NEW STANDARD ACADEMY

DPP -01 **NEET - JEE**

CLASS : 12TH

PHYSICS

1. An uncharged insulated conductor A is brought near a charged insulated conductor B. What happens to charge and potential of B?

2. Two electric field lines never cross each other. Why?

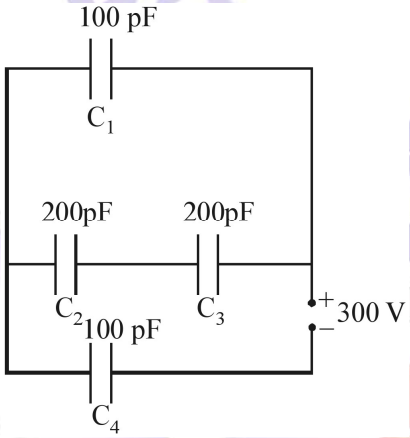
3. Write the S.I. unit of (i) electric field intensity and (ii) electric dipole moment.

4. Acube ofside bhasacharge qateach of its vertices. Determine the potential and electric field due to this charge array at the centre of the cube.

5. Two tiny spheres carrying charges 1.5 μC and2.5 μC are located 30 cm apart. Find the potential and electric field:

(a) at the mid-point of the linejoining the two charges, and
(b) at a point 10 cm from this midpoint in a plane normal to the line and passing through the mid-point.

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



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

8. A spherical capacitor has an inner sphere of radius 12 cm and an outer sphere of radius 13 cm. The outer sphere is earthed and the inner sphere is given a charge of 2.5 μC. The space between the concentric spheres is filled with a liquid of dielectric constant32.

(a) Determine the capacitance of the capacitor.
(b) What is the potential of the inner sphere?
(c) Compare the capacitance of this capacitor with latter is much smaller.

9. Answercarefully:

(a) Two large conducting spheres carrying charges Q_1 and Q_2 are brought close to each other. Is the magnitude of electrostatic force between them exactly given b $yQ_1Q_2 / 4\pi\varepsilon_0 r^2$, where r is the distance between their *centres* ?
(b) If Coulomb's law involved $1/r^1$ dependence (instead of $1/r^2$), would Gauss's law be still true?
(c) A small test charge is released at rest at a point in an electrostatic field configuration. Will it travel along the field line passing through that point?
(d) What is the work done by the field ofanucleus in a complete circular orbit of the electron? What if the orbit is elliptical?
(e) We know that electric field is discontinuous across the surface of a charged conductor. Is electric potential also discontinuous there?
(1) What meaning would you give to the capacitance of a single conductor?
(g) What meaning would you give to the capacitance of a single conductor?

10. A cylindrical capacitor has two co-axial cylinders of length 15 cm and radii 1.5 cm and 1.4 cm. The outer cylinder is earthed and

the inner cylinder is given a charge of 3.5 μC. Determine the capacitance of the system and the potential of the inner cylinder. Neglect end effects (i.e., bending of field lines at the ends).

CHEMISTRY

1. Define the term molarity
2. Define the term mass percentage.
3. State the main advantage of molality over molarity as the unit of concentration.
4. What is the sum of mole fractions of all the components in a three component system?
5. What is the difference between molality and molarity of a solution?
6. Why do gases nearly always tend to be less soluble in liquid as the temperature is raised?
7. If a table spoon of sugar is added to water, then what happens to vapour pressure of water?
8. The dissolution of NH_4Cl in water is endothermic process what will be the effect of temperature on its solubility:
9. Define Raoult's law in its general form in reference to solutions.
10. What type of liquids from ideal solutions?

BIOLOGY

1 What do you understand by the term meiocyte?
2 Which mode of reproduction insure creation of new variants?
3 Arrange the following terms in the correct development sequence pollen grains , sporogenus tissue ,microspore tetrade ,pollen mother cell and male gametes.
4 What is the apomixis and what is its importance?
5 Why Apple is a false fruit?
6 What does a seed consist of?
7 What is a double fertilization?
8 Define the gene?
9 What is the alleles?
10 what is Recombination ?

MATHS

1. Let $f: R \to R$ be defined as $f(x) = \dfrac{2x-3}{4}$, Write $fof^{-}(1)$.
2. Classify the following functions as injection, surjection or objection.
   $f: Z \to$, defined by $f(x) = x^2 + x$
3. If $f(x) = 2x + 5$ and $g(x) = x^2 + 1$ be two real functions, then describe each of the following functions f^2
4. Let $f: R \to R$ be defined by $f(x) = x^4$, write $f^{-1}(1)$.
5. Let $f: \left(-\dfrac{\pi}{2}, \dfrac{\pi}{2}\right) \to R$ be a function defined by $f(x) = \cos[x]$. Write range (f).
6. If $A = \{1,2,3,4,5,\ldots,n\}$ where n is a natural number, then find the number of invertible functions that can be defined from the set A to itself.
7. If $f(x) = [x]$ and $g(x) = x[x]$, then find the range of the function of.
8. If $f(x) = \cos[\pi^2]x + \cos[-\pi^2]x$, where, [x] denotes the greatest integers less then or equal to x, then write the value of $f(\pi)$.
9. If $f: \mathbf{R} \to \mathbf{R}$ and $g: \mathbf{R} \to \mathbf{R}$ are defined by $f(x) = x^2 + 3x + 1$, $g(x) = 2x - 3$ for all $x \in R$, find formulae for
   (i) fog (ii) gof (iii) fof (iv) gog.
10. Let $f: N \to N$ be defined by
$$f(n) = \begin{cases} n+1, & \text{if n is odd} \\ n-1, & \text{if n is even} \end{cases}$$
Show that f is a objection.