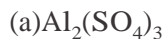


## SAMPLE QUESTIONS - PHYSICS

- Two point charges  $+4q$  and  $+q$  are placed 30 cm apart. At which point on the line joining them, the electric field is zero?  
(a) 15 cm from the charge  $q$                       (b) 7.5 cm from the charge  $q$   
(c) 20 cm from the charge  $4q$                       (d) 5 cm from the charge  $4q$
- The electric field outside the plates of two oppositely charged plane sheets of charge density  $\sigma$  is  
(a)  $+\sigma/2\epsilon_0$                       (b)  $-\sigma/2\epsilon_0$                       (c)  $+\sigma/\epsilon_0$                       (d) Zero
- Principle of electrostatic induction is used in  
(a) capacitors                      (b) inductors                      (c) generators                      (d) resistors
- When a number of capacitors of equal capacitances were connected in series, the effective capacitance is  $0.4 \mu\text{F}$  and when they were connected in parallel, the effective capacitance is  $90 \mu\text{F}$ . What is the capacitance of each capacitor?  
(a)  $9 \mu\text{F}$                       (b)  $10 \mu\text{F}$                       (c)  $6 \mu\text{F}$                       (d)  $3 \mu\text{F}$
- If  $p$  is the dipole moment of the dipole placed in an uniform electric field  $E$ , then the torque acting on it is given by  
(a)  $Pe$                       (b)  $Pe \cos \theta$                       (c)  $Pe \sin \theta$                       (d)  $Pe \theta$

## SAMPLE QUESTIONS – CHEMISTRY

- Schottky defect in crystals is observed when  
(a) Unequal number of cations and anions are missing from the lattice.  
(b) Equal number of cations and anions are missing from the lattice.  
(c) An ion leaves its normal site and occupies an interstitial site.  
(d) Density of the crystal is increased.
- Super conductors are derived from the compounds of  
(a) P – block elements                      (b) Lanthanides  
(c) Actinides                      (d) Transition elements
- Which of the following FCC structure contains cations in alternate tetrahedral voids?  
(a) NaCl                      (b) ZnS  
(c) Na<sub>2</sub>O                      (d) CaF<sub>2</sub>
- A 500 g toothpaste sample has 0.2g fluoride concentration. What is the concentration of fluorine in terms of ppm level?  
(a) 250                      (b) 200  
(c) 400                      (d) 1000
- Which of the following 0.10M aqueous solution will have the lowest freezing point?



### SAMPLE QUESTIONS – MATHEMATICS

- Let  $V = \{-2, -1, 0, 1, 2\}$   $f$  be a function defined by  $f(x) = X^2 + 1$ . Find the range of  $f$ .  
a)  $\{1, 2, 3\}$       b)  $\{2, 3, 4\}$       c)  $\{1, 2, 5\}$       d) none of these
- Which of the following is an odd function?  
a)  $X^2 + X$       b)  $e^{-x} + X$       c)  $X^3$       d)  $\cos X$
- If  $f(x) = 5x + 4$ , for what value of  $x$  is  $2f(x) = f(3x)$   
a)  $\frac{5}{4}$       b)  $\frac{4}{5}$       c)  $\frac{5}{5}$       d)  $\frac{4}{5}$
- Let  $A = \{1, 2, 3, 4\}$   $B = \{a, b, c, d, e\}$  and  $f : A \rightarrow B$  is such that then  $f = \{(1, a), (2, b), (3, c), (4, b)\}$  then  $f$  is  
a) one to one function only      b) onto function only  
c) both one to one and onto function      d) none of these
- Given  $f(x) = x^2 + 1$  and  $g(x) = x + 1$  then  $f \circ g$  is  
a)  $x^2 + (x+1)$       b)  $(x+1)^2 + 1$       c)  $(1+x)^2$       d) none of these

### SAMPLE QUESTIONS – BIOLOGY

- Species plantarum and Genera plantarum were written by  
a. Bentham and Hooker      b. Carolus Linnaeus  
c. Engler and Prantl      d. Hutchinsons
- Select the correct hierarchy  
a. Kingdom, Class, Series, Family, Genera, Species  
b. Kingdom, Series, Class, Family, Genera, Species  
c. Kingdom, Class, Family, Series, Genera, Species  
d. Kingdom, Family, Series, Class, Genera, Species
- Cell Theory was proposed by  
a. Darwin & Wallace      b. Mendel and Morgan  
c. Schleiden & Schwan      d. Watson and Crick
- Animal cells differ from plant cells in having  
a. Endoplasmic reticulum      b. Golgi complex  
c. Centrioles      d. Ribosomes
- Chemical nature of the cell membrane

- a. Mucopolysaccharides
- b. Lipopolysaccharides

- c. Mucoproteins
- d. Lipoproteins