

Sept-2011

XI - Science  
Unit Test - 1 - Question Bank

MCQs - Select and write the most appropriate answer.

- 1) Two rods of same material in length but one has cross-sectional area double the other that of second. If they are heated through same temperature then which rod expands more?
  - (a) thick (b) thin (c) both expands equally (d) none of these
- 2) When water is heated from  $0^{\circ}\text{C}$  to  $10^{\circ}\text{C}$ , its volume...
  - (a) decreases continuously (b) first decreases then increases (c) first increases then decreases (d) increases continuously
- 3) Two metal rods has lengths in the ratio 3:2 and coefficient of linear expansions are in ratio 2:3. If they are heated from  $35^{\circ}\text{C}$  to  $95^{\circ}\text{C}$  then ratio of their linear expansion is
  - (a) 1:2 (b) 2:1 (c) 1:1 (d) 4:9
- 4) Which of the following relation is incorrect?
  - (a)  $\frac{\alpha}{1} = \frac{\beta}{2} = \frac{\gamma}{3}$  (b)  $6\alpha = 3\beta = 2\gamma$  (c)  $\beta = \frac{2}{3}\alpha = 2\gamma$  (d)  $2\alpha = \frac{3}{2}\beta = \gamma$
- 5)  $32^{\circ}\text{F}$  is equal to...
  - (a)  $212^{\circ}\text{K}$  (b)  $212^{\circ}\text{C}$  (c)  $273.15^{\circ}\text{C}$  (d)  $273.15^{\circ}\text{K}$
- 6) Coulomb's force between two point charges separated by certain distance in air is  $F$ . If the same charges are situated in medium at same place then Coulomb's force reduces to  $F/4$ . The dielectric constant of medium will be
  - (a) 2 (b) 4 (c) 6 (d) 5
- 7) Substances whose molecule possess electric dipole are... substances
  - (a) unipolar (b) nonpolar (c) polar (d) none
- 8) If the distance between two point charges is doubled and magnitude of charges are also doubled, the Coulomb's force between them will be
  - (a) same (b) half (c) two times (d) four times.
- 9) Two positive charges of same magnitude are kept 20 cm apart. A point between the charges will have zero intensity is at
  - (a) 5 cm from the first charge (b) 5 cm from the second charge (c) midway between two charges (d) can not be predicted.
- 10) When axis of dipole is perpendicular to uniform electric field, moment of couple is
  - (a) zero (b) minimum (c) maximum (d) infinity

Questions

- (1) Obtain an expression for the intensity of an electric field a point due to point charge
- (2) Explain what is meant by dielectric constant medium?
- (3) What is meant by an electric dipole and an electric dipole moment?
- (4) What is principle of superposition of forces?
- (5) State Coulomb's law in electrostatics and express it in vector form
- (6) What are electric lines of force? State their properties

- ⑦ Define coefficient of linear expansion, coefficient of superficial expansion and coefficient of cubical expansion of solids
- ⑧ What are different scales of thermometer? What is the relation between them?
- ⑨ Define principal and molar specific heat of a gas at (i) constant volume and (ii) constant pressure
- ⑩ What is meant by an ideal gas? Derive the ideal gas equation  $PV = nRT$
- ⑪ Write a short note on absolute scale of temperature
- ⑫ What do you understand by the term temperature and heat?

### Problems

- (1) The distance between electron and proton in the H-atom is about  $2.64 \times 10^{-11} \text{ m}$ . What is electric force acting between them. (Magnitude of charge of proton = magnitude of charge of electron =  $1.6 \times 10^{-19} \text{ C}$ )
- (2) What is the force experienced by a test charge of  $0.2 \text{ mC}$  placed in an electric field of  $3.2 \times 10^6 \text{ N/C}$ ?
- (3) Two charges  $2 \times 10^{-7} \text{ C}$  and  $3 \times 10^{-7} \text{ C}$  are separated by distance  $30 \text{ cm}$  in air. Calculate force between two charges ( $\frac{1}{4\pi\epsilon_0} = 9 \times 10^9 \text{ Nm}^2/\text{C}^2$ )
- (4) The length of metal rod is  $150 \text{ cm}$  at  $25^\circ \text{C}$ . Find its length when it is heated to  $150^\circ \text{C}$ . ( $\alpha$  for steel =  $2.2 \times 10^{-5} / ^\circ \text{C}$ )
- (5) A certain mass of gas at  $20^\circ \text{C}$  is heated until both its pressure and volume are doubled. Calculate its final temperature
- (6) ~~What~~ If the temperature in a room is  $30^\circ \text{C}$ . What is its temperature in degree Fahrenheit?