NEW STANDARD ACADEMY

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Exam : MOCK- 10	NEET - JEE	Marks: 60
Date : 15-05-23	CLASS : 12TH	Time: 3 HRS

PHYSICS

1. 5J work is done in moving a positive charge of 0.5 C between two points. What is the potential difference between these points?

2. Two points A and B are located in diametrically opposite directions of a point charge of $+2\,\mu C$ at distances 2 m and 1 m respectively from it. The potential difference between A and B is____

3. Two point charges 4×10^{-9} C and -3×10^{-9} C are located 0.10 m apart. At what point on the line joining the two charges is the electrical potential zero? Take the potential at infinity to be zero.

4. An electric dipole consists of two charges of $\pm 0.1\,\mu C$ separated by a distance of 2.0 cm. The dipole is placed in an external field of $10^5\,N/C$. What maximum torque does the field exert on the dipole?

5. Find: (i) the equivalent capacitance and (ii) the total energy stored in the system of capacitors given in the network. The charging battery has an emf of 4 V.
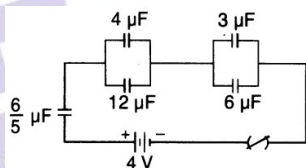
6. A hexagon of side 8 cm has a charge 4 µC at each of its vertices. The potential at the centre of the hexagon is.

7. Two charged conducting spheres of radii a and b are connected to each other by a wire. The ration of electric fields at the surfaces of two spheres is

8. Figure shows tracks of three charged particles in a uniform electrostatic field. Give the signs of the three charges. Which particle has the highest charge to mass ratio?
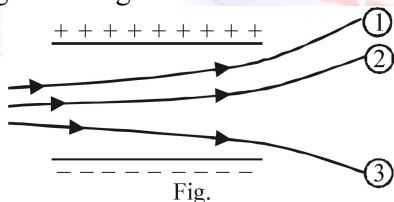

Fig.

9. Careful measurement of the electric field at the surface of a black box indicates that the net outward flux through the surface of the box is $8.0 \times 10^3\,Nm^2/C$.
   (a) What is the net charge inside the box?
   (b) If the net outward flux through the surface Of the box were zero, could you con clude that there were no charges inside the box? Why or why not?

10. A point charge of $2.0\,\mu C$ is at the centre of a cubic Gaussian surface 9.0 cm on edge. What is the net electric flux through the surface?

CHEMISTRY

1. A solution obtained by mixing 300 g of 25% and 400 g of 40% solution by mass. Calculate the mass % of the resulting solution.

2. An aqueous solution of 2% non-voltile solute exerts a pressure of 1.004 bar at the normal boiling point of the solvent. What is the molar mass of the solute?

3. 6.8 g of a compound is dissolved in 100 g water. Calculate osmotic pressure of this solution at 298 K, when boiling point of is 100. 11°C K_b for water is $0.52\,K\,m^{-1}$.

4. For benzene, molal elevation constant is 2.52 K m^{-1}. A solution of some organic substance in benzene boils at 0.126^{o}C higher than benzene. Calculate the molality of the solution.

5. How many grams KCl should be added to 1 kg of water of lower its freezing point to -8.0^{o}C. (K_f for water = 1.86^{o}C kg mol^{-1}).

6. On dissolving 30 g of non-volatile solute in 90 g of water a solution is made. It has a vapour pressure of 2.8 kPa at 298 K. Vapour pressure of pure water is 3.64 kPa at the same temperature. What is the molar mass of solute?

7. Assuming the electrode potential to the reduction potential, write the correct expression for computing the emf of a cell, E_{cell}. Use E_{anode} and $E_{cathode}$ as the respectively potential for the anode and the cathode respectively.

8. What is molar conductivity?

9. Why does the conductivity of a solution decrease with dilution?

10. What is the unit of molar conductivity?

BIOLOGY

1. Justify the statement vegetative reproduction is also a type of asexual reproduction.

2. Give difference between albuminous and non-albuminous seed with an example?

3. In diploid organism is a heterozyous for 4 loci how many types of gametes can be produced explain it.

4. Two heterozygous parents are crossed if the two loci are linked what would be the distribution of phenotypic features in F1 generation for dihybrid cross?

5. What is point mutation? Give one example.

6. What are dual function of deoxy ribo nucleoside tri phosphate?

7. Differentiate between template strand and coding strand .

8. Name a few enzymes involved in DNA replication other than DNA polymer is and ligase . Name the key function for each of them.

9. What is the function of a histone in DNA packaging?

10. Distinguish between heterochromatin and euchromatin which of the two is transcripinally active?

MATHS

1. Let f be an invertible real function. Write
$(f^{-1} \, of) \, (1) + (f^{-1} \, of) \, (2) + ... + (f^{-1} of)(100)$.

2. If $A = \{1,2,3,4,5,...,n\}$ where n is a natural number, then find the number of invertible functions that can be defined from the set A to itself.

3. If $f(x) = [x]$ and $g(x) = x[x]$, then find the range of the function of.

4. Find the domain and range of the following function :

$$\left\{ \left(x; \frac{x^2 - 9}{x - 3} \right) ; x \in R, x \neq 3 \right\}$$

5. Prove that the function $f : N \to N$ defined by
$f(m) = m^2 + m + 1$ for all $m` \in N$ is one-one but not onto.

6. (a) Let $f : \mathbf{Z} \to \mathbf{Z}$ be defined as f(n) = 3n for all $n \in \mathbf{Z}$. Let $g : \mathbf{Z} \to \mathbf{Z}$ be defined as

$$g(n) = \begin{cases} \dfrac{n}{3} \text{ if } n \text{ is a muiltiple of } 3 \\ 0 \text{ if } n \text{ is not a multiple of } 3 \end{cases}$$

Show that $gof = I_Z$ and $fog \neq I_Z$.

7. Let f (x) $= \begin{cases} 1 + x \, , \, 0 \le x \le 2 \\ 3 - x \, , \, 2 < x \le 3 \end{cases}$. Find fof.

8. Consider f : R $\to R_+ \to [4, \infty]$ given by f(x) $= x^2 + 4$, Show that f is invertible with inverse f^{-1} of f given by
f^{-1} (x) $= \sqrt{x - 4}$, where R$^+$ is the set of all non-negative real number.

9. Let $f : N \to N$ be defined by

$$f(n) = \begin{cases} \dfrac{n+1}{2}, if \, n \, is \, odd \\ \dfrac{n}{2}, \quad if \, n \, is \, even \end{cases} \text{ for all } n \in N .$$

State whether the function f is bijective. Justify your answer.

10. Let A and B be two sets. Show that $f : A \times B \to B \times A$ defined by $f(a,b) = (b,a)$ is a bijection.