12. Thermometry, Thermal Expansion and Calorimetry – Multiple Choice Questions

1. Thermometry

1. On centigrade scale the temperature of a body increases by 30 degrees. The increase in temperature on Fahrenheit scale is

(a) 50° (b) 40°

(c) 30° (d) 54°

2. The temperature of the sun is measured with

(a) Platinum thermometer

(b) Gas thermometer

(c) Pyrometer

(d) Vapour pressure thermometer

3. Thermoelectric thermometer is based on

(a) Photoelectric effect (b) Seebeck effect

(c) Compton effect (d) Joule effect

4. If temperature of an object is 140°*F*, then its temperature in centigrade is

(a) 105°*C* (b) 32°*C*

(c) 140°*C* (d) 60°*C*

5. On a new scale of temperature (which is linear) and called the *W* scale, the freezing and boiling points of water are 39° *W* and 239° *W* respectively. What will be the temperature on the new scale, corresponding to a temperature of 39° *C* on the Celsius scale

(a) 200° *W* (b) 139° *W*

(c) 78° *W* (d) 117° *W*

6. Absolute scale of temperature is reproduced in the laboratory by making use of a

(a) Radiation pyrometer

(b) Platinum resistance thermometer

(c) Constant volume helium gas thermometer

(d) Constant pressure ideal gas thermometer

7. Mercury thermometers can be used to measure temperatures upto

(a) 100°C (b) 212°C

(c) 360°C (d) 500°C

8. Mercury boils at 367°*C*. However, mercury thermometers are made such that they can measure temperature up to 500°*C*. This is done by

(a) Maintaining vacuum above mercury column in the stem of the thermometer

(b) Filling nitrogen gas at high pressure above the mercury column

(c) Filling nitrogen gas at low pressure above the mercury level

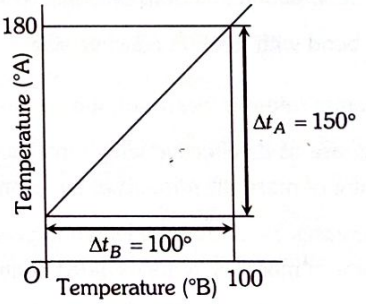
(d) Filling oxygen gas at high pressure above the mercury column

9. A constant volume gas thermometer shows pressure reading of 50*cm* and 90*cm* of mercury at 0°*C* and 100°*C* respectively. When the pressure reading is 60 *cm* of mercury, the temperature is

(a) 25°*C* (b) 40°*C*

(c) 15°*C* (d) 12.5°*C*

10. The graph between two temperature scales *A* and *B* is shown in figure between upper fixed point and lower fixed point there are 150 equal division on scale *A* and 100 on scale *B*. The relationship for conversion between the two scales is given by



(a) $\frac{t_A - 180}{100} = \frac{t_B}{150}$ (b) $\frac{t_A - 30}{150} = \frac{t_B}{100}$

(c) $\frac{t_B - 180}{150} = \frac{t_A}{100}$ (d) $\frac{t_B - 40}{100} = \frac{t_A}{180}$

11. Heat is associated with

(a) Kinetic energy of random motion of molecules

(b) Kinetic energy of orderly motion of molecules

(c) Total kinetic energy of random and orderly motion of molecules

(d) Kinetic energy of random motion in some cases and kinetic energy of orderly motion in other

2. Thermal Expansion

1. Expansion during heating

(a) Occurs only in solids

(b) Increases the weight of a material

(c) Decreases the density of a material

(d) Occurs at the same rate for all liquids and solids

2. A brass disc fits simply in a hole of a steel plate. The disc from the hole can be loosened if the system

(a) First heated then cooled

(b) First cooled then heated

(c) Is heated

(d) Is cooled

3. If a cylinder of diameter $1.0\ cm$ at $30°C$ is to be fitted into a hole of diameter $0.9997\ cm$ in a steel plate at the same temperature, then minimum required rise in the temperature of the plate is : (Coefficient of linear expansion of steel $=12\times10^{-6}/°C$)

(a) 25°C (b) 35°C

(c) 45°C (d) 55°C

4. A bimetallic strip is made of aluminium and steel ($\alpha_{Al} > \alpha_{steel}$) .On heating, the strip will

(a) Remain straight

(b) Get twisted

(c) Will bend with aluminium on concave side

(d) Will bend with steel on concave side

5. As the temperature is increased, the period of a pendulum

(a) Increase as its effective length increases even though its centre of mass still remains at the centre of the bob

(b) Decreases as its effective length increase even though its centre of mass still remains at the centre of the bob

(c) Increases as its effective length increases due to shifting to centre of mass below the centre of the bob

(d) Decreases as its effective length remains same but the centre of mass shifts above the centre of the bob

6. A uniform metallic rod rotates about its perpendicular bisector with constant angular speed. If it is heated uniformly to raise its temperature slightly

(a) Its speed of rotation increases

(b) Its speed of rotation decreases

(c) Its speed of rotation remains same

(d) Its speed increases because its moment of inertia increases

7. The radius of a metal sphere at room temperature T is R and the coefficient of linear expansion of the metal is α. The sphere heated a little by a temperature ΔT so that its new temperature is $T+\Delta T$. The increase in the volume of the sphere is approximately

(a) $2\pi R\alpha\Delta T$ (b) $\pi R^2\alpha\Delta T$

(c) $4\pi R^3\alpha\Delta T/3$ (d) $4\pi R^3\alpha\Delta T$

8. If the length of a cylinder on heating increases by 2%, the area of its base will increase by

(a) 0.5% (b) 2%

(c) 1% (d) 4%

9. A solid ball of metal has a concentric spherical cavity within it. If the ball is heated, the volume of the cavity will

(a) Increase (b) Decrease

(c) Remain unaffected (d) None of these

10. A *litre* of alcohol weighs

(a) Less in winter than in summer

(b) Less in summer than in winter

(c) Same both in summer and winter

(d) None of the above

11. Density of substance at $0°C$ is 10 *gm/cc* and at $100°C$, its density is 9.7 *gm/cc*. The coefficient of linear expansion of the substance will be

(a) 10^2 (b) 10^{-2}

(c) 10^{-3} (d) 10^{-4}

12. A beaker is completely filled with water at 4°C. It will overflow if

(a) Heated above 4°C

(b) Cooled below 4°C

(c) Both heated and cooled above and below 4°C respectively

(d) None of the above

13. Two uniform brass rods A and B of length l and $2l$ and radii $2r$ and r respectively are heated to the same temperature. The ratio of the increase in the volume of A to that of B is

(a) 1 : 1 (b) 1 : 2

(c) 2 : 1 (d) 1 : 4

14. The coefficient of volume expansion of a liquid is $49\times10^{-5}K^{-1}$. Calculate the fractional change in its density when the temperature is raised by 30°C.

(a) 7.5×10^{-2} (b) 3.0×10^{-2}

(c) 1.5×10^{-2} (d) 1.1×10^{-2}

15. The coefficient of apparent expansion of a liquid when determined using two different vessels A and B are γ_1 and γ_2 respectively. If the coefficient of linear expansion of the vessel A is α, the coefficient of linear expansion of the vessel B is

(a) $\frac{\alpha\gamma_1\gamma_2}{\gamma_1+\gamma_2}$ (b) $\frac{\gamma_1-\gamma_2}{2\alpha}$

(c) $\frac{\gamma_1-\gamma_2+\alpha}{3}$ (d) $\frac{\gamma_1-\gamma_2}{3}+\alpha$

16. A piece of metal weighs 45 g in air and 25 g in a liquid of density $1.5\times10^3 kg-m^{-3}$ kept at 30°C. When the temperature of the liquid is raised to 40°C, the metal piece weighs 27 g. The density of liquid at 40°C, is $1.25\times10^3 kg-m^{-3}$. The coefficient of linear expansion of metal is

(a) $1.3\times10^{-3}/°C$ (b) $5.2\times10^{-3}/°C$

(c) $2.6\times10^{-3}/°C$ (d) $0.26\times10^{-3}/°C$

17. A glass flask is filled up to a mark with 50 cc of mercury at 18°C. If the flask and contents are heated to 38°C, how much mercury will be above the mark (α for glass is $9\times10^{-6}/°C$ and coefficient of real expansion of mercury is $180\times10^{-6}/°C$)

(a) 0.85 cc (b) 0.46 cc

(c) 0.153 cc (d) 0.05 cc

18. A sphere, a cube and a thin circular plate, all of same material and same mass are initially heated to same high temperature

(a) Plate will cool fastest and cube the slowest

(b) Sphere will cool fastest and cube the slowest

(c) Plate will cool fastest and sphere the slowest

(d) Cube will cool fastest and plate the slowest

19. If an anisotropic solid has coefficients of linear expansion α_x, α_y, and α_z for three mutually perpendicular directions in the solid, its coefficient of volume expansion will be

(a) $(\alpha_x\alpha_y\alpha_z)^{1/3}$ (b) $\alpha_x+\alpha_y+\alpha_z$

(c) $(\alpha_x^2+\alpha_y^2+\alpha_z^2)^{1/2}$ (d) $(\sqrt{\alpha_x}+\sqrt{\alpha_y}+\sqrt{\alpha_z})^2$

3. Calorimetry

1. Melting point of ice

(a) Increases with increasing pressure

(b) Decreases with increasing pressure

(c) Is independent of pressure

(d) Is proportional to pressure

2. It is difficult to cook rice in an open vessel by boiling it a high altitude because of

(a) Low boiling point and high pressure

(b) High boiling point and low pressure

(c) Low boiling point and low pressure

(d) High boiling point and high pressure

3. Triple point of water is

(a) 273.16°F (b) 273.16 K

(c) 273.16°C (d) 273.16 R

4. It is known that wax contracts on solidification. If molten wax is taken in a large vessel and it is allowed to cool slowly, then

(a) It will start solidifying from the top to downward

(b) It will start solidifying from the bottom to upward

(c) It will start solidifying from the middle, upward and downward at equal rates

(d) The whole mass will solidify simultaneously

5. The thermal capacity of 40 g of aluminium (specific heat = 0.2 $cal/g/°C$) is

(a) 40 $cal/°C$ (b) 160 $cal/°C$

(c) 200 $cal/°C$ (d) 8 $cal/°C$

6. Two spheres made of same substance have diameters in the ratio 1 : 2. Their thermal capacities are in the ratio of

(a) 1 : 2 (b) 1 : 8

(c) 1 : 4 (d) 2 : 1

7. The latent heat of vaporization of a substance is always

(a) Greater than its latent heat of fusion

(b) Greater than its latent heat of sublimation

(c) Equal to its latent heat of sublimation

(d) Less than its latent heat of fusion

8. The factor not needed to calculate heat lost or gained when there is no change of state is

(a) Weight (b) Specific heat

(c) Relative density (d) Temperature change

9. Water is used to cool radiators of engines, because

(a) Of its lower density (b) It is easily available

(c) It is cheap (d) It has high specific heat

10. How much heat energy is gained when 5 kg of water at 20°C is brought to its boiling point
(Specific heat of water = 4.2 $kJ\ kg^{-1}c^{-1}$)

(a) 1680 kJ (b) 1700 kJ

(c) 1720 kJ (d) 1740 kJ

11. 80 gm of water at 30°C are poured on a large block of ice at 0°C. The mass of ice that melts is

(a) 30 g (b) 80 g

(c) 1600 g (d) 150 g

12. A liquid of mass M and specific heat S is at a temperature $2t$. If another liquid of thermal capacity 1.5 times, at a temperature of $\frac{t}{3}$ is added to it, the resultant temperature will be

(a) $\frac{4}{3}t$ (b) t

(c) $\frac{t}{2}$ (d) $\frac{2}{3}t$

13. Boiling water is changing into steam. At this stage the specific heat of water is

(a) < 1 (b) ∞

(c) 1 (d) 0

14. How many *grams* of a liquid of specific heat 0.2 at a temperature 40°C must be mixed with 100 g of a liquid of specific heat of 0.5 at a temperature 20°C, so that the final temperature of the mixture becomes 32°C

(a) 175 g (b) 300 g

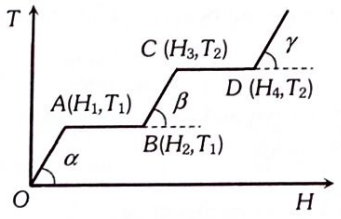
(c) 295 g (d) 375 g

15. Three bodies of the same material and having masses m, m and $3m$ are at temperature $40°C, 50°C$ and $60°C$ respectively. If the bodies are brought in terminal contact, the final temperature will be

(a) $45°C$ (b) $54°C$

(c) $52°C$ (d) $48°C$

16. 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



(a) T_2 is the melting point of the solid

(b) BC represents the change of state from solid to liquid

(c) $(H_2 - H_1)$ represents the latent heat of fusion of the substance

(d) $(H_3 - H_1)$ represents the latent heat of vaporization of the liquid

17. 22320 *cal* of heat is supplied to $100g$ of ice at $0°C$. If the latent heat of fusion of ice is $80\,cal\,g^{-1}$ and latent heat of vaporization of water is $540\,cal\,g^{-1}$, the final amount of water thus obtained and its temperature respectively are

(a) $8g, 100°C$ (b) $100g, 90°C$

(c) $92g, 100°C$ (d) $80g, 100°C$

18. 540 g of ice at 0°C is mixed with 540 g of water at 80°C. The final temperature of the mixture is

(a) 0°C (b) 40°C

(c) 80°C (d) Less than 0°C

19. 19 g of water at $30°C$ and 5 g of ice at $-20°C$ are mixed together in a calorimeter. What is the final temperature of the mixture? Given specific heat of ice = 0.5 cal g^{-1} $(°C)^{-1}$ and latent heat of fusion of ice = 80 cal g^{-1}

(a) $0°C$ (b) $-5°C$

(c) $5°C$ (d) $10°C$

20. 50 g of copper is heated to increase its temperature by 10°C. If the same quantity of heat is given to 10 g of water, the rise in its temperature is (Specific heat of copper = 420 *Joule-kg*$^{-1}$ $°C^{-1}$)

(a) 5°C (b) 6°C

(c) 7°C (d) 8°C

21. A lead bullet strikes against a steel plate with a velocity $200 ms^{-1}$. If the impact is perfectly inelastic and the heat produced is equally shared between the bullet and the target, then the rise in temperature of the bullet is (specific heat capacity of lead $= 125 Jkg^{-1}K^{-1}$)

(a) 80°C (b) 60°C

(c) 160°C (d) 40°C

(e) 120°C

22. An experiment takes 10 minutes to raise temperature of water from 0°C to 100°C and another 55 minutes to convert it totally into steam by a stabilized heater. The latent heat of vaporization comes out to be

(a) 530 *cal/g* (b) 540 *cal/g*

(c) 550 *cal/g* (d) 560 *cal/g*

23. The weight of a person is 60 *kg*. If he gets 10^5 calories heat through food and the efficiency of his body is 28%, then upto how much height he can climb (approximately)

(a) 100 m (b) 200 m

(c) 400 m (d) 1000 m

24. A stationary object at 4°C and weighing 3.5 *kg* falls from a height of 2000 m on a snow mountain at 0°C. If the temperature of the object just before hitting the snow is 0°C and the object comes to rest immediately $(g = 10 m/s^2)$ and (latent heat of ice $= 3.5 \times 10^5$ *joule*$/s$), then the mass of ice that will melt is

(a) 2 *kg* (b) 200 g

(c) 20 g (d) 2 g

25. An electric kettle takes 4A current at 220 V. How much time will it take to boil 1 kg of water from temperature 20°C ? The temperature of boiling water is 100°C

(a) 12.6 min (b) 4.2 min

(c) 6.3 min (d) 8.4 min

26. Steam at 100°C is passed into 20 g of water at 10°C. When water acquires a temperature of 80°C, the mass of water present will be [Take specific heat of water = 1 cal $g^{-1}°C^{-1}$ and latent heat of steam = 540 cal g^{-1}]

(a) 42.5 g (b) 22.5 g

(c) 24 g (d) 31.5 g

4. IIT-JEE/AIEEE

1. Two rods, one of aluminium and the other made of steel, having initial length l_1 and l_2 are connected together to form a single rod of length l_1+l_2. The coefficients of linear expansion for aluminium and steel are α_a and α_s respectively. If the length of each rod increases by the same amount when their temperatures are raised by $t°C$, then find the ratio $\frac{l_1}{(l_1+l_2)}$ **[2003]**

(a) $\frac{\alpha_s}{\alpha_a}$ (b) $\frac{\alpha_a}{\alpha_s}$

(c) $\frac{\alpha_s}{(\alpha_a+\alpha_s)}$ (d) $\frac{\alpha_a}{(\alpha_a+\alpha_s)}$

2. A pendulum clock loses 12 s a day if the temperature is 40°C and gains 4 s a day if the temperature is 20°C. The temperature at which the clock will show correct time and the co-efficient of linear expansion (α) of the metal of the pendulum shaft are respectively **[2016]**

(a) $60°C; \alpha = 1.85\times10^{-4}/°C$

(b) $30°C; \alpha = 1.85\times10^{-3}/°C$

(c) $55°C; \alpha = 1.85\times10^{-2}/°C$

(d) $25°C; \alpha = 1.85\times10^{-5}/°C$

3. The pressure that has to be applied to the ends of a steel wire of length 10 cm to keep its length constant when its temperature is raised by 100°C is

(For steel Young's modulus is $2\times10^{11}Nm^{-2}$ and coefficient of thermal expansion is $1.1\times10^{-5}K^{-1}$) **[2014]**

(a) $2.2\times10^{8}Pa$ (b) $2.2\times10^{9}Pa$

(c) $2.2\times10^{7}Pa$ (d) $2.2\times10^{6}Pa$

4. An ideal gas is expanding such that PT^2 = constant. The coefficient of volume expansion of the gas is **[2008]**

(a) $\frac{1}{T}$ (b) $\frac{2}{T}$

(c) $\frac{3}{T}$ (d) $\frac{4}{T}$

5. Amount of heat required to raise the temperature of a body through 1K is called its **[2002]**

(a) Water equivalent (b) Thermal capacity

(c) Entropy (d) Specific heat

6. If mass energy equivalence is taken into account, when water is cooled to form ice, the mass of water should **[2002]**

(a) Increase (b) Remain unchanged

(c) Decrease (d) First increase then decrease

7. A substance of mass m kg requires a power input of P watts to remain in the molten state at its melting point. When the power is turned off, the sample completely solidifies in time t sec. What is the latent heat of fusion of the substance **[1992]**

(a) $\frac{Pm}{t}$ (b) $\frac{Pt}{m}$

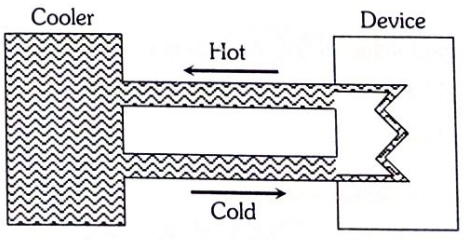
(c) $\frac{m}{Pt}$ (d) $\frac{t}{Pm}$

8. Assume that a drop of liquid evaporates by decrease in its surface energy, so that its temperature remains unchanged. What should be the minimum radius of the drop for this to be possible ? The surface tension is T, density of liquid is ρ and L is its latent heat of vaporization **[2013]**

(a) $\rho L/T$ (b) $\sqrt{T/\rho L}$

(c) $T/\rho L$ (d) $2T/\rho L$

9. A water cooler of storage capacity 120 litres can cool water at a constant rate of P watts. In a closed circulation system (as shown schematically in the figure), the water from the cooler is used to cool an external device that generates constantly 3 kW of heat (thermal load). The temperature of water fed into the device cannot exceed 30°C and the entire stored 120 litres of water is initially cooled to 10°C. The entire system is thermally insulated. The minimum value of P (in watts) for which the device can be operated for 3 hours is



(Specific heat of water is $4.2 kJ kg^{-1}K^{-1}$ and the density of water is $1000 kg m^{-3}$) **[2016]**

(a) 1600 (b) 2067

(c) 2533 (d) 3933

10. Water of volume 2 *litre* in a container is heated with a coil of $1\,kW$ at $27°C$. The lid of the container is open and energy dissipates at rate of $160\,J/s$. In how much time temperature will rise from $27°C$ to $77°C$ [Given specific heat of water is $4.2\,kJ/kg$]

(a) 8 *min* 20 *s* (b) 6 *min* 2 *s*

(c) 7 *min* (d) 14 *min*

11. 2 *kg* of ice at – 20°C is mixed with 5 *kg* of water at 20°C in an insulating vessel having a negligible heat capacity. Calculate the final mass of water remaining in the container. It is given that the specific heats of water and ice are 1 *kcal/kg per* °C and 0.5 *kcal/kg*/°C while the latent heat of fusion of ice is 80 *kcal/kg* **[2003]**

(a) 7 *kg* (b) 6 *kg*

(c) 4 *kg* (d) 2 *kg*

12. Steam at 100°C is passed into 1.1 *kg* of water contained in a calorimeter of water equivalent to 0.02 *kg* at 15°C till the temperature of the calorimeter and its contents rises to 80°C. The mass of the steam condensed in *kg* is **[1995]**

(a) 0.130 (b) 0.065

(c) 0.260 (d) 0.135

13. A lead bullet at 27°C just melts when stopped by an obstacle. Assuming that 25% of heat is absorbed by the obstacle, then the velocity of the bullet at the time of striking (M.P. of lead = 327°C, specific heat of lead = 0.03 *cal/g*°C, latent heat of fusion of lead = 6 *cal/g* and J = 4.2 *joule/cal*) **[1981]**

(a) 410 *m/s* (b) 1230 *m/s*

(c) 307.5 *m/s* (d) None of the above

14. A copper ball of mass 100 *g* is at a temperature T. It is dropped in a copper calorimeter of mass 100 *g*, filled with 170 *g* of water at room temperature. Subsequently, the temperature of the system is found to be 75°C. T is given by : (Given : room temperature $= 30°C$, specific heat of copper $= 0.1\,cal/gm°C$) **[2017]**

(a) 825°C (b) 800°C

(c) 885°C (d) 1250°C

5. NEET/AIPMT

1. The correct value of 0°C on Kelvin scale will be **[2015]**

(a) 273.15 *K* (b) 273.00 *K*

(c) 273.05 *K* (d) 273.63 *K*

2. Coefficient of linear expansion of brass and steel rods are α_1 and α_2. Lengths of brass of steel rods are l_1 and l_2 respectively. If $(l_2 - l_1)$ is maintained same at all temperatures, which one of the following relations holds good **[2016]**

(a) $\alpha_1 l_2 - \alpha_2 l_1$ (b) $\alpha_1 l_2^2 = \alpha_2 l_1^2$

(c) $\alpha_1^2 l_2 = \alpha_2^2 l_1$ (d) $\alpha_1 l_1 = \alpha_2 l_2$

3. A piece of ice falls from a height h so that it melts completely. Only one-quarter of the heat produced is absorbed by the ice and all energy of ice gets converted into heat during its fall. The value of h is

(Latent heat of ice is $3.4\times10^5\,J/kg$ and $g = 10N/kg$) **[2016]**

(a) 34 *km* (b) 544 *km*

(c) 136 *km* (d) 68 *km*

6. AIIMS

1. The absolute zero is the temperature at which **[1998]**

(a) Water freezes

(b) All substances exist in solid state

(c) Molecular motion ceases

(d) None of the above

2. A centigrade and a Fahrenheit thermometer are dipped in boiling water. The water temperature is lowered until the Fahrenheit thermometer registers 140°. What is the fall in temperature as registered by the Centigrade thermometer? **[1998]**

(a) 30° (b) 40°

(c) 60° (d) 80°

3. 'Stem Correction' in platinum resistance thermometers are eliminated by the use of **[1998]**

(a) Cells (b) Electrodes

(c) Compensating leads (d) None of the above

4. A clock with a metal pendulum beating seconds keeps correct time at 0°C. If it loses 12.5 *s* a day at 25°C, the coefficient of linear expansion of metal pendulum is **[2010]**

(a) $\frac{1}{86400}/°C$ (b) $\frac{1}{43200}/°C$

(c) $\frac{1}{14400}/°C$ (d) $\frac{1}{28800}/°C$

5. When a bimetallic strip is heated, it **[2006]**

(a) Does not bend at all

(b) Gets twisted in the form of an helix

(c) Bend in the form of an arc with the more expandable metal outside

(d) Bends in the form of an arc with the more expandable metal inside

6. The real coefficient of volume expansion of glycerine is 0.000597 per°C and linear coefficient of expansion of glass is 0.000009 per°C. Then the apparent volume coefficient of expansion of glycerine is **[2000]**

(a) 0.000558 per°C (b) 0.00057 per°C

(c) 0.00027 per°C (d) 0.00066 per°C

7. If specific heat of a substance is infinite, it means **[1997]**

(a) Heat is given out

(b) Heat is taken in

(c) No change in temperature takes place whether heat is taken in or given out

(d) All of the above

8. The relative humidity on a day, when partial pressure of water vapour is $0.012\times10^5\ Pa$ at 12°C is (take vapour pressure of water at this temperature as $0.016\times10^5\ Pa$) **[1998]**

(a) 70% (b) 40%

(c) 75% (d) 25%

9. Two rigid boxes containing different ideal gases are placed on a table. Box A contains one mole of nitrogen at temperature T_0, while Box B contains one mole of helium at temperature (7/3) T_0. The boxes are then put into thermal contact with each other and heat flows between them until the gases reach a common final temperature (Ignore the heat capacity of boxes). Then, the final temperature of the gases, T_f, in terms of T_0 is **[2008]**

(a) $T_f = \frac{7}{3}T_0$ (b) $T_f = \frac{3}{2}T_0$

(c) $T_f = \frac{5}{2}T_0$ (d) $T_f = \frac{3}{7}T_0$

10. We have seen that a gamma–ray dose of 3 Gy is lethal to half the people exposed to it. If the equivalent energy were absorbed as heat, what rise in body temperature would result **[2007]**

(a) $300\mu K$ (b) $700\mu K$

(c) $455\mu K$ (d) $390\mu K$

7. Assertion & Reason

Read the assertion and reason carefully to mark the correct option out of the options given below:

(a) If both assertion and reason are true and the reason is the correct explanation of the assertion.

(b) If both assertion and reason are true but reason is not the correct explanation of the assertion.

(c) If assertion is true but reason is false.

(d) If the assertion and reason both are false.

(e) If assertion is false but reason is true.

1. Assertion : The melting point of ice decreases with increase of pressure.

   Reason : Ice contracts on melting.

2. Assertion : Fahrenheit is the smallest unit measuring temperature.

   Reason : Fahrenheit was the first temperature scale used for measuring temperature.

3. Assertion : Melting of solid causes no change in internal energy.

   Reason : Latent heat is the heat required to melt a unit mass of solid.

4. Assertion : Specific heat capacity is the cause of formation of land and sea breeze.

   Reason : The specific heat of water is more than land.

5. Assertion : The molecules at 0°C ice and 0°C water will have same potential energy.

   Reason : Potential energy depends only on temperature of the system.

6. Assertion : Water kept in an open vessel will quickly evaporate on the surface of the moon.

   Reason : The temperature at the surface of the moon is much higher than boiling point of the water.

7. Assertion : Specific heat of a body is always greater than its thermal capacity.

   Reason : Thermal capacity is the required for raising temperature of unit mass of the body through unit degree.

8. Assertion : Two bodies at different temperatures, if brought in thermal contact do not necessary settle to the mean temperature.

   Reason : The two bodies may have different thermal capacities.

12. Thermometry, Thermal Expansion and Calorimetry – Answers Keys

1. Thermometry

1	d	2	c	3	b	4	d	5	d
6	c	7	c	8	d	9	a	10	b
11	a								

2. Thermal Expansion

1	c	2	d	3	a	4	d	5	a
6	b	7	d	8	d	9	b	10	b
11	d	12	c	13	c	14	c	15	d
16	c	17	c	18	c	19	b		

3. Calorimetry

1	b	2	c	3	b	4	b	5	d
6	b	7	a	8	c	9	d	10	a
11	a	12	b	13	b	14	d	15	b
16	c	17	c	18	a	19	c	20	a
21	a	22	c	23	b	24	b	25	c
26	b								

4. IIT-JEE/AIEEE

1	c	2	d	3	a	4	c	5	b
6	c	7	b	8	d	9	b	10	a
11	b	12	a	13	a	14	c		

5. NEET/AIPMT

1	a	2	d	3	c

6. AIIMS

1	c	2	b	3	c	4	a	5	c
6	b	7	c	8	c	9	b	10	b

7. Assertion and Reason

1	b	2	c	3	e	4	a	5	d
6	c	7	d	8	a				