

### CONCEPT ACHIEVEMENT TEST (CAT-3)

1. Three liquids with masses  $m_1$ ,  $m_2$ ,  $m_3$  are thoroughly mixed. If their specific heats are  $c_1$ ,  $c_2$ ,  $c_3$  and their temperatures  $T_1$ ,  $T_2$ ,  $T_3$  respectively, then the temperature of the mixture is

(1)  $\frac{c_1 T_1 + c_2 T_2 + c_3 T_3}{m_1 c_1 + m_2 c_2 + m_3 c_3}$  (2)  $\frac{m_1 c_1 T_1 + m_2 c_2 T_2 + m_3 c_3 T_3}{m_1 c_1 + m_2 c_2 + m_3 c_3}$

(3)  $\frac{m_1 c_1 T_1 + m_2 c_2 T_2 + m_3 c_3 T_3}{m_1 T_1 + m_2 T_2 + m_3 T_3}$  (4)  $\frac{m_1 T_1 + m_2 T_2 + m_3 T_3}{c_1 T_1 + c_2 T_2 + c_3 T_3}$

$\Rightarrow T = \frac{m_1 c_1 T_1 + m_2 c_2 T_2 + m_3 c_3 T_3}{m_1 c_1 + m_2 c_2 + m_3 c_3}$

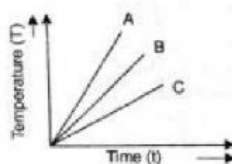
2. A vessel contains 110 g of water. The heat capacity of the vessel is equal to 10 g of water. The initial temperature of water in vessel is  $10^\circ\text{C}$ . If 220 g of hot water at  $70^\circ\text{C}$  is poured in the vessel, the final temperature neglecting radiation loss, will be

- (1)  $70^\circ\text{C}$  (2)  $80^\circ\text{C}$  (3)  $60^\circ\text{C}$  (4)  $50^\circ\text{C}$

3. 2 gm of steam condenses when passed through 40 gm of water initially at  $25^\circ\text{C}$ . The condensation of steam raises the temperature of water to  $54.3^\circ\text{C}$ . What is the latent heat of steam

- (1) 540 cal/g (2) 536 cal/g (3) 270 cal/g (4) 480 cal/g

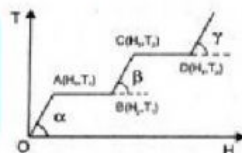
4. Which of the substances A, B or C has the highest specific heat? The temperature vs time graph is shown



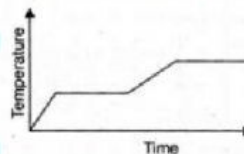
- (1) A  
(3) C

- (2) B  
(4) All have equal specific heat

5. The graph shows the variation of temperature (T) of one kilogram of a material with the heat (H) supplied to it. At O, the substance is in the solid state. From the graph, we can conclude that



- (1)  $T_2$  is the melting point of the solid  
 (2) BC represents the change of state from solid to liquid  
 (1)  $(H_2 - H_1)$  represents the latent heat of fusion of the substance  
 (4)  $(H_3 - H_1)$  represents the latent heat of vaporization of the liquid
6. Heat is supplied to a certain homogenous sample of matter, at a uniform rate. Its temperature is plotted against time, as shown. Which of the following conclusions can be drawn



- (1) Its specific heat capacity is greater in the solid state than in the liquid state  
 (2) Its specific heat capacity is smaller in the liquid state than in the solid state  
 (3) Its latent heat of vaporization is greater than its latent heat of fusion  
 (4) Its latent heat of vaporization is smaller than its latent of fusion
7. If 10 g of ice is added to 40 g of water at  $15^\circ\text{C}$ , then the temperature of the mixture is  
 (specific heat of water =  $4.2 \times 10^5 \text{ J kg}^{-1} \text{ K}^{-1}$ ). Latent heat of fusion of ice =  $3.36 \times 10^5 \text{ J kg}^{-1}$ )  
 (1)  $15^\circ\text{C}$  (2)  $12^\circ\text{C}$  (3)  $10^\circ\text{C}$  (4)  $0^\circ\text{C}$

8. Match the following:

Column – I		Column – II	
(1)	Conversion of a liquid	(p)	Regulation
(2)	Conversion of a liquid into vapour is	(q)	Sublimation
(3)	Conversion of solid into vapour directly	(r)	Fusion
(4)	Melting of ice caused by pressure is	(s)	Vaporisation

(1) A – r, B – q, C – p, D – s

(1) A – q, B – p, C – s, D – r

(2) A – r, B – s, C – q, D – p

(4) A – p, B – q, C – r, D – s