CLASS XII (2025-26)

HOLYDAY HOME WORK

CHEMISTRY CLASS XII

1.The ratio of Osmotic pressure of an 1:1 electrolyte to what types of a non-electrolyte solute of the same concentration is

(a) 1. (b)1/2

(c) 2. (d) 0.1

2.The celebrity of a salt in water is 40 at 30 degree Celsius. The amount of water required to dissolve 120 gram of the salt at the same temperature is about

(a)400g. (b)200g

(c )300g. (d) 22.4L

3.Molarity is an preferred unit for measuring concentration because it is

(a)Convenient to measure (b) a small quantity (c) temperature independent (d)a reflection of the molecular structure of the solute.

In the following question statement of assertion followed by statement of a reason is given choose the correct answer out of the following choices.

(a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true but R is not the correct explanation of A
(c) A is true but R is false
A is false but R is true

4. Assertion(A):Molarity is preferred over Molarity as unit of concentration
Reason(R): Molarity is more accurate because it does not change with temperature

5. Assertion(A):Soft drink bottles are sealed under high pressure
Reason (R): The dissolution of gas in liquid is an endothermic process.

6. $H_2S$ a toxic gas with rotten egg-like smell ,is used for qualitative analysis. If the solubility of $H_2S$ in water at STP is 0.195m, Calculate Henry's law constant.

7. What is the role molecular interaction play in the solution of alcohol and water?

8. State Henery's law and mention some important applications.

9. Solution containing 30 gram of a non- volatile solute exactly in 90 gram of water has a vapour pressure of 2.8 KPA at 298 K further 18 gram of water is then added to the solution the new vapour pressure becomes 2.9 KPa at 298 K Calculate molar mass of the solute and vapour pressure of water at 298 K.

10.Calculate the depression in the freezing point of water when 10 gram of 2 chloro butanoic acid is added to 250 gram of water; Ka = 1.4 x$10^{-3}$ ,Kf = 1.86 KKg $mol^{-1}$

11.(a)Discuss biological and industrial importance of osmosis .

(b) At higher altitude people suffering from a disease called in anoxia. In this disease they becomes weak and cannot think clearly. Give reason .

(c) When mercuric iodide is added to an aqueous solution of KI the freezing point is raised. Give reason

12.(i) When 2.56 gram of sulphur was dissolved in 100 gram of CS2 the freezing point lower by 0.383K. Calculate the formula of sulphur(Sx).Kf for CS2 = 3.83 KKg/mol

(ii) Blood cells are isotonic with 0.9% sodium chloride solution. What happens if we place blood cell in a solution containing?

(a)1.2% sodium chloride solution? and

(b) 0.4% sale sodium chloride solution?

13. Define (i) van't Hoff factor (ii) Molality (iii) Osmotic pressure

(iv) Reverse osmosis

14.(i)what is similarity between Raoult's law and Henry's law?

(ii) State Raoult's law for a solution containing non-volatile solute. What types of deviation from Raoult's law is shown by a solution of chloroform and acetone and why?

15.Define (i) Osmotic pressure (ii) Colligative properties (iii) Isotonic solution

# DAV PUBLIC SCHOOL, BARIATU, RANCHI

## ASSIGNMENTS FOR SUMMER HOLIDAYS

**CLASS-XII** **SUBJECT: ENGLISH**

1. **Buy a stamp, paste it on a self-addressed envelope and post it on your own address.**

2. **You are the Health Secretary of Students' Council of MAX Public School, Pune. The Council has decided to start a Cleanliness Drive around the school from 2 October 20xx. Draft a notice in not more than 50 words asking the students (XI-XII) to enroll themselves for the drive.**

3. **As the Secretary of the Literary Club of your school, you are organizing a Public Speaking Competition for the students of classes (IX-XII) of your school. Quiz Master Siddharth Basu has consented to judge the competition. Write a notice furnishing all the details about the auditions to be displayed on your school notice board in not more than 50 words.**

4. **Prepare the Critical Appreciation of the poem 'My Mother at Sixty Six' ( Introduction of the poet and her popular works, Brief summary of the poem, Message, Setting, Tone, Poetic Devices )**

5. **Pictorial presentation of the chapter 'The Third Level' along with the introduction of the author, his popular works , brief summary of the chapter.**

**( collect and paste on a white sheet the pictures like BRASS SPITTONS, DRESSING STYLE OF 1894, STRING WATCH, OPEN-FLAME GAS LIGHTS,GRAND CENTRAL STATION, etc.)**

## NOTE:

1. **TYPED AND COMPLETE ASSINGMENTS TO BE SUBMITTED TO YOUR SUBJECT TEACHER AFTER THE SUMMER VACATION.**

2. **THE ASSIGNMENTS TO BE SUBMITTED IN A PLASTIC FOLDER.**

3. **STAPLE THE PAGES WHEN REQUIRED.**

"EDUCATION LEADS TO LIFE

IGNORANCE LEADS TO DEATH"

.....XXXXXXXXXX.....

DAV PUBLIC SCHOOLBARIATU

Subject:physical education

Class :12

HOLIDAY HOMEWORK(2025)

*Q1.Draw a fixture of 13 teams on the basis of knockout?*

*Q2 What are the key functions of sports events management?*

*Q3 Define bye?*

*Q4 List various types of tournaments?*

*Q5 what are the Advantage and disadvantage of knockout tournament?*

*Q6Draw a fixture of 19 teams Participating in basketball tournament on knockout basis*

*Q7 What is the method of fixing bye?*

*Q8 Draw a chart of various committee for tournaments?*

*Q9 write 4 responsibility of pre,during and post tournaments committee?*

*Q10 What did you understand by fixture?*

**DAV PUBLIC SCHOOL, BARIATU, RANCHI**
**Class XII 2025**
**Biology**
**Summer Holiday Homework**

**I. Multiple Choice Questions (MCQs)**

1. Researchers are trying to transfer apomictic genes to hybrid varieties as hybrid characters in the progeny

   a) Do not segregate
   b) Segregate
   c) Develop genetic variations
   d) Will remain unexpressed

2. Water pollinating flowers have

   a) Bright colour
   b) Fragrance
   c) Tassels
   d) Mucilage covering over pollen grains

3. Device for self-pollination is

   a) Dicliny
   b) Unisexuality
   c) Heterostyly
   d) None of the above

4. The phenomenon wherein, the ovary develops into a fruit without fertilisation is called

   a) Parthenocarpy
   b) Apomixis
   c) Asexual reproduction
   d) Sexual reproduction

5. A particular species of plant produces light, non-sticky pollens in large numbers and its stigmas are long and feathery. These modifications facilitate pollination by

   a) Insects
   b) Water
   c) Wind
   d) Animals

**II. Define the following:**

a) Xenogamy
b) Meiocyte
c) Polyembryony
d) Apomixis
e) Emasculation

**III. Answer the following questions (vert short, short and long answer type questions):**

1. Explain pollen-pistil interaction.

2. Differentiate between chasmogamous & cleistogamous flowers.

3. Why is apple called a false fruit?

4. State the function of filiform apparatus found in mature embryo sac of an angiosperm.

5. Differentiate between coleoptile and coleorhiza.

6. Write the contrivances for cross pollination (any three contrivances).

7. What is microsporogenesis? Explain briefly.

8. Explain double fertilization in angiosperms.

9. Name two main pre fertilization events in angiosperms.

10. What is megasporogenesis? Explain the process.

11. Differentiate between epicotyl and hypocotyl.

12. Define perisperm.

13. Write the advantages of apomictic seeds to farmers.

**IV. Diagrams to draw & label:**

a) Transverse Section (T.S.) of young anther.

b) A diagrammatic view of mature anatropous angiospermic ovule.

c) Mature pollen grain.

**V. Assertion-Reason type questions**

**Directions: In the following questions, a statement of Assertion (A) is followed by statement of Reason (R)**

**Select the correct answer to these questions from the codes (A), (B), (C) and (D) as given below.**

**(A)** If both **A** and **R** are true and **R** is the correct explanation of **A**.

**(B)** If both **A** and **R** are true and **R** is not the correct explanation of **A**.

**(C)** If **A** is true but **R** is false.

**(D)** If **A** is false but **R** is true.

1. Assertion (A): Chasmogamous flowers are always cross pollinated.

   Reason (R): Cleistogamous flowers are always self-pollinated.

2. Assertion (A): Vallisneria is a dioecious submerged aquatic plant.

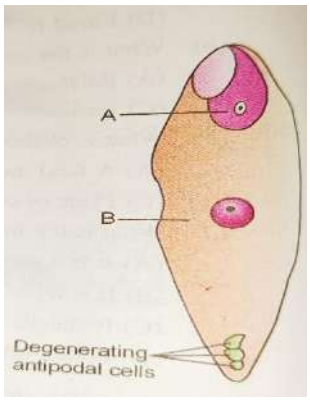
   Reason (R): It has different mechanism for pollination.

3. Assertion (A): Apple is a false fruit.

   Reason (R): In apple, thalamus also contributes in fruit formation.

**VI. Diagram/Case-based questions**

Study the figure given below and answer the questions:




(i) Which part represents ‘B’ in the given figure.

(ii) Write the function of ‘B’.

(iii) What does the whole figure denote?

(iv) Name the part ‘A’ in the figure.

**VII.** Prepare an investigatory project/model on any topic of your choice from Biology.

---

D.A.V. Public School BARIATU, Ranchi

Class: XII Subject: MATHEMATICS

## SECTION -A

## ASSERTION-REASON BASED QUESTIONS

In the following questions, a statement of assertion (A) is followed by a statement of Reason (R). Choose the correct answer out of the following choices.

(a) Both A and R are true and R is the correct explanation of A.

(b) Both A and R are true but R is not the correct explanation of A.

(c) A is true but R is false.

(d) A is false but R is true.

1 .Assertion (A): If R is a relation defined on the set of natural number N such that $R = \{(x, y) : x, y \in N \text{ and } 2x + y = 24\}$, then R is an equivalence relation.

Reason(R): A Relation is said to be an equivalence relation if it is reflexive, symmetric and transitive.

2. .Assertion (A): If the relation R is defined in A={1,2,3} by aRb , if $|a^2 - b^2| \leq 5$ then $R^{-1} = R$.

Reason(R): For above relation, domain of $R^{-1}$ = *Range of* $R$.

3. Assertion (A): In Set A ={1,2,3} relation R in Set A , given as R={(1,2)} is Transitive.

Reason(R): A singleton Relation is Transitive.

. 

## CASE STUDY BASED

**4.** .Sherlin and Danju are playing Ludo at home. While rolling a dice, Sherlin's sister Raji observed and noted the possible outcomes of the throw every time belongs to set {1, 2,3,4,5,6}. Let A={S,D}, B={1,2,3,4,5,6} . Based on the given information answer the following question:

(a) Raji wants to know the number of relations possible from A to B ,. How many numbers of relations are possible?

(b) Let R be a relation on set B defined by R={(1,1), (2,2),(3,3),(4,4),(5,5)(6,6)}, Then R is which kind of relation?

## SECTION-B

**5**. Define the Relation R in the set $N \times N$ as follows: For $(a,b),(c,d) \in N \times N$, $(a,b)R(c,d)$ iff ad(b+c)=bc(a+d). Prove that R is an Equivalence Relation in $N \times N$ .

**6**. Let A={ $x \in Z : 0 \leq x \leq 12$ }.Show that $R = \{(a,b) : a,b \in A, |a-b| \text{ is divisible by } 4\}$ is an Equivalence relation. Find the set of all elements related to 1.

**7**.Find the number of Equivalence relation in the set {1,2,3}containing (1,2) and(2,1).

**8**.Find the minimum number of elements that must be added to the relation R={(a,b), (b,c)}on the set {a,b,c}so that it become Symmetric and Transitive.

**9**. Find the minimum number elements that must be added to the relation R={(a,b), (b,c),(b,d)}on the set {a,b,c,d}so that it is an Equivalence relation.

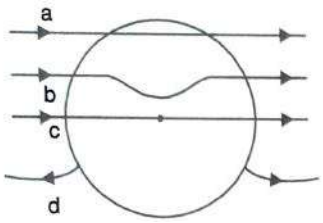
**10**. Check whether the relation $R_1$= {(a,b): $a \leq b^2$ } is Equivalence Relation or not?

**D A V PUBLIC SCHOOL, BARIATU**
**ASSIGNMENT FOR SUMMER HOLIDAYS**
**CLASS – XII, SUBJECT : PHYSICS**

## ELECTRIC CHARGE AND FIELD

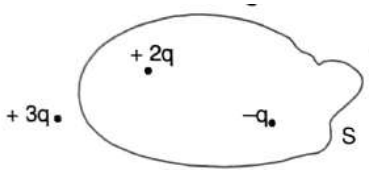
### SECTION A

1. A metallic sphere is placed in a uniform electric field and the electric field lines are shown in the figure.




The line of force is correctly represented by:
(a) a (b) b (c) c (d) d

2. The figure below shows three charges +3q, +2q and -q and a closed surface S. The electric flux linked with S does not get contribution from:

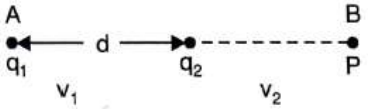



(a) any of the three charges (b) +3q alone as it lies outside
(c) -q only as it is negative (d) +2q and -q only as they lie inside the surface S

3. An electric dipole with moment p placed in an electric field E experiences both a net force as well as a torque. The electric field applied is:
(a) a uniform field acting along p
(b) a uniform field acting opposite to p
(c) a uniform field acting perpendicular to p
(d) essentially a non-uniform electric field.

4. $\vec{E}_1$ and $\vec{E}_2$ denote the electric field intensities at points P1 and P2 lying on axial line and equatorial line of an electric dipole. We have:
(a) $\vec{E}_1 \| \vec{E}_2$ but not parallel to $\vec{P}$
(b) $\vec{E}_1 \perp \vec{E}_2$
(c) $\vec{E}_1$ anti-parallel to $\vec{E}_2$
(d) $\vec{E}_1 \| \vec{E}_2 \| \vec{P}$

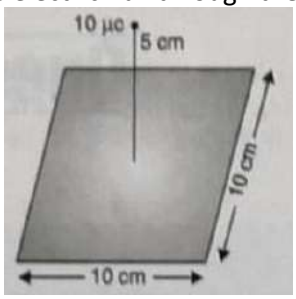
5. P is a point on the line joining two charges q1 and q2 placed at A and B, a distance 'd' apart as shown. The net electric field at P is zero. This is possible only if:




(a) $q_1>0$, $q_2>0$
(b) $q_1<0$, $q_2<0$
(c) $|q_2|>|q_1|$ and the charges are unlike
(d) $|q_2|<|q_1|$ and the charges are unlike

OR

A point charge of +10 μC is placed at O, at a distance of 5 cm directly above the centre of square of side 10 cm as shown in the figure below. The electric flux through the square is:




(a) Zero

(b) $\frac{10^{-5}}{6\varepsilon_0}$ $NC^{-1} m^2$

(c) $\frac{10^{-5}}{\varepsilon_0}$ $NC^{-1} m^2$

(d) $\frac{10^{-3}}{6\varepsilon_0}$ $NC^{-1} m^2$

**INSTRUCTIONS for Q.6-Q.7** Two statements are given—one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below.
(a) Both A and R are true and R is the correct explanation of A.
(b) Both A and R are true but R is NOT the correct explanation of A.
(c) A is true but R is false.
(d) A is false but R is true.

**6. Assertion (A):** The direction of electric field intensity is along that of decreasing electrostatic potential.
**Reason (R):** A free positive charge experiences a force in the direction in which its electrostatic energy decreases in the electric field.

**7. Assertion (A):** During thunderstorm, it is safer to sit inside a car than to stand under a tree as there is no effect of electric field inside a car.
**Reason (R):** The paint on the car makes the car body a bad conductor and hence the external electric charges have no effect inside the car.

## SECTION B

8. A point charge +20 μC is at the centre of cube of side 10 cm. What is the magnitude of the electric flux through the cube? How will the flux change if the size of the cube is doubled?

OR

Given a uniform electric field $\vec{E}=5\times10^3$ N/C, find the flux due to this field through a square of side 10 cm on a face whose plane is parallel to the y-z plane. What would be the flux through the same square if the plane makes a $30^0$ angle with the x-axis?

9. 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 $17.0\times10^{-22}$ $C/m^2$. What is the electric field intensity:
(a) in the outer region of the first plate?
(b) in the outer region of the second plate?
(c) between the plates?

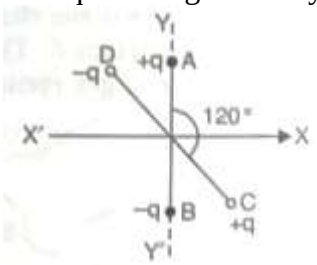
OR

Two point charges, q1 and q2 are located at points A (a, 0, 0) and B (0, b, 0) respectively. Find the electric field due to both these charges, at the point C (0, 0, c).

10. Plot a graph showing the variation of coulomb force (F) versus $\frac{1}{r^2}$, where r is the distance between the two charges of each pair of point charges: (1 μC, 2 μC) and (2 μC, -3 μC). Interpret the graphs obtained.

OR

Two small identical electrical dipoles AB and CD, each of dipole moment 'p' are kept with their directions at an angle of $120^0$ as shown in the figure. What is the resultant dipole moment of this combination? If this system is subjected to electric field $\vec{E}$ directed along +X-direction, what will be the magnitude and direction of the torque acting on the system?




11. Two point charges 4Q, Q are separated by 1 m in air. At what point on the line joining the charges is the electric field intensity zero? Also calculate the electrostatic potential energy of the system of charges, taking $q=2\times10^{-7}$ C.

## SECTION C

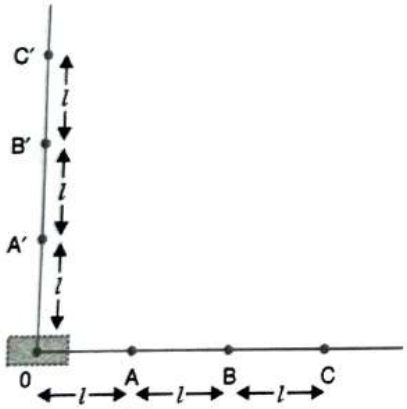
12. An electric dipole of dipole moment $\vec{p}$ is placed in a uniform electric field $\vec{E}$. Write the expression for the torque $\vec{\tau}$ experienced by the dipole. Identify two pairs of perpendicular vectors in the expression. Show diagrammatically, the orientation of the dipole in the field for which the torque is (i) Maximum (ii) Half the maximum value (iii) Zero.

OR

The following data was obtained for the dependence of the magnitude of electric field, with distance, from a reference point O, with a certain charge distribution in the shaded region.

| Field point | A | B | C | A' | B' | C' |
|---|---|---|---|---|---|---|
| Magnitude of electric field | E | E/8 | E/27 | E/2 | E/16 | E/54 |

(i) Identify the charge distribution and justify your answer.
(ii) If the potential due to this charge distribution, has a value V at the point A, what is its value at the points B, C, A', B' and C'?




13. State Coulomb's law in electrostatics. Obtain Gauss law from Coulomb's law for a point charge using a spherical gaussian surface with centre on the point charge.

OR

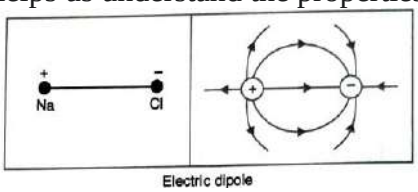
State Gauss's law. Using the law, deduce Coulomb's law.

## SECTION D

CASE STUDY

14. Read the following paragraph and answer the questions:

Electric Dipole: An electric dipole deals with the separation of the positive and negative charges found in a large number of situations in nature. A simple example of dipole is a polar molecule having separation between a positive charge centre and a negative charge centre. A study of the electric forces between dipoles helps us understand the properties of a substance.




Electric dipole

(i) What is meant by electric dipole moment? Give its SI unit.

(ii) Mark points $P_1$ and $P_2$, if any, at which:

(a) the electric field intensity is zero.

(b) the electric potential is zero.

(iii) An electric dipole consists of two charges ±10 μC held 1 cm apart.

(a) Find the electric dipole moment $\vec{p}$. In which direction does it act?

(b) Assuming the dipole to be small, the electric field due to the dipole at a point 10 cm away from its centre on its axial line is x units. Calculate x.

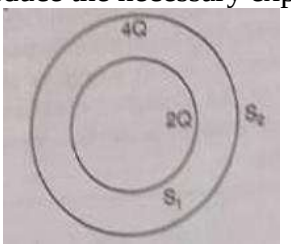
OR

Calculate the electric field intensity at a distance of 10 cm from the centre of a short dipole of moment $10^{-8}$ SI units on its equatorial line. What is the direction of $\vec{E}$ relative to that of $\vec{p}$?

## SECTION E

15. (a) Deduce an expression for the torque acting on an electric dipole of dipole moment $\vec{p}$ placed in a uniform electric field $\vec{E}$.

(b) Consider two hollow concentric spheres, $S_1$ and $S_2$ enclosing charges 2Q and 4Q respectively as shown in the figure. **(i)** Find the ratio of the electric flux through them. **(ii)** How will the electric flux through the sphere $S_1$ change if a medium of dielectric constant '$\epsilon_r$' is introduced in the space inside $S_1$ in place of air? Deduce the necessary expression.




OR

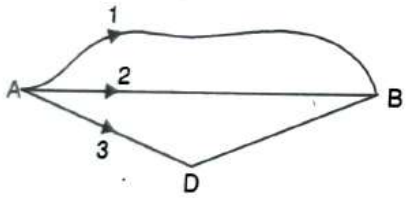
**(a)** Consider a system of n charges $q_1,q_2,...,q_n$ with position vectors $r_1,r_2,r_3,...,r_n$ relative to some origin 'O'. Deduce the expression for the net electric field $\vec{E}$ at a point P with position vector $\vec{r}$, due to the system of charges. State the principle used.

**(b)** Find the resultant electric field due to an electric dipole of dipole moment, q·2a, (2a being the separation between the charges ±q) at a point distance 'x' on its equatorial line.

# ELECTOSTATIC POTENTIAL

## SECTION A

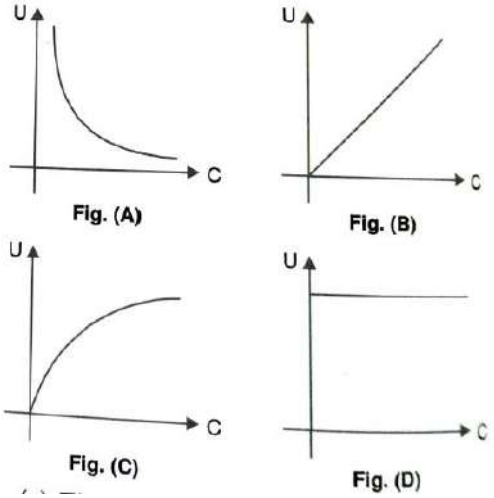
1. A proton is moved from point A to point B along three different paths 1, 2 and 3 shown in the figure. If $W_1$, $W_2$ and W3 denote the work done in the three cases in that order. (Given path 1 is the longest.) We have:




(a) $W_1=W_2=W_3$ (b) $W_2<W_3<W_1$
(c) $W_2>W_3>_{W1}$ (d) $W_1=W_3>W_2$

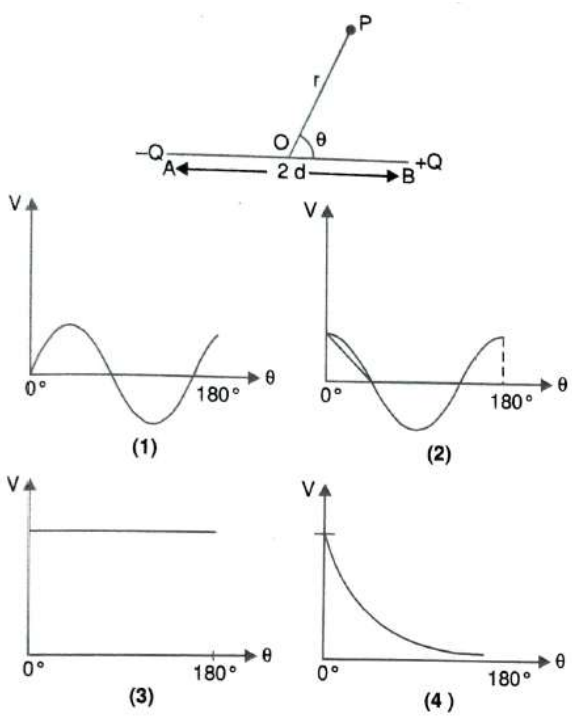
2. A metal sphere 'S' of radius 3 cm is charged. The electrostatic potential on the surface of 'S' is V volts. If OA = 1.5 cm; $V_A$ and $V_O$ denote potentials at A and O respectively, we have:
(a) $V_A = \frac{V}{2}$ volt ; $V_A = \frac{V}{.03}$ volts
(b) $V_A$=V volt; $V_O$= 0 volt
(c) $V_A$ = 2V volt; $V_O$ = ∞ volts
(d) $V_A$= $V_O$ = V volts

**3.** The graph which correctly represents the variation of energy stored 'U' in a capacitor versus capacitance 'C' for constant charge is shown in:



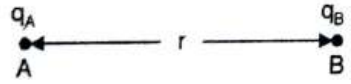

(a) Fig. (A) (b) Fig. (B)
(c) Fig. (C) (d) Fig. (D)

**4.** A short electric dipole consists of two charges '-q' and '+q' placed at points A and B separated by a distance 2d. P is a point (r, θ) with respect to the dipole (±q, 2a) as shown. Other factors remaining same; the variation of the potential 'V' at P verses θ; as θ changes from $0^0$ to $180^0$ is correctly represented as in Figure.




(a) (1) (b) (2) (c) (3) (d) (4)

5. Two unequal charges $q_A$ and $q_B$ ($q_A > q_B$) are placed at A and B as shown. Which of the following statements is correct for the system?




(a) $\vec{E}_{BA} = -\vec{E}_{AB}$; $V_{BA} = -V_{AB}$

(b) $\vec{F}_{BA} = -\vec{F}_{AB}$; $V_{AB} = V_{BA}$

(c) $V_{AB} = V_{BA}$; $\vec{E}_{BA} \neq -\vec{E}_{AB}$

(d) $\vec{F}_{BA} = -\vec{F}_{AB}$; $V_{AB} \neq V_{BA}$

INSTRUCTIONS FOR Q.6-Q.7

Two statements are given—one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below.

(a) Both A and R are true and R is the correct explanation of A.

(b) Both A and R are true but R is NOT the correct explanation of A.

(c) A is true but R is false.

(d) A is false and R is also false

6. Assertion (A): For a given capacitor, the capacitance increases as the charge on it is increased.
Reason (R): The capacitance of a capacitor is given by the relation $C = \frac{q}{V}$. So $C \propto q$.

7. Assertion (A): The electric field intensity at any point on the surface of a conductor is perpendicular to the surface.
Reason (R): The surface of a conductor is an equipotential surface.

## SECTION B

**8.** Two uniformly charged large parallel thin plates having charge densities +σ and −σ are held a vertical distance 'd' apart. Sketch an equipotential surface due to electric field between the plates. If a particle of mass m and charge '-q' remains stationary between the plates, what is the magnitude and direction of this field?

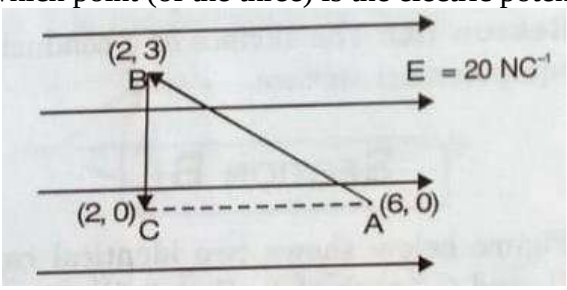
**OR**

A parallel plate capacitor, each of plate area A and separation 'd' between the two plates, is charged with charges +Q and -Q on the two plates. Deduce the expression for the energy stored in the capacitor.

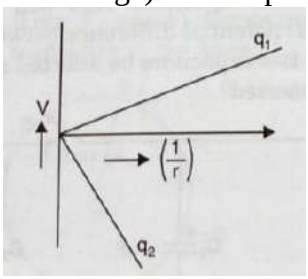
**9.** Two identical slabs, one conducting and the other insulating are placed in turn in a uniform electric field in a region of space. Discuss giving reason, the change in electric field inside the two slabs. What is an equipotential surface? Show that the electric field intensity is perpendicular to the surface at every point.

OR

A test charge 'q' is moved without acceleration from A to C along the path from A to B and then from B to C in electric field E as shown in the figure. (i) Calculate the potential difference between A and C. (ii) At which point (of the three) is the electric potential minimum and why?




**10.** The two graphs drawn below, show the variation of electrostatic potential (V) with $\frac{1}{r}$ (r being distance of the field point from the point charge) for two point charges $q_1$ and $q_2$.



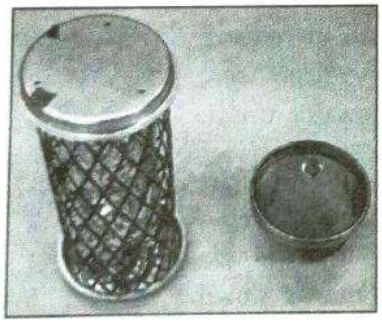

**(i)** What are the signs of the two charges? **(ii)** Which of the two charges has a larger magnitude and why?

## SECTION D

**CASE STUDY**

**11.** Read the following paragraph and answer the questions:

A Faraday cage or Faraday shield is an enclosure made of a conducting material. The electric fields within a conductor cancel out with any external fields, so the electric field within the enclosure is zero. These Faraday cages act as big hollow conductors you can put things in to shield them from electrical fields. Any electrical shocks the cage receives, pass harmlessly around the outside of the cage.



**(i)** Give two examples of materials which cannot be used to make Faraday's cage.
**(ii)** Electric field at a point P inside Faraday's cage with net charge Q in it is E. How will the field change if the net charge inside the cage is increased?
**(iii)** How does the electric field inside Faraday's cage change if:

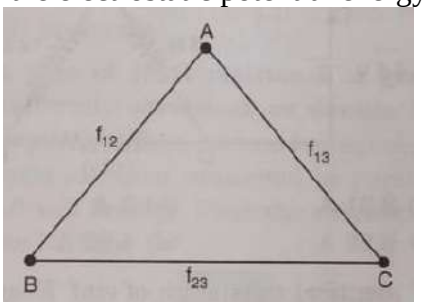
**(a)** the dimensions of the cage are increased without changing its shape?
**(b)** the cage is made spherical instead of cylindrical?
**(c)** the cage is made of an insulating material?
**(d)** one of a number of charges is shifted out of the cage?

OR

An experiment is to be performed in a region free from the influence of electric field. Suggest a suitable set-up for the same and justify your answer. Can electric field lines pass through Faraday's cage?

## SECTION E

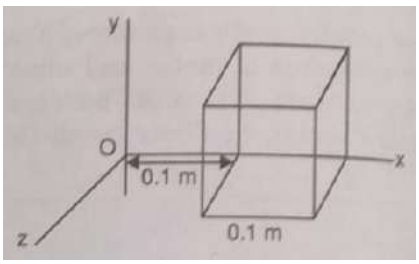
**12.** (a) Define electrostatic potential at a point. Write its S.I. unit.
Three point charges $q_1$, $q_2$ and $q_3$ are kept respectively at points A, B and C as shown in the figure. Derive the expression for the electrostatic potential energy of the system.




(b) Depict the equipotential surface due to:

(i) an electric dipole.
(ii) an infinitely large uniformly charged flat sheet.

13. Given: $E_x$=ax, where a=500 Nm/C
$E_y$ = 0, $E_z$ = 0.




Calculate (i) the flux through the cube, and (ii) the charge inside the cube.