Subject: Physics	**GRADE XI (SCIENCE)**	**F.M.: 40**
Time : 1:30 hrs.	**SET A**	**P.M.: 20**

Group A

A. Multiple choice question. [1×7 = 7]

1. The force F is given in terms of time t and displacement x by the equation $F = A\cos Bx + C\sin Dt$
   What is the dimension of D/B?
   a) $[M^0L^1T^{-1}]$ b) $[M^1L^1T^{-1}]$
   c) $[M^0L^1T^1]$ d) $[M^1L^0T^{-1}]$

2. Two forces $\vec{F_1} = 5\hat{i} + 10\hat{j} - 20\hat{k}$ and $\vec{F_2} = 10\hat{i} - 5\hat{j} - 15\hat{k}$ act on a single point the angle between $\vec{F_1}$ and $\vec{F_2}$ is
   a) 60° b) 90° c) 45° d) 30°

3. The density of a solid at normal pressure is ρ. When the solid is subjected to an excess pressure P, the density charges to ρ'. If the bulk modulus of the solid is k then the ratio $\frac{\rho'}{\rho}$ is
   a) $1+\frac{P}{K}$ b) $1+\frac{K}{P}$ c) $\frac{P}{P+K}$ d) $\frac{K}{P+K}$

4. Two rods of materials A and B are of same length linear expansively of A and cubical expasivity of B are $12\times10^{-6}\ K^{-1}$ and $3\times10^{-5}\ K^{-1}$ respectively. If both the rods are heated from the same temp. to 80°C the length of the rod A will be
   a) Large than rod B b) Double than length rod B
   c) Equal to length rod B d) Shorter than the length of rod B

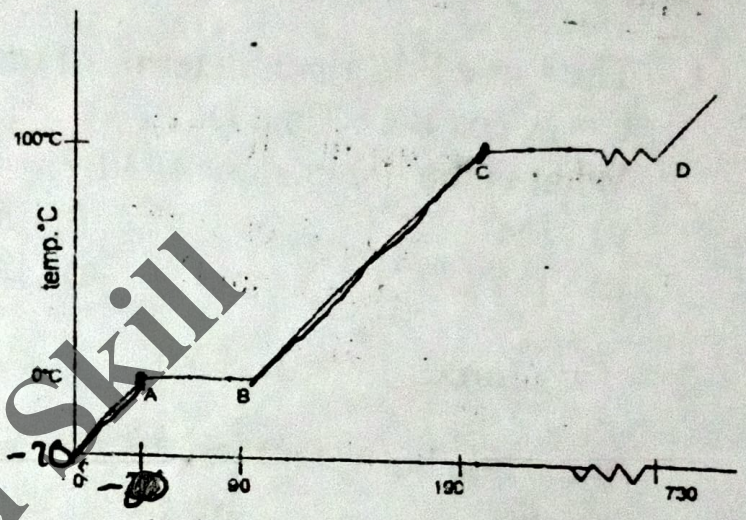
5. $\gamma_r = \gamma_g + \gamma_a$, where, γ_r is real expansivity of liquid and γ_a is apparent expansivity of liquid for γ_a +ve when liquid is heated, the liquid level
   a) rises b) falls c) remains same d) can't be predicted

6. A concave mirror of focal length f produces an image n times the size of the object. If the image is real then the distance of the object from the mirror is
   a) (n–1)f b) $\left(\frac{n-1}{n}\right)f$ c) $\left(\frac{n+1}{n}\right)f$ d) (n+1)f

7. The ratio of electric force between two electrons to two protons separated by the same distance in air is
   a) 10^0 b) 10^6 c) 10^4 d) None

Short questions [5×3 = 15]

8. i) Derive an expression for the force required to make a particle of mass moving in a circle of radius r with uniform velocity v. [3]
   ii) A particle of mass 2kg travel in a circle of radius 10m at a constant speed of 20m/s what is the magnitude of the acceleration and force? [2]
9. i) What type of mirror will you suggest for shaving on makeup purpose and why? [2]
   ii) An object 10cm high is placed in front of a convex mirror of focal length 20cm and object is 30cm the mirror. Find the height of the image. [3]
10. i) Explain, the method of mixture to determine the sp. heat capacity of solid. [3]
    ii) A newly born baby quickly wrapped with cotton cloths why? [2]
11. The graph between temp. vs heat required per unit mass of water is shown in fig below. Study the fig. and answer the following questions.
    a) Write down the temp. and state of water at point A and C. [1]
    b) The slope of OA is greater than BC, what does it signify? [2]
    c) Calculate the total amount of heat required to convert –20°C 15 gm ice into 100°C steam. [2]



12. i) Define electric field intensity and derive the expression for electric field intensity due to a point charge. [1+2]
    ii) A charged oil drop remains stationary when situated between two parallel horizontal metal plates between which there is an electric field of intensity 2×10^4 V/m. If mass of the drop is 4.8×10^{-15} kg. Find the number of electrons attached to the drop. [2]

Group C

Long question [1×8 = 8]

13. i) Derive following equations of motion from velocity – time graph.
    a) $v = u + at$ [1]
    b) $S = ut + \frac{1}{2}at^2$ [2]
    c) $v^2 = u^2 + 2as$ [2]
    ii) A body is dropped from the top of the tower of height 60 m at the same time another object is projected vertically upward form the foot of the tower with velocity 20m/s. Find when and where they meet each other. [3]