6. Given a non-empty set X , consider the binary operation $*$: $P(X) \times P(X) \rightarrow P(X)$ given by $A * B = A \cap B$, $\forall A, B \in P(X)$, where $P(X)$ is the power set of X . Show that $*$ is commutative and associative and X is the identity element for this operation and X is the only invertible element in $P(X)$ with respect to the operation.

Q. 7. Let $A = R \times R$ and let $*$ be a binary operation on A defined by $(a, b) * (c, d) = (ad + bc, bd)$ for all $(a, b), (c, d) \in R \times R$.

- (i) Show that $*$ is commutative on A .
- (ii) Show that $*$ associative on A .
- (iii) Find the identity element of $*$ in A .

Q. 8. A binary operation $*$ is defined on the set R of real numbers by $a * b = \begin{cases} a, & \text{if } b = 0 \\ |a| + b, & \text{if } b \neq 0 \end{cases}$

If at least one of a and b is 0, then prove that $a * b = b * a$. Check whether $*$ is commutative. Find the identity element for $*$, if it exists.

Physical Education:

Very short answer questions

- Q1. What is planning in games and sports ?
- Q2. Write one objectives of adventure sports ?
- Q3. What is the main objective of intramural activities ?
- Q4. Name any two non- nutritive component of diet.
- Q5. What do mean by league tournament ?
- Q6. What is food intolerance ?
- Q7. What is diabetes ?

Short answer questions

- Q8. Illustrate the differences between intramural and extramurals?
- Q9. What is a knock out tournament ?Mention any two disadvantages of knock out tournaments ?
- Q10. Draw fixture of 24 teams.
- Q11. Explain any three myths about dieting.
- Q12. Explain pitfalls of dieting.
- Q13. Elaborate any three methods to prevent asthma.

Long answer questions

- Q14. How AAHPER youth fitness test is administrated?
- Q15. Explain in detail the effect of diet on sports performance.
- Q16. Draw a fixture of 7 teams participating in the league tournament.
- Q17. What do you mean by knockout tournament? Draw the fixtures of 21 teams on knockout basis.
- Q18. What do you mean by knockout tournament? Discuss the advantage and disadvantage of knockout tournament.



CHAPTER - 1

Very Short Answer Type I Questions [1 Marks]

1. Identify the figure and mention the vegetative part that helps it to propagate.



2. A moss plant is unable to complete its life-cycle in a dry environment. State two reasons.
3. Name the vegetative propagules in the following.
- (i) Agave (ii) Bryophyllum
4. Name an organism where cell division is itself a mode of reproduction.
5. Name an alga that reproduces asexually through zoospores. Why are these reproductive units so called ?
6. Which one of the following statements is true for yeast ?
- (i) The cell divides by binary fission. One of them develops into a bud.
(ii) The cell divides unequally. The smaller cell develops into a bud.
(iii) The cell produces conidia which develop into a bud.
7. Name the common phenomenon with reference to reproduction in rotifers, honeybees and turkey.
- Or**
- Name the phenomenon and one bird, where the female gamete directly develops into a new organism.
8. Which of the following statements is true for Bryophyllum ?
- (i) Germinating bud appears from the node of the rhizome.
(ii) Germinating bud appears from the node of the rhizome.
(iii) Germinating bud appears from the notch at the leaf margin.
9. Which of the following statements is true for Hydra ?
- (i) It produces asexual gemmules.
(ii) It produces unicellular bud.
(iii) It produces multicellular bud.
10. Mention the unique flowering phenomenon exhibited by *Strobilanthus Kunthiana* (neelakurinji).
11. Cucurbits and papaya plants bear staminate and pistillate flowers. Mention the categories they are put under separately on the type of flowers they bear.
- Or** How can Cucurbita plants differ from papaya plants with reference to the flowers they bear ?
12. Mention the unique feature with respect to flowering and fruiting in bamboo species.
13. Name the mode of reproduction that ensures the creation of new variants.
14. Name the biological process that enables continuity of species.
15. Name the mode of reproduction that helps in producing genetically identical offspring.
16. Which one of the following organisms exhibit binary fission ?
Bacillus, Penicillium, Yeast, Amoeba.
17. Name the respective asexual reproductive structures of yeast and sponges.
18. Name the units of vegetative propagation in grasses and water hyacinth.
19. Name the type of cell division that place in the zygote of an organism exhibiting haplontic life cycle.

20. How does *Penicillium* reproduce asexually ?
21. Name the phase all organisms have to pass through before they can reproduce sexually.
22. Name the phenomenon and the cell responsible for the development of a new individual without fertilisation as seen in honeybees.
23. Name the group of organisms that produces non-motile male gametes. How do they reach the female gamete for fertilisation ?
24. All papaya plants flowers, but fruits are seen only in some. Explain.
25. A list of three flowering plants is given below.
Which ones out of them are
 - (i) monoecious ?
 - (ii) bearing pistillate flowers ?
 Date palm, Cucurbita and pea.

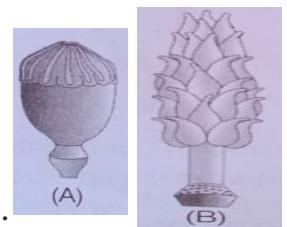
Short Answer Type I Question [2 Marks]

1. Why do moss plants produce very large number of male gametes ? Provide one reason .
What are gametes called ?
2. Why do alge and fungi shift to sexual mode of reproducing just before the onset of adverse conditions ?
3. Name the units of vegetative propagation in water hyacinth. Explain giving reasons why it has become the most invasive aquatic weed.
4. Why are mosses and liverworts unable to complete their sexual mode of reproduction in dry conditions ?
5. Write two major adaptations in animals exhibiting external fertilisation.
6. (i) State the difference between meiocyte and gametes with respect to chromosomenumber.
(ii) Why is a whiptail lizard referred to as parthenogenetic ?
7. The cell division involved in gamete formation is not of the same type in different organisms. Justify.
8. Unicellular organisms are immortal, whereas multicellular organisms are not. Justify.
9. (i) Name the organisms that reproduce through the following structures :
(a) Conidia (b) Zoospores
(ii) Mention one similarity and one difference between these two reproductive structures.
10. Both coconut, palm and date palm produce staminats flowers. One is monoecious and the other is dioecious. Write the difference.
11. A moss plant produces a large number of antherozoids but relatively a few egg cells. Why?
Or Why do moss plants very large number of male gametes ? Provide one reason.
What are these gametes called ?
12. (i) State the difference between meiocyte and gamete with respect to chromosome number.
(ii) Why is whiptail lizard referred to as parthenogenic ?
13. Give reasons as to why cell division cannot be a type of reproduction in multicellular organisms ?
14. In a developing embryo, analyse the consequences if cell divisions are not followed by cell differentiation.

CHAPTER - 2

Very Short Answer Type Question [1 Mark]

1. These pictures show the gynoecium of (A) Papaver and (B) *Michelia* flowers. Write the difference in the structure of their ovaries.



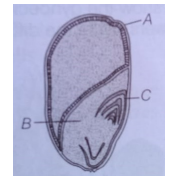
2. Name the part of flower which the tassels of corn cob represent.
3. Give an example of a plant, which came into India as a contaminant and is cause of pollen allergy.
4. How many microsporangia are present in a typical anther of an angiosperm ?
5. How do flowers of Vallisneria get pollinated ?
6. How many pollen grains and ovules are likely to be formed in the anther and the ovary of an angiosperm bearing 25 microspore mother cells and 25 megaspore mother cells respectively ?
7. The meiocyte of rice has 24 chromosomes. Write the number of chromosomes in its endosperm ?
8. Why is banana considered a good example of parthenocarpy ?
9. How many microspore mother cells would be required to produce one hundred pollen grains in a pollen sac ?
10. An anther with malfunctioning tapetum often fails to produce viable male gametophytes. Give reasons.
11. How do pollen grains of Vallisneria protect themselves ?
12. How is possible in Oxalis and Viola plants to produce assured seed-sets even in the absence of pollinators ?
13. Normally one embryo develops in one seed, but when an orange seed is squeezed, many embryos of different shapes and sizes are seen. Mention how it has happened ?
14. Mention any one application of a pollen bank.

Short Answer Type I Question [2 Marks]

1. Write the difference between the tender coconut water and the thick, white kernel of a mature coconut and their ploidy.
2. Name the organic material of which exine and intine of an angiosperm pollen grains are made up of. Explain the role of exine.
3. List post-fertilisation events in angiosperms.
4. Differentiate between the two cells enclosed in a mature male gametophyte of an angiosperm.
5. In angiosperms, zygote is diploid while primary endosperm cell is triploid. Explain.
6. Name all haploid cells present in an unfertilised mature embryo sac of a flowering plant. Write the total number of cells in it.
7. Write the importance of bagging of unisexual flowers in a crop improvement programme.
8. Geitonogamous flowering plants are genetically autogamous but functionally cross-pollinated. Justify.
9. Why is emasculation of a bisexual flower necessary in crop improvement programme ?
10. Why are some seeds of Citrus referred to as polyembryonic? How are they formed ?
11. List the adaptive features of water-pollinated flowers like Vallisneria.
12. Write the cellular contents carried by the pollen tube. How does the pollen tube gain its entry into the embryo sac ?
13. Name the product of fertilisation that forms the kernel of coconut. How does the kernel differ from coconut water ?
14. Where is sporopollenin present in plants? State its significance with reference to its chemical nature.
15. State one advantage and one disadvantage of cleistogamy.
16. Differentiate between albuminous and non-albuminous seeds giving one example of each.

Short Answer Type II Question [3 Marks]

1. State what is apomixis. Comment on its significance. How can it be commercially used ?
2. Double fertilisation is reported in plants of both, castor and groundnut. However the mature seeds of groundnut are non-albuminous and castor are albuminous. Explain the post fertilisation events of that are responsible for it.
3. Draw a labelled diagram of sectional view of a mature embryo sac of an angiosperm.
4. Explain any three advantages that seeds offer to angiosperms.
5. Make a list of any three outbreeding devices that flowering plants have developed and explain how they help to encourage cross-pollination.
6. Why are angiosperm anthers called ditheous ? Describe the structure of its microsporangium.
7. (i) Describe endosperm development in coconut.
(ii) Why is tender coconut considered a healthy source of nutrition ?
(iii) How are peas different from castor seeds with respect to endosperm ?
8. Differentiate between perisperm and endosperm giving one example of each.
9. LS of maize grain is given below. Label the parts A, B and C in it.



10. Differentiate between geitonogamy and xenogamy in plants. Which one between the two will lead to inbreeding depression and why ?
11. Draw a diagram of a male gametophyte of angiosperm. Label any four parts. Why is sporopollenin considered as the most resistant organic material

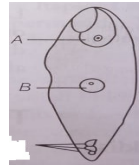
Long Answer Type Question [5 Marks]

1. A flower of tomato plant following the process of sexual reproduction produces 240 viable seeds.
 - (i) What is the minimum number of pollen grains that must have been involved in the pollination of its pistill ?
 - (ii) What would have been the minimum number of values present in the ovary ?
 - (iii) How many megaspore mother cells were involved ?
 - (iv) What is the minimum number of microspore mother cells involved in the above case ?
 - (v) How many male gametes were involved in this case ?
2. (i) Plan an experiment and prepare a flow chart of the steps that you would follow to ensure that the seeds are formed only from the desired sets of pollen grains. Name the type of experiment that you carried out.
 - (ii) Write the importance of such experiments.
3. (i) Describe in sequence the process of microsporogenesis in angiosperms.
 - (ii) Draw a labelled diagram of a 2-celled final structure formed.
4. (i) Describe in sequence the process of microsporogenesis in angiosperms.
 - (ii) Draw a labelled diagram of a 2-celled final structures formed.
5. (i) Draw a diagram of fertilised embryo sac of a dico flower. Label all its cellular components.
 - (ii) Explain the development of a mature embryo from this embryo sac.
6. (i) Why does endosperm development precede embryo development in angiosperm seeds ? State the role of endosperm in mature albuminous seeds.
 - (ii) Describe with the help of three labelled diagrams the different embryonic stages that include mature embryo of dicot plants.

7. (i) Explain the phenomenon of double fertilisation.
(ii) Draw a labelled diagram of a typical anatropous ovule.
8. (i) Explain the different ways apomictic seeds can develop. Give an example of each.
(ii) Mention one advantage of apomictic seeds to farmers.
(iii) Draw a labelled mature stage of a dicotyledonous embryo.
9. How does the megaspore mother cell develop into 7-celled and 8-nucleate embryo sac in an angiosperm? Draw a labelled diagram of mature embryo sac.
10. (i) Describe the process of syngamy and triple fusion in angiosperms.
(ii) Explain the development of a fertilised egg upto a mature embryo in a dicot plant. Draw a labelled diagram of a mature dicot embryo.
11. (i) Draw diagrammatic sectional view of a mature anatropous ovule and label the following parts in it,
 - (a) that develops into seed coat.
 - (b) that develops into embryo after fertilisation.
 - (c) that develops into endosperm in an albuminous seed.
 - (d) through which the pollen tube gains entry into the embryo sac.
 (ii) Describe the characteristic features of wind-pollinated flowers.
12. (i) Draw a labelled schematic diagram of the transverse section of a mature anther of an angiospermic plant.
(ii) Describe the characteristic features of an insect pollinated flower.
13. (i) Draw a diagram of a mature embryo sac of an angiosperm and label the following parts in it.

(a) Filiform apparatus	(b) Synergids	(c) Central cell
(d) Egg cell	(e) Polar nuclei	(f) Antipodals

 (ii) Write the fate of egg cell and polar nuclei after fertilisation.
14. Why is fertilisation in an angiosperm referred to as double fertilisation? Mention the ploidy of the cells involved.



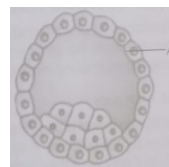
15. (i) Name the structures which the parts 'A' and 'B' shown in the diagram below respectively develop into.
(ii) Explain the process of development which 'B' undergoes in albuminous and exalbuminous seeds. Give one example of each of these seeds.
16. Give reasons, Why ?
 - (i) Most zygotes in angiosperm divide only after certain amount of endosperm is formed.
 - (ii) Groundnut seeds are exalbuminous and castor seeds are albuminous.
 - (iii) Micropyle remains as a small pore in the seed coat of a seed.
 - (iv) Integuments of an ovule hardens and the water content is highly reduced as the seed matures.
 - (v) Apples and cashewnuts are not called true fruits.

CHAPTER - 3

Very Short Answer Type Question [1 Mark]

1. What happens to corpus luteum of human female if the ovum is
 - (i) fertilised,
 - (ii) not fertilised ?
2. Mention the function of zona pellucida.

3. Draw and label the parts of the head region only of a human sperm.
4. List the different parts of human oviduct through which the ovum travels till it meets the sperm for fertilisation.
5. How does the sperm penetrate through the zona pellucida in human ovum ?
6. Write the physiological reason, why a woman generally cannot conceive a child after 50 years of age.
7. Name the cells that nourish the germ cells in the testes. Where are these cells located in the testes?
8. Where is acrosome present in humans ? Write its function.
9. How is the entry of only one sperm and not many, ensured into an ovum during fertilisation in humans ?
10. Identify the figure given and the part labelled 'A'.



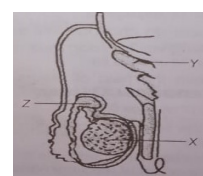
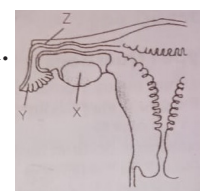
11. Name the embryonic stage that gets implanted in the uterine wall of human female.
12. List the changes of the primary oocyte undergoes in the tertiary follicular stage in the human embryo.

Short Answer Type I Question [2 Marks]

1. Why are the human testes located outside abdominal cavity? Name the pouch in which they are present.
2. Where does fertilisation occur in humans? Explain the events that occur during this process.
3. Write the location and functions of the following in human testes.
 - (i) Sertoli cells
 - (ii) Leydig cells
4. Write the effect of the high concentration of LH on an mature Graafian follicle.
5. Describe the structure of seminiferous tubule.
6. When and where do chorionic villi appear in humans ?
7. Differentiate with the help of diagrams only between morula and blastocyst of a human.
8.
 - (i) Where do the signals for parturition originate from in humans ?
 - (ii) Why is it important of feed the new born babies on colostrum ?
9. Mention the names and the characteristics of different uterine wall layers in humans. which one of them undergoes cyclic changes during menstrual cycle ?
10. Explain the functions of myometrium and endometrium in humans females.
11. What is colostrum ? Why are breast-fed babies likely to be healthy ?
12. Name the embryonic stage that gets implanted in human female. Explain the events that occur during this process.
13. Differentiate between the major structural changes in the human ovary during the follicular and luteal phases of the menstrual cycle.

Short Answer Type II Question [3 Marks]

1. This diagram below shows a part of the human female reproductive system.
 - (i) Name the gamete cells that would be present in 'X' in taken from a newborn baby.
 - (ii) Name 'Y' and write its function.
 - (iii) Name 'Z' and write the events that taken place here.
2. The diagram below shows human male reproductive system. (one side only).



- (a) Identify 'X' and write its location in the body.
 - (b) Name the accessory gland 'Y' and its secretion.
 - (c) Name and state the function of 'Z'.
3. Describe the process of parturition in humans.
 4. Explain the events in a normal woman during her menstrual cycle on the following days.
 - (i) Pituitary hormone levels from 8 to 12 days.
 - (ii) Uterine events from 13 to 15 days.
 - (iii) Ovarian events from 16 to 23 days.
 5. Explain
 - (i) Ovarian event from 13-15 days.
 - (ii) Ovarian hormones level from 16-23 days.
 - (iii) Uterine events from 24 to 29 days.
 6. Name the stage of human embryo of which it gets implanted. Explain the process of implantation.
 7. Name and explain the role of the inner and middle walls of the human uterus.
 8. Draw a labelled diagram of the sectional view of a human seminiferous tubule (six parts to be labelled).
 9. (i) Draw a diagram of the structure of a human ovum surrounded by corona radiata. Label the following part
 - (a) Ovum (b) Plasma membrane (c) Zona pellucida
 (ii) State the function of zona pellucida.
 10. Draw the following diagrams related to human reproduction and label them:
 - (i) The zygote after the first cleavage division
 - (ii) Morula stage
 - (iii) Blastocyst stage (sectional view)
 11. Why is parturition called a neuroendocrine mechanism? Explain.
 12. Explain the fate of inner cell mass in a human embryo immediately after implantation.
 13. Draw a labelled diagram of the reproductive system in a human female.

Long Answer Type Question [5 Marks]

1. Explain the development of a secondary oocyte (ovum) in a human female from the embryonic stage up to its ovulation. Name the hormones involved in this process.
2. (i) Draw a sectional view of a seminiferous tubule of human. Label Sertoli cell, spermatogonia and Leydig cell on it and write their functions.
 (ii) Explain the role of pituitary and sex hormones in the process of spermatogenesis.
3. Mention the site of fertilisation of a human ovum. List the events that follow in sequence until the implantation of the blastocyst.
4. Describe the role of pituitary and ovarian hormones during the menstrual cycle in a human female.

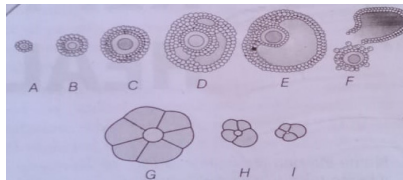
Or

Describe the changes that occur in ovaries and uterus in human female during the reproductive cycle.

Or

Explain the ovarian and uterine events that occur during a menstrual cycle in a human female under the influence of pituitary and ovarian hormones respectively.

5. During the reproductive cycle of a human female, when where and how does a placenta develop? What is the function of placenta during pregnancy and embryo development ?
6. (i) How is 'oogenesis' markedly different from 'spermatogenesis' with respect to the growth till puberty in the humans ?
(ii) Draw a sectional view of human ovary and label the different follicular stages, ovum and corpus luteum.
7. (i) Draw a labelled diagrammatic view of human male reproductive system.
(ii) Differentiate between:
 - (a) Vas deferens and vasa efferentia
 - (b) Spermatogenesis and spermiogenesis
8. (i) Describe the events of spermatogenesis with the help of a schematic representation.
(ii) Write two difference between spermatogenesis and oogenesis.
9. The following is the illustration of the sequence of ovarian events (A-I) in a human female.
 - (i) Identify the figure that illustrates ovulation and mention the stage of oogenesis it represents.



- (ii) Name the ovarian hormone and the pituitary hormone that have caused the above mentioned event.
 - (iii) Explain the changes that occur in the uterus simultaneously in anticipation.
 - (iv) Write the difference between 'C' and 'H'.
 - (v) Draw a labelled sketch of the structure of a human ovum prior to fertilisation.
10. (i) Write the specific location and the functions of the following cells in human males.
 - (a) Leydig cells
 - (b) Sertoli cells
 - (c) Primary spermatocytes
 11. Explain the role of any accessory glands in human male reproductive system.

CHAPTER - 4

Very Short Answer Type Question [1 Mark]

1. Name an IUD that you would recommend to promote the cervix hostility to sperms.
2. State one reason why breast feeding the baby acts as a natural contraceptive for the mother.
3. Expand GIFT and ICSI.
4. Mention one positive and one negative application of amniocentesis.
5. Why is tubectomy considered a contraceptive method ?

Short Answer Type I Question [2 Marks]

1. After a brief medical examination a healthy couple came to know that both of them are unable to produce functional gametes and should look for an 'ART' (Assisted Reproductive Technique). Name the 'ART' and the procedure involved that you can suggest to them to help them bear a child.
 2. A childless couple has agreed for a test-tube baby programme. List only the basic steps the procedure.
- Or**
- An infertile couple is advised to adopt test-tube baby programme. Describe two principle procedures adopted for such technologies.

3. What is amniocentesis? How is it misused ?
4. What do oral pills contain and how do they act as.

Or

How do oral contraceptive pills act in a human female ?

Or

Name an oral pill used as a contraceptive by human female. Explain how does it prevent pregnancy.

5. How does 'Cu-T' act as an effective contraceptive ?

Or

Why are copper-containing intra uterine devices considered an ideal contraceptive for human females ?

6. Why is 'Saheli' considered an effective contraceptive for women to space children ?

Or

Why is 'Saheli' a well-accepted contraceptive pill ?

7. Why is ZIFT a boon to childless couples ? Explain the procedure.
8. How do 'implants' as an effective method of contraception in human females ? Mention its one advantage over contraceptive pills.
9. Why is there a statutory ban on amniocentesis ? Why is the technique so named ?
10. At the time of Independence, the population of India was 350 million, which exploded to over one billion by May, 2000. List any two reasons for the rise in population and any two steps taken up by the government to check this population explosion.
11. Describe the lactational amenorrhoea method of birth control.
12. How do copper and hormone releasing IUDs act as contraceptives ?
13. Explain the Zygote Intra Fallopian Transfer (ZIFT) technique. How is Intra Uterine Transfer (IUT) technique different from it ?
14. (i) Given any two reasons for infertility among young couple.
(ii) Test-tube baby programme is a boon to such couples. Explain the steps followed in the procedures.

Short Answer Type II Question [3 Mark]

1. If implementation of better techniques and new strategies are required to provide more efficient care and amniocentesis ? Write the use of this technique and give reason to justify the ban.
2. A woman has certain queries as listed below, before starting with contraceptive pills. Answer them.
 - (i) What do contraceptive pills contain, and how do they act as contraceptives?
 - (ii) What schedule should be followed for taking these pills ?
3. (i) Name any two copper releasing IUDs.
(ii) Explain how do they act as effective contraceptives in human females.
4. A couple where both husband and wife are producing functional gametes, but the wife is still unable to conceive, is seeking medical aid. Describe any one method that you can suggest to this couple to become happy parents.
5. Suggest and explain any three Assisted Reproductive Technologies (ARTs) to an infertile couple.
6. A pregnant human female was advised to undergo MTP. It was diagnosed from a zygote formed by an XX-egg fertilised by Y-carrying sperm. Why was she to be very advised to undergo MTP?

Value Based Question [4 Mark]

1. Your school has been selected by the Department of Education to organise and host an inter school seminar on 'Reproductive ' Health-Problems and Practices. However, many parents are reluctant to permit their wards to attend it. Their argument is that the topic is 'too embarrassing'. Put forth four arguments with appropriate reasons and explanation to justify the topic to be very essential and timely.
2. Women are often blamed for producing female children consequently, they are ill-treated and ostracied. How will you address this issue scientifically if you were to conduct an awareness programme to highlight the values involved ?

CHAPTER - 5

Very Short Answer Type Question [1 Mark]

1. How many chromosomes do drones of honeybee possess? Name the type of cell division involved the production of sperms by them.
2. A geneticist interested in studying variations and patterns of inheritance in living beings prefers to choose organisms for experiments with shorter life cycle. Provide a reason.
3. State the chromosomal defect in individuals with Turner's syndrome.
4. Write the chromosomal defect in individuals affected with Klinefelter's syndrome.
5. On what basis is the skin colour in humans considered polygenic ?
6. Mention any two contrasting traits with respect to seeds in pea plant that were studied by Mendel.
7. In a test cross progeny of pea plants, all were bearing violet flowers. Give the genotypes of the parent pea plants.
8. A garden pea plant (A) produced inflated yellow pods and another plant (B) of the same species produced constricted green pods. Identify the dominant traits.
9. Name the respective pattern of inheritance where F_1 phenotype
 - (i) does not resemble either of the two parents and is in between the two.
 - (ii) resembles only one of the two parents.
10. In a dihybrid cross, when would the proportion of parental gene combinations be much higher than non-parental types, as experimentally shown by Morgan and his group.
11. Write the possible genotypes Mendel got when he crossed F_1 tall pea plant with a dwarf pea plant.

Short Answer Type I Question [2 Marks]

1. Differentiate between male and female heterogamety.
2. A cross was carried out between two pea plants showing the contrasting traits of height of the plants. The result of the cross showed 50% parental characters.
 - (i) Work out the cross with the help of a Punnett square.
 - (ii) Name the type cross carried out.
3. How does the gene 'I' control ABO blood groups in humans? Write the effect the gene has on the structure of red blood cells.
4. Write the types of sex determination mechanisms the following crosses show. Give an example of each type.
 - (i) Female XX with male XO
 - (ii) Female ZW with male ZZ
5. In snapdragon, a cross between true breeding red flowered (RR) plants and true-breeding white flowered (rr) plants showed a progeny of plants with all pink flowers.

- (i) The appearance of pink flowers is not known as blending. Why ?
 - (ii) What is this phenomenon known as ?
6. With the help of one example, explain the phenomenon of codominance and multiple allelism in human population.
 7. Write the scientific name of the fruit fly. Why did Morgan prefer the work with fruit for his experiments? State any three reasons.
 8. Linkage and crossing over of genes are alternatives of each other. Justify with the help of an example.
 9. In a cross between two tall pea plants, some of the offspring produced were dwarf. Show with the help of a Punnett square, how it is possible ?

Or

When a tall pea plant was selfed, it produced one-fourth of its progeny as dwarf. Explain with the help of a cross.

10. A cross between a red flower-bearing plant and a white flower-bearing plant of *Antirrhinum* produced all plants having pink flowers. Work out a cross to explain how this is possible?
11. In a typical monohybrid cross, the F_2 - population ratio is written as 3 : 1 for phenotype, but expressed as 1 : 2 : 1 for genotype. Explain with the help of an example.
12. With the help of a Punnett square, find the percentage of heterozygous individuals in a F_2 -population in a cross involving a true-breeding pea plant with green pods and a true-breeding pea plant with yellow pods respectively.
13. A pea plant homozygous for axial flower and constricted pods, is crossed with the pea plant homozygous for terminal, having inflated pods. Work out the cross up to F_1 - generation.
14. Differentiate between multiple allelism and pleiotropy. With the help of an example each.

Short Answer Type III Question [3 Mark]

1. During a monohybrid cross involving a tall pea plant with a dwarf pea plant, the offspring populations were tall and dwarf in equal ratio. Work out a cross to show how it is possible ?
2. A teacher wants his/her students to find the genotype of pea plants bearing purple coloured flowers in their school garden. Name and explain the cross that will make it possible.
3. If there is a history of haemophilia in the family, the chances of male members becoming haemophilic are more than that of the female.
 - (i) Why is it so ?
 - (ii) Write the symptoms of the disease.
4. Which chromosomes carry the mutant genes causing thalassaemia in humans? What are the problems caused by these mutant genes ?
5. A colourblind child is born to a normal couple. Work out a cross to show how it is possible? Mention the sex of this child.
6. Mendel published his work on inheritance of characters in 1865, but it remained unrecognised till 1900. Give three reasons for the delay in accepting his work.
7. Why is pedigree analysis done in the study of human genetics ?