PHYSICS

BOOKS - UNIVERSAL BOOK DEPOT

1960 PHYSICS (HINGLISH)

THERMOMETRY, THERMAL EXPANSION AND CALORIMETRY

Thermometry

1. On the Celsius scale the absolute zero of temperature is at

A. $0^\circ C$

B. $-32^\circ C$

C. $100^\circ C$

D. $-273.15^\circ C$

Answer: D

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2. Oxygen boils at $-183^\circ C$. This temperature is approximately

A. $215^\circ F$

B. $-297^\circ F$

C. $329^\circ F$

D. $361^\circ F$

Answer: B

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3. Recently, the phenomenon of superconductivity has been observed at 95 K . This temperature is nearly equal to

A. $-288^\circ F$

B. $-146^\circ F$

C. $-368^\circ F$

D. $+178^\circ F$

Answer: A

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4. The temperature of a substance increases by $27^{\circ}C$. On the kelvin scale this increase is equal to

A. 300 K

B. $2.46K$

C. 27 K

D. 7K

Answer: C

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5. The resistance of a resistance thermometer has values 2.71 and 3.70 ohm at $10^{\circ}C$ and $100^{\circ}C$. The temperature at which the resistance is 3.26 ohm is

A. $40^{\circ}C$

B. $50^{\circ}C$

C. $60^{\circ}C$

D. $70^{\circ}C$

Answer: B

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6. No other thermometer is as suitable as a platinum resistance thermometer to measure temperature in the entire range of

A. $0^\circ C$ to $100^\circ C$

B. $100^\circ C$ to $1500^\circ C$

C. $-50^\circ C$ to $+350^\circ C$

D. $-200^\circ C$ to $600^\circ C$

Answer: D

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7. The temperature of the sun is measured with

A. Platinum thermometer

B. Gas thermometer

C. Pyrometer

D. Vapour pressure thermometer

Answer: C

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8. Absolute temperature can be calculated by

A. Mean square velocity

B. Motion of the molecule

C. Both (a) and (b)

D. None of the above

Answer: A

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9. Thermoelectric thermometer is based on

A. Photoelectric effect

B. Seeback effect

C. Compton effect

D. Joule effect

Answer: B

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10. Maximum density of H_2O is at the temperature

A. $32^\circ F$

B. $39.2^\circ F$

C. $42^\circ F$

D. $4^\circ F$

Answer: B

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11. The study of physical phenomenon at low temperatures (below liquid nitrogen temperature) is called

A. Refrigeration

B. Radiation

C. Cryogenics

D. Pyrometry

Answer: C

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12. 'Stem Correction' in platinum resistance thermometers are eliminated by the use of

A. Cells

B. Electrodes

C. Compensating leads

D. None of the above

Answer: C

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13. The absolute zero is the temperature at which

A. Water freezes

B. All substances exist in solid state

C. Molecular motion ceases

D. None of the above

Answer: C

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14. What is absolute scale of temperature?

A. Radiation pyrometer

B. Platinum resistance thermometer

C. Constant volume helium gas thermometer

D. Constant pressure ideal gas thermometer

Answer: C

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15. The absolute zero is the temperature at which

A. Matter ceases to exist

B. Ice melts and water freezes

C. Volume and pressure of a gas becomes zero

D. None of these

Answer: C

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16. On which of the following scales of temperature, the temperature is never negative

A. Celsius

B. Fahrenheit

C. Reaumur

D. Kelvin

Answer: D

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17. The temperature on Celsius scale is $25^\circ C$. What is the corresponding temperature on the Fahrenheit scale

A. $40^\circ F$

B. $77^\circ F$

C. $50^\circ F$

D. $45^\circ F$

Answer: B

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18. One quality of a thermometer is that its heat capacity should be small. If P is a mercury thermometer, Q is a resistance thermometer and R thermocouple type then

A. P is best, R worst

B. R is best, P worst

C. R is best, Q wrost

D. P is best, Q wrost

Answer: C

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19. Two thermometers are used to record the temperature of a room. If the bulb of one is wrapped in wet hanky

A. The temperature recorded by both will be same

B. The temperature recorded by wet-bulb thermometer will be greater than that

recorded by the other

C. The temperature recorded by dry-bulb thermometer will be greater than that recorded by the other

D. None of the above

Answer: C

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20. The temperature of a body on Kelvin scale is found to be x K . When it is measured by Fahrenheit thermometer, it is found to be $x^{\circ} F$, then the value of x is

A. 40

B. 313

C. 574.25

D. 301.25

Answer: C

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21. A centigrade and a Fehrenheit thermometer are dipped in boiling water. The water temperature is lowered until the Fehrenheit thermometer registers $140^\circ F$. What is the fall in temperature as register by the centigrade thermometer

A. 30°

B. 40°

C. 60°

D. 80°

Answer: C

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22. At what temperature do the Celsius and Fahrenheit readings have the same numerical value ?

A. -40°

B. $+40^\circ$

C. 36.6°

D. -37°

Answer: A

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23. Standardisation of thermometers is obtained with

A. Jolly's thermometer

B. Platinum resistance thermometer

C. Thermocouple thermometer

D. Gas thermometer

Answer: D

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24. The gas thermometer are more sensitive than the liquid thermometers because gases

A. Gases expand more than liquids

B. Gases are easily obtained

C. Gases are much lighter

D. Gases do not easily change their states

Answer: A

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25. Mercury thermometers can be used to measure temperatures upto

A. $100^\circ C$

B. $212^\circ C$

C. $360^\circ C$

D. $500^\circ C$

Answer: C

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26. A constant volume gas thermometer shows pressure readings of $50cm$ and $90cm$ of mercury at $0^\circ C$ and $100^\circ C$ respectively, The temperature of the bath when pressure reading is $60cm$ of mercury.

A. $25^\circ C$

B. $40^\circ C$

C. $15^\circ C$

D. $12.5^\circ C$

Answer: A

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27. Mercury boils at $367^\circ C$. However, mercury thermometers are made such that they can

measure temperature up to $500^{\circ}C$. 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

Answer: B

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28. A device used to measure very high temperature is

A. Pyrometer

B. Thermometer

C. Bolometer

D. Calorimeter

Answer: A

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29. The absolute zero temperature in Fahrenheit scale is

A. $-273^\circ F$

B. $-32^\circ F$

C. $-460^\circ F$

D. $132^\circ F$

Answer: C

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30. A constant pressure air thermometer gave a reading of 47.5 units of volume when immersed in ice cold water, and 67 units in a boiling liquid. The boiling point of the liquid will be

A. $135^\circ C$

B. $125^\circ C$

C. $112^\circ C$

D. $100^\circ C$

Answer: C

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31. On a thermometer, the freezing points of water is marked as $20^\circ C$ and the boiling points of water is marked as $150^\circ C$. A temperature of $60^\circ C$ will be read on this thermometer as

A. $98^\circ C$

B. $110^\circ C$

C. $40^\circ C$

D. $60^\circ C$

Answer: A

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32. If temperature of an object is $40^\circ F$, then its temperature in centigrade is

A. $105^{\circ} C$

B. $32^{\circ} C$

C. $140^{\circ} C$

D. $60^{\circ} C$

Answer: D

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33. Of the following thermometers, the one which can be used for measuring a rapidly changing temperature is a

A. Thermocouple thermometer

B. Gas thermometer

C. Maximum resistance thermometer

D. Vapour pressure thermometer

Answer: A

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34. 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°

Answer: D

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35. The correct value of $0^\circ C$ on the Kelvin scale is

A. $273.15K$

B. $273.00K$

C. $273.05K$

D. $273.63K$

Answer: A

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Thermal Expansion

1. When a copper ball is heated, the largest percentage increase will occur in its

A. Diameter

B. Area

C. Volume

D. Density

Answer: C

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2. A vertical column 50 cm long at $50^\circ C$ balances another column of same liquid 60 cm long at $100^\circ C$. The coefficient of absolute expansion of the liquid is

A. $0.005/^\circ C$

B. $0.0005/^\circ C$

C. $0.002/^\circ C$

D. $0.0002/^\circ C$

Answer: A

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3. The apparent coefficient of expansion of liquid, when heated in a copper vessel is C and when heated in a silver vessel is S. If A is the linear coefficient of expansion of Copper, linear expansion coefficient of silver is

A. $\frac{C+S-3A}{3}$

B. $\frac{C+3A-S}{3}$

C. $\frac{S+3A-C}{3}$

D. $\frac{C+S+3A}{3}$

Answer: B

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4. A uniform metal rod is used as a bar pendulum. If the room temperature rises by $10^{\circ}C$, and the coefficient of linear expansion of the metal of the rod is $2 \times 10^{-6} per^{\circ} C$, the period of the pendulum will have percentage increase of

A. -2×10^{-3}

B. -1×10^{-3}

C. 2×10^{-3}

D. 1×10^{-3}

Answer: D

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5. A bar of iron is 10 cm at $20^{\circ} C$. At $19^{\circ} C$ it will be (α of iron $= 11 \times 10. /^{\circ} C$)

A. 11×10 cm longer

B. 11×10 cm shorter

C. 11×10 cm shorter

D. 11×10 cm longer

Answer: C

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6. When a rod is heated but prevented from expanding, the stress developed is independent of

A. Material of the rod

B. Rise in temperature

C. Length of rod

D. None of above

Answer: C

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7. 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

Answer: C

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8. On heating a liquid of coefficient of cubical expansion γ in a container having coefficient

of linear expansion $\gamma/3$. The level of liquid in the container will

A. Rise

B. Fall

C. Will remain almost stationary

D. It is difficult to say

Answer: C

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9. A pendulum clock keeps correct time at $0^\circ C$. Its mean coefficient of linear expansions is $\alpha/.^\circ C$, then the loss in seconds per day by the clock if the temperature rises by $t^\circ C$ is

A. $\frac{\frac{1}{2}\alpha t \times 864000}{1-\frac{\alpha t}{2}}$

B. $\frac{1}{2}\alpha t \times 86400$

C. $\frac{\frac{1}{2}\alpha t \times 86400}{\left(1-\frac{\alpha t}{2}\right)^2}$

D. $\frac{\frac{1}{2}\alpha t \times 86400}{1+\frac{\alpha t}{2}}$

Answer: B

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10. When a bimetallic strip is heated, it

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

Answer: C

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11. A solid metal ball has a spherical cavity. If the ball is heated, the volume of the cavity will

A. Increase

B. Decrease

C. Remain unaffected

D. None of these

Answer: A

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12. A litre of alcohol weighs

A. Less in winter than in summer

B. Less in summer than in winter

C. Some both in summer and winter

D. None of the above

Answer: B

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13. 5 litre of benzene weighs

A. More in summer than in winter

B. More in winter than in summer

C. Equal in winter and summer

D. None of the above

Answer: B

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14. Water has maximum density at

A. $0^\circ C$

B. $32^\circ F$

C. $-4^\circ C$

D. $4^\circ C$

Answer: D

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15. At some temperature T, a bronze pin is a little large to fit into a hole drilled in a steel block. The change in temperature required for an exact fit is minimum when

A. Only the block is heated

B. Both block and pin are heated together

C. Both block and pin are cooled together

D. Only the pin is cooled

Answer: A

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16. 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%

Answer: D

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17. The volume of a gas at $20^\circ C$ is 100 cm at normal pressure. If it is heated to $100^\circ C$, its volume becomes 125 cm at the same pressure, then volume coefficient of the gas at normal pressure is

A. $0.0015/^\circ C$

B. $0.0045/^\circ C$

C. $0.0025/^\circ C$

D. $0.0033/^\circ C$

Answer: D

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18. The coefficient of superficial expansion of a solid is $2 \times 10/.^{\circ} C$. It's coefficient of linear expansion is

A. $4 \times 10^{-5}/^{\circ} C$

B. $3 \times 10^{-5}/^{\circ} C$

C. $2 \times 10^{-5}/^{\circ} C$

D. $1 \times 10^{-5}/^{\circ} C$

Answer: D

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19. The density of a substance at $0^\circ C$ is $10g/cc$ and at $100^\circ C$, its density is $9.7g/cc$. The coefficient of linear expansion ($/ \circ C$)of the substance is

A. 10^2

B. 10^{-2}

C. 10^{-3}

D. 10^{-4}

Answer: D

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20. Coefficient of apparent expansions of mercury is $0.18 \times 10^{-3}/^{0}C$. If the density of mercury at $0^{0}C$ is $13.6g/cc$ its density at $473K$ will be

A. $13.11gm/cc$

B. $26.22 gm / cc$

C. $52. gm / cc$

D. None of these

Answer: A

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21. The real coefficient of volume expansion of glycerine is $0.000597 per^{\circ} C$ and linear coefficient of expansion of glass is

$0.000009 par^{\circ} C$. Then the apparent volume coefficient of glycerine is

A. $0.000558 per^{\circ} C$

B. $0.00057 per^{\circ} C$

C. $0.00027 per^{\circ} C$

D. $0.00066 per^{\circ} C$

Answer: B

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22. A beaker filled with water at $4.^{\circ} C$ over flows if the temperature of water increases or decreases. Explain why?

A. Heated above$4^{\circ} C$

B. Cooled below $4^{\circ} C$

C. Both heated and cooled above and below 4° C respectively

D. None of the above

Answer: C

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23. The volume of a metal sphere increases by 0.24% when its temperature is raised by $40^{\circ}C$. The coefficient of linear expansion of the metal is ..... . $^{\circ}C$

A. 2×10^{-5}

B. 6×10^{-5}

C. 2.1×10^{-5}

D. 1.2×10^{-5}

Answer: A

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24. The ratio among coefficient of volume expansion, superficial expansion and linear expansion i.e.,

$\gamma : \beta : \alpha$ is

A. $1:2:3$

B. $3:2:1$

C. $4:3:2$

D. None of these

Answer: B

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25. If on heating liquid through $80^\circ C$, the mass expelled is $(1/100)^{th}$ of mass still remaining, the coefficient of apparent expansion of liquid is

A. $1.25 \times 10^{-4}/^\circ C$

B. $12.5 \times 10^{-4} / ^{\circ} C$

C. $1.25 \times 10^{-5} / ^{\circ} C$

D. None of these

Answer: A

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26. In cold countries, water pipes sometimes burst, because

A. Pipe contracts

B. Water expands on freezing

C. When water freezes, pressure increases

D. When water freezes, it takes heat from pipes

Answer: B

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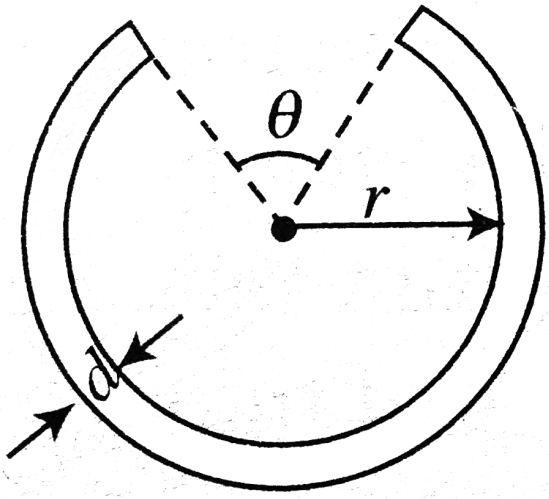

27.

A thin cylindrical metal rod is bent into a ring with a small gap as shown in figure. On heating the system

A. x decreases, r and d increase d

B. x and r increase, d dencreases

C. x, r and d all increase

D. Data insufficient to arrive at a conclusion

Answer: C

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28. The length of a metallic rod is 5 m at $0^\circ C$ and becomes $5.01m$, on heating upto $100^\circ C$. The linear expansion of the metal will be

A. $2.33 \times 10^{-5} /^\circ C$

B. $6.0 \times 10^{-5} / ^{\circ} C$

C. $4.0 \times 10^{-5} / ^{\circ} C$

D. $2.0 \times 10^{-5} / ^{\circ} C$

Answer: D

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29. A metal rod of silver at $0^{\circ} C$ is heated to $100^{\circ} C$. It's length is increased by $0.19 cm$. Coefficient of cubical expansion of the silver rod is

A. $5.7 \times 10^{-5} / ^{\circ} C$

B. $0.63 \times 10^{-5} / ^{\circ} C$

C. $1.9 \times 10^{-5} / C$

D. $16.1 \times 10^{-5} / ^{\circ} C$

Answer: A

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30. A brass disc fits snugly in a hole in a steel plate. Should you heat or cool this system to

losen the disc from the hole ? given that $\alpha_b > \alpha_F e.$

A. First heated then cooled

B. First cooled then heated

C. Is heated

D. Is cooled

Answer: D

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31. A metallic bar is heated from $0^{\circ}C$ to $100^{\circ}C$. The coefficient of linear expansion is $10^{-5}K^{-1}$. What will be the percentage increase in length

A. $0.5cm$

B. $1.0cm$

C. $1.5cm$

D. $2.0cm$

Answer: B

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32. If a cylinder of diameter $1.0cm$ at $30^\circ C$ is to be slid into a hole of diameter $0.9997cm$ in a steel plate at the same temperature, the minimum required rise in the temperature of the plate is: (Coefficient of linear expansion of steel $= 12 \times 10^{-6/\circ C}$)

A. $25^\circ C$

B. $35^\circ C$

C. $45^\circ C$

D. $35^\circ C$

Answer: A

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33. The temperature of water at the surface of a deep lake is $2^\circ C$. The temperature expected at the bottom is

A. $2^\circ C$

B. $3^\circ C$

C. $4^\circ C$

D. $1^\circ C$

Answer: C

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34. Two rods, one of aluminium and other made of steel, having initial lengths l_1 and l_2 are connected together to form a single rod of length $(l_1 + l_2)$. The coefficient of linear expansions for aluminium and steel are α_a

and α_s respectively. If length of each rod increases by same amount when their tempertures are raised by $t^\circ C$, then find the ratio $l_1(l_1 + l_2)$.

A. $\frac{\alpha_s}{\alpha_a}$

B. $\frac{\alpha_a}{\alpha_s}$

C. $\frac{\alpha_s}{(\alpha_a + \alpha_s)}$

D. $\frac{\alpha_a}{(\alpha_a + \alpha_s)}$

Answer: C

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Calorimetery

1. When vapour condenses into liquid

A. It absorbs heat

B. It liberates heat

C. Its temperature increases

D. Its temperature decreases

Answer: B

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2. At NTP water boils at $100^\circ C$. Deep down the mine, water will boil at a temperature

A. $100^\circ C$

B. $> 100^\circ C$

C. $< 100^\circ C$

D. Will not boil at all

Answer: B

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3. If specific heat of a substance is infinite, it means

A. Heat is given out

B. Heat is taken in

C. No change in temperature takes whether heat is taken in or given out

D. All of the above

Answer: C

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4. A gas in an airtight container is heated from $25^\circ C$ to $90^\circ C$. The density of gas will

A. Increase slightly

B. Increase considerably

C. Remain the same

D. Decrease slightly

Answer: C

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5. The amount of heat required to change the state of 1 kg of substance at constant temperature is called

A. Latent heat

B. Sublimation

C. Hoar frost

D. Latent heat of fusion

Answer: D

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6. 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

Answer: A

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7. When an ideal gas undergoes an adiabatic change causing a temperature change ΔT

(i) there is no heat ganied or lost by the gas

(ii) the work done by the gas is equal to change in internal eenrgy

(iii) the change in internal energy per mole of the gas is $C_V \Delta T$, where C_V is the molar heat capacity at constant volume.

A. Weight

B. Specific heat

C. Relative density

D. Temperature change

Answer: C

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8. 540 g of ice at $0^\circ C$ is mixed with 540 g of water at $80^\circ C$. The final temperature of the mixture is

A. $0^\circ C$

B. $40^\circ C$

C. $80^\circ C$

D. Less than $0^\circ C$

Answer: A

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9. Water is used in car radiators as coolant because

A. Of its lower density

B. It is easily available

C. It is cheap

D. It has high specific heat

Answer: D

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

A. $1680kj$

B. $1700kj$

C. $1720kj$

D. $1740kj$

Answer: A

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

Reason : Ice contract on melting.

A. Increases with increasing pressure

B. Decreases with increasing pressure

C. Is independent of pressure

D. Is proportional to pressure

Answer: B

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12. $1gm$ of ice at $0^\circ C$ is converted to steam at $100^\circ C$ the amount of heat required will be $(L_{\text{steam}} = 536cal/g)$.

A. 100 calorie

B. 0.01 kilocalorie

C. 716 calorie

D. 1 kilocalorie

Answer: C

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13. 80 g of water at $30^\circ C$ are poured on a large block of ice at $0^\circ C$. The mass of ice that melts is

A. 30 gm

B. 80 gm

C. 1600 gm

D. 150 gm

Answer: A

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14. The saturation vapour pressure of water at $100^\circ C$ is

A. 739 mm of mercury

B. 750 mm of mercury

C. 760 mm of mercury

D. 712 mm of mercury

Answer: C

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15. Two spheres A and B have diameters in the ratio $1:2$, densities in the ratio $2:1$ and

specific heat in the ratio $1:3$. Find the ratio of their thermal capacities.

A. $1:2$

B. $1:12$

C. $1:4$

D. $2:1$

Answer: B

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16. Work done in converting 1 g of ice at $-10^{\circ}C$ into steam at $100^{\circ}C$ is

A. $3045j$

B. $6056j$

C. $721j$

D. $616j$

Answer: A

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17. If mass-energy equivalence is taken into account, when water is cooled to from ice, the mass of water should

A. Increase

B. Remain unchanged

C. Decrease

D. First increase then decrease

Answer: B

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18. Compared to a burn due to water at $100^\circ C$, a burn due to steam at $100^\circ C$ is

A. More dangerous

B. Less dangerous

C. Equally dangerous

D. None of these

Answer: A

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19. $50gm$ of copper is heated to increase its temperature by $10^{\circ}C$. If the same quantity of heat is given to $10gm$ of water, the rise in its temperature is (Specific heat of copper= 420 Joule $kg^{-1} \circ C^{-1}$)

A. $5^{\circ}C$

B. $6^{\circ}C$

C. $7^{\circ}C$

D. $8^{\circ}C$

Answer: A

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20. Two liquid A and B are at $32^\circ C$ and $24^\circ C$. When mixed in equal masses the temperature of the mixture is found to be $28^\circ C$. Their specific heats are in the ratio of

A. $3:2$

B. $2:3$

C. $1:1$

D. $4:3$

Answer: C

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21. A beaker contains 200 g of water. The heat capacity of the beaker is equal to that of 20 g of water. The initial temperature of water in the beaker is $20^\circ C$ .If 440 g of hot water at $92^\circ C$ is poured in it, the final temperature (neglecting radiation loss) will be nearest to

A. $58^\circ C$

B. $68^\circ C$

C. $73^\circ C$

D. $78^\circ C$

Answer: B

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22. Amount of heat required to raise the temperature of a body through $1K$ is called its.

A. Water equivalent

B. Thermal capacity

C. Entropy

D. Specific heat

Answer: B

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23. A metallic ball and highly stretched spring are made of the same material and have the

same mass. They are heated so that they melt.

The latent heat required

A. Are the same for both

B. Is greater for the ball

C. Is greater for the spring

D. For the two may or may not be the same depending upon the metal

Answer: A

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24. A liquid of mass m and specific heat c is heated to a temperature 2T. Another liquid of mass m/2 and specific heat 2 c is heated to a temperature T. If these two liquids are mixed, the resulting temperature of the mixture is

A. (2/3)T

B. (8/5)T

C. (3/5)T

D. (3/2)T

Answer: D

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25. Calorie is defined as the amount of heat required to raise temperature of 1 g of water by $1^{\circ}C$ and it is defined under which of the following conditions?

A. From $14.5^{\circ}C$ to $15.5^{\circ}C$ at 760 mm of Hg

B. From $98.5^{\circ}C$ to $99.5^{\circ}C$ at 760 mm of Hg

C. From $13.5^\circ C$ to $14.5^\circ C$ at 76 mm of Hg

D. From $3.5^\circ C$ to $4.5^\circ C$ at 76 mm of Hg

Answer: A

Watch Video Solution

26. $100g$ ice at $0^\circ C$ is mixed with $100g$ water at $100^\circ C$. The resultant temperature of the mixture is

A. $10^\circ C$

B. $20^\circ C$

C. $30^\circ C$

D. $40^\circ C$

Answer: A

Watch Video Solution

27. At NTP water boils at $100^\circ C$. Deep down the mine, water will boil at a temperature

A. Higher temperature

B. Lower temperature

C. At the same temperature

D. At critical temperature

Answer: B

Watch Video Solution

28. A closed bottle containing water at $30^{\circ}C$ is carried to the moon in a space-ship. If it is placed on the surface of the moon, what will

happen to the water as soon as the lid is opened

A. Water will boil

B. Water will freeze

C. Nothing will happen on it

D. It will decompose into H_2 and O_2

Answer: A

 Watch Video Solution

29. The thermal capacity of 40 g of aluminium (specific heat $= 0.2 cal / gm^{\circ} C$)

A. $40 cal /^{\circ} C$

B. $160 cal /^{\circ} C$

C. $200 cal /^{\circ} C$

D. $8 cal /^{\circ} C$

Answer: D

Watch Video Solution

30. If temperature scale is changed from $'^{\circ} C$ to $'^{\circ} F$, the numerical value of specific heat

A. Increases

B. Decreases

C. Remains unchanged

D. None of the above

Answer: B

Watch Video Solution

31. By exerting a certain amount of pressure on an ice block, you

A. Lower its melting point

B. Make it melt at $0^{\circ} C$ only

C. Make it melt at a faster rate

D. Raise its melting point

Answer: A

View Text Solution

32. When we rub our hands they become warm. Have we supplied heat to the hands?

A. Heat is absorbed by our palm

B. Heat is lost in the environment

C. Produced of heat is stopped

D. None of the above

Answer: B

Watch Video Solution

33. A bullet moving with a uniform velocity v, stops suddenly after hitting the target and the whole mass melts be m, specific heat S, initial temperature $25^\circ C$, melting point $475^\circ C$ and the latent heat L. Then v is given by

A. $mL = mS(475 - 25) + \frac{1}{2}.\frac{mv^2}{J}$

B. $mS(475 - 25) + mL = \frac{mv^2}{2J}$

C. $mS(475 - 25) + mL = \frac{mv^2}{J}$

D. $mS(475 - 25) - mL = \frac{mv^2}{2J}$

Answer: B

Watch Video Solution

34. The height of a waterfall is 84 metre . Assuming that the entire kinetic energy of falling water is converted into heat, the rise in temperature of the water will be ($g = 9.8m/s^2$, $J = 4.2$ joule / cal)

A. $0.098^\circ C$

B. $0.98^\circ C$

C. $9.8^\circ C$

D. $0.0098^\circ C$

Answer: A

Watch Video Solution

35. In a water-fall the water falls from a height of 100 m . If the entire K.E. of water is converted into heat, the rise in temperature of water will be

A. 350 cal

B. 150 cal

C. 60 cal

D. 6 cal

Answer: A

Watch Video Solution

36. In supplying 400 calories of heat to a system, the work done will be

A. 400 joules

B. 1672 joules

C. 1672 watts

D. 1672 regs

Answer: B

37. 0.93 watt - hour of energy is supplied to a block of ice weighing 10 gm. It is found that

A. Half of the block melts

B. The entire block melts and the water attains a temperature of $4^{\circ} C$

C. The entire block just melts

D. The block remains unchanged

Answer: C

Watch Video Solution

38. The weight of a person is 60 kg . If he gets 105 calories heat through food and the efficiency of his body is 28%, then upto how much height he can climb (approximately)

A. 100 mm

B. 200 mm

C. 400 mm

D. 1000 mm

Answer: B

Watch Video Solution

Watch Video Solution

39. The temperature of Bhakhra dam water at the ground level with respect to the temperature at high level should be

A. Greater

B. Less

C. Equal

D. $0^\circ C$

Answer: A

Watch Video Solution

40. The height of a waterfall is 84 metre . Assuming that the entire kinetic energy of falling water is converted into heat, the rise in temperature of the water will be ($g = 9.8m/s^2$, $J = 4.2$ joule / cal)

A. $0.196^\circ C$

B. $1.960^\circ C$

C. $0.96^\circ C$

D. $0.0196^\circ C$

Answer: A

Watch Video Solution

41. Hailstone at $0^\circ C$ from a height of 1 km on an insulating surface converting whole of its kinetic energy into heat. What part of it will melt? $(g = 10m/s)$

A. $\frac{1}{33}$

B. $\frac{1}{8}$

C. $\frac{1}{33} \times 10^{-4}$

D. All of it will melt

Answer: A

Watch Video Solution

42. The SI unit of mechanical equivalent of heat is

A. Joule $\times$ Calorie

B. Joule/Calorie

C. Calorie $\times$ Erg

D. Erg/Calorie

Answer: B

Watch Video Solution

43. Of two masses of 5 kg each falling from height of 10 m , by which 2 kg water is stirred. The rise in temperature of water will be

A. $2.6^\circ C$

B. $1.2^\circ C$

C. $0.32^\circ C$

D. $0.12^\circ C$

Answer: D

View Text Solution

44. A lead ball moving with a velocity v strikes a wall and stops. If 50% of its energy is converted into heat. The increase in temperature is (Specific heat of lead is S)

A. $\frac{2V^2}{JS}$

B. $\frac{V^2}{4JS}$

C. $\frac{V^2}{J}$

D. $\frac{V^2S}{2J}$

Answer: B

Watch Video Solution

45. The SI unit of mechanical equivalent of heat is

A. A constant

B. A physical quantity

C. A conversion factor

D. None of the above

Answer: C

 Watch Video Solution

46. The height of a waterfall is 84 metre . Assuming that the entire kinetic energy of falling water is converted into heat, the rise in

temperature of the water will be ($g = 9.8m/s^2$, $J = 4.2$ joule / cal)

A. $42^\circ C$

B. $49^\circ C$

C. $0.49^\circ C$

D. $4.9^\circ C$

Answer: C

Watch Video Solution

47. A block of mass $100g$ slides on a rough horizontal surface, if the speed of the block decreases from $10ms^{-1}$ to $5ms^{-1}$, find the thermal energy developed in the process.

A. $3.75J$

B. $37.5J$

C. $0.375J$

D. $0.75J$

Answer: A

Watch Video Solution

Watch Video Solution

48. 4200 J of work is required for

A. Increasing the temperature of 10 gm of water through $10^{\circ} C$

B. Increasing the temperature of 100 gm of water throught $10^{\circ} C$

C. Increasing the temperature of 1 kg of water throught $10^{\circ} C$

D. Increasing the temperature of 10 kg of water through $10^{\circ}C$

Answer: B

Watch Video Solution

49. At $100^{\circ}C$, the substance that causes the most severe burn, is

A. Oil

B. Steam

C. Water

D. Hot air

Answer: B

Watch Video Solution

50. In a water-fall the water falls from a height of 100 m . If the entire K.E. of water is converted into heat, the rise in temperature of water will be

A. $0.23^\circ C$

B. $0.46^\circ C$

C. $2.3^\circ C$

D. $0.023^\circ C$

Answer: A

Watch Video Solution

51. A lead bullet of $10g$ travelling at $300m/s$ strikes against a block of wood and comes to rest. Assuming 50% heat is absorbed by the

bullet, the increase in its temperature is (sp-heat of lead is $150 J / K g - K$)

A. $100^{\circ} C$

B. $125^{\circ} C$

C. $150^{\circ} C$

D. $200^{\circ} C$

Answer: C

Watch Video Solution

52. The temperature at which the vapour pressure of a liquid becomes equals to the external (atmospheric) pressure is its

A. Melting point

B. Sublimation point

C. Critical temperature

D. Boiling point

Answer: D

 Watch Video Solution

53. When the pressure on water is increased the boiling temperature of water as compared to $100^{\circ} C$ will be

A. Lower

B. The same

C. Higher

D. On the critical temperature

Answer: C

Watch Video Solution

54. Calorimeters are made of which of the following

A. Glass

B. Metal

C. Wood

D. Either (a) or (c)

Answer: B

Watch Video Solution

55. Triple point of water is

A. $273.16^\circ F$

B. $273.16K$

C. $273.16^\circ C$

D. $273.16R$

Answer: B

Watch Video Solution

56. A liquid boils when its vapour pressure equals

A. The atmospheric pressure

B. Pressure of $76.0cm$ column of mercury

C. The critical pressure

D. The dew point of the surroundings

Answer: A

Watch Video Solution

57. A system is provided with 200 cal of heat and the work done by the system on the surrounding is $40J$. Then its internal energy

A. 840 dyne

B. 840 W

C. 840 erg

D. 840 J

Answer: D

Watch Video Solution

58. How many grams of liquid of specific heat 0.2 at temperature $40^\circ C$ must be mixed with $100gm$ of a liquid of specific heat of 0.5 at temperature $20^\circ C$, so that the final temperature of the mixture becomes $32^\circ C$

A. 175 gm

B. 300 g

C. 295 gm

D. 375 g

Answer: D

Watch Video Solution

59. 1 g of a steam at $100^\circ C$ melt how much ice at $0^\circ C$? (Length heat of ice $= 80 cal/gm$ and latent heat of steam $= 540 cal/gm$)

A. 1 gm

B. 2 gm

C. 4 gm

D. 8 gm

Answer: D

Watch Video Solution

60. 5 g of ice at $0^\circ C$ is dropped in a beaker containing 20 g of water at $40^\circ C$. The final temperature will be

A. $32^\circ C$

B. $16^\circ C$

C. $8^\circ C$

D. $24^\circ C$

Answer: B

Watch Video Solution

61. One kilogram of ice at $0^\circ C$ is mixed with one kilogram of water at $80^\circ C$. The final temperature of the mixture is

(Take : specific heat of water $= 4200 Jkg^{-1}K^{-1}$, latent heat of ice $= 336 kJ/kg^{-1}$)

A. $40^\circ C$

B. $60^\circ C$

C. $0^\circ C$

D. $50^{\circ} C$

Answer: C

Watch Video Solution

62. During constant temperature, we feel colder on a day when the relative humidity will be

A. $25\ \%$

B. $12.5\ \%$

C. $50\ \%$

D. $75\ \%$

Answer: A

Watch Video Solution

63. Which of the following is the unit of specific heat

A. $Jkg^{\circ}C^{-1}$

B. $J/kg.^{\circ}C$

C. $kg.^{\circ} C / J$

D. $J / kg.^{\circ} C^{-2}$

Answer: B

Watch Video Solution

64. 540 g of ice at $0^{\circ} C$ is mixed with 540 g of water at $80^{\circ} C$. The final temperature of the mixture is

A. $0^{\circ} C$

B. $40^\circ C$

C. $40^\circ C$

D. $4^\circ C$

Answer: A

Watch Video Solution

65. The freezing point of the liquid decreases when pressure is increased, if the liquid

A. Expands while freezing

B. Contracts while freezing

C. Does not change in volume while freezing

D. None of these

Answer: A

View Text Solution

66. The relative humidity on a day, when partial pressure of water vapour is 0.012×10^5 Pa at

$12^{\circ} C$ is (take vapour pressure of water at this temperature as 0.016×10^{5} Pa)

A. $70\ \%$

B. $40\ \%$

C. $75\ \%$

D. $25\ \%$

Answer: C

Watch Video Solution

67. A hammer of mass $1kg$ having speed of $50m/s$, hit a iron nail of mass $200gm$. If specific heat of iron is $0.105cal/gm^{\circ}C$ and half the energy is converted into heat, the raise in temperature of nail is

A. $7.1^{\circ}C$

B. $9.2^{\circ}C$

C. $10.5^{\circ}C$

D. $12.1^{\circ}C$

Answer: A

Watch Video Solution

68. Latent heat of 1 gm of steam is 536 cal/gm , then its value in joule/kg is

A. 2.25×10^6

B. 2.25×10^3

C. 2.25

D. None

Answer: A

Watch Video Solution

69. Which of the following has maximum specific heat?

A. Water

B. Alcohol

C. Glycerine

D. Oil

Answer: A

Watch Video Solution

70. If $10g$ of the ice at $0^\circ C$ is mixed with $10g$ of water at $100^\circ C$, then the final temperature of the mixture will be

A. $10^\circ C$

B. $0^\circ < < T_m < 20^\circ C$

C. $20^\circ C$

D. Above $20^\circ C$

Answer: A

Watch Video Solution

71. A stationary object at $4^\circ C$ and weighing $3.5kg$ falls from a height of $2000m$ on a snow mountain at $0^\circ C$. If the temperature of the object just before hitting the snow is $0^\circ C$and the object comes to rest immediately? (g=10m//s^(2)) and $heatofice$=3.5xx10^(5) joule //sec), then the object will melt

A. 2 kg of ice

B. 200 gm of ice

C. 20 gm ice

D. 2 gm of ice

Answer: B

Watch Video Solution

72. 300 grams of water at $25^\circ C$ is added to 100 grams of ice at $0^\circ C$. The final temperature of the mixture is _____ ^ $\circ C$

A. $-\frac{5}{3}.^\circ C$

B. $-\frac{5}{2}.^\circ C$

C. $-5^\circ C$

D. $0^\circ C$

Answer: D

Watch Video Solution

73. Calculate the amount of heat (in calories) required to convert $5gm$ of ice at $0^\circ C$ to steam at $100^\circ C$

A. 3100

B. 3200

C. 3600

D. 4200

Answer: C

Watch Video Solution

74. 2gm of steam condenses when passed through 40 gm of water initially at $25^\circ C$. The condensation of steam raises the temperature

of water to $54.3^{\circ} C$. What is the latent heat of steam

A. 540 cal/g

B. 536 cal/g

C. 270 cal/g

D. 480 cal/g

Answer: A

Watch Video Solution

75. 10 g of ice at $0^\circ C$ is mixed with 100 g of water at $50^\circ C$. What is the resultant temperature of mixture

A. $31.2^\circ C$

B. $32.8^\circ C$

C. $36.7^\circ C$

D. $38.2^\circ C$

Answer: D

Watch Video Solution

76. 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

A. $\dfrac{c_1T_1 + c_2T_2 + c_3T_3}{m_1c_1 + m_2c_2 + m_3c_3}$

B. $\dfrac{m_1c_1T_1 + m_2c_2T_2 + m_3c_3T_3}{m_1c_1 + m_2c_2 + m_3c_3}$

C. $\dfrac{m_1c_1T_1 + m_2c_2T_2 + m_3c_3T_3}{m_1T_1 + m_2T_2 + m_3T_3}$

D. $\dfrac{m_1T_1 + m_2T_2 + m_3T_3}{c_1T_1 + c_2T_2 + c_3T_3}$

Answer: B

Watch Video Solution

77. The point on the pressure temperature phase diagram where all the phases co-exist is called

A. Sublimation

B. Fusion point

C. Triple point

D. Vaporisation point

Answer: C

Watch Video Solution

78. Boiling water is changing into steam. Under this condition the specific heat of water is

A. < 1

B. ∞

C. 1

D. 0

Answer: B

Watch Video Solution

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

A. $70^{\circ}C$

B. $80^{\circ}C$

C. $60^{\circ}C$

D. $50^\circ C$

Answer: D

Watch Video Solution

80. The thermal capacity of a body is 80 cal , then its water equivalent is

A. 80 cal / gm

B. 8 gm

C. 80 gm

D. 80 kg

Answer: C

Watch Video Solution

81. A liquid of mass M and specific heat S is at a temperature $2T$. Another liquid of thermal capacity $1.5 \times$ the first liquid at a temperature $\frac{T}{3}$ is added to it. The resultant temperature of the mixture will be

A. $\frac{4}{3}T$

B. T

C. $\frac{T}{2}$

D. $\frac{2}{3}T$

Answer: B

Watch Video Solution

82. Dry ice is

A. Ice cube

B. Sodium chloride

C. Liquid nitrogen

D. Solid carbon dioxide

Answer: D

Watch Video Solution

Critical Thinking

1. A galss flask is filled up to a mark with 50 cc of mercury at $18^\circ C$. If the flask and contents are heated to $38^\circ C$, how mech mercury will be

above the mark (α for glass is $9 \times 10^{-6} / ^{\circ} C$ and coeffiecient of real expansion of mercury is $180 \times 10^{-6} / ^{\circ} C$)?

A. $0.85cc$

B. $0.46cc$

C. $0.153cc$

D. $0.05cc$

Answer: C

Watch Video Solution

2. The coefficient of apparent expansion of mercury in a glass vessel is $153 \times 10^{-6} /^{\circ} C$ and in a steel vessel is $114 \times 10^{-6} /^{\circ} C$. If α for steel is $12 \times 10^{-6} /^{\circ} C$, then that of glass is

A. $9 \times 10^{-6} /^{\circ} C$

B. $6 \times 10^{-6} /^{\circ} C$

C. $36 \times 10^{-6} /^{\circ} C$

D. $27 \times 10^{-6} /^{\circ} C$

Answer: A

Watch Video Solution

3. Solids expand on heating because

A. Kinetic energy of the atoms increases

B. Potential energy of the atoms increases

C. Total energy of the atoms increases

D. The potential energy curve is asymmetric about the equilibrium distance between neighbouring atoms

Answer: D

Watch Video Solution

4. An iron tyre is to be fitted onto a wooden wheel 1.0 m in diameter. The diameter of the tyre is 6 mm smaller than that of wheel the tyre should be heated so that its temperature increases by a minimum of (coefficient of volume expansion of iron is $3.6 \times 10^{-5} / ^{\circ} C$)

A. $167^{\circ} C$

B. $334^\circ C$

C. $500^\circ C$

D. $1000^\circ C$

Answer: C

Watch Video Solution

5. A glass flask of volume one litre at $0^\circ C$ is filled, level full of mercury at this temperature. The flask and mercury are now heated to $100^\circ C$. How much mercury will spill out if

coefficient of volume expansion of mercury is $1.82 \times 10^{-4} / ^{\circ} C$ and linear expansion of glass is $0.1 \times 10^{-4} / ^{\circ} C$ respectively?

A. $21.2cc$

B. $15.2cc$

C. $1.52cc$

D. $2.12cc$

Answer: B

Watch Video Solution

6. A steel scale measures the length of a copper wire as $80.0cm$ when both area at $20^\circ C$ (the calibration temperature for scale). What would be the scale read for the length of the wire when both are at $40^\circ C$? (Given $\alpha_{\text{steel}} = 11 \times 10^{-6} per^\circ C$ and $\alpha_{\text{copper}} = 17 \times 10^{-6} per^\circ C$)

A. $80.0096cm$

B. $80.0272cm$

C. 1cm

D. $25.2cm$

Answer: A

Watch Video Solution

7. A bimetallic strip is formed out of two identical strips one of copper and the other of brass. The co-efficients of linear expansion of the two metals are α_C and α_B. On heating, the the strip bends to form an are of radius of curvature R. Then R is

A. Proportional to ΔT

B. Inversely proportional to ΔT

C. Proportional to $|\alpha_B - \alpha_C|$

D. Inversely proportional to $|\alpha_B - \alpha_C|$

Answer: B::D

Watch Video Solution

8. Two metal strips that constitue a thermostat must necessarily differ in their

A. Mass

B. Length

C. Resistivity

D. Coefficient of linear expansion

Answer: D

Watch Video Solution

9. A metal ball immersed in alcohol weights W_1 at $0^\circ C$ and W_2 at $50^\circ C$. The coefficient of expansion of cubical the metal is less than that of the alcohol. Assuming that the density

of the metal is large compared to that of alcohol, it can be shown that

A. $W_1 > W_2$

B. $W_1 = W_2$

C. $W_1 < W_2$

D. $W_2 = (W_1/2)$

Answer: C

Watch Video Solution

10. The coefficient of volumetric expansion of mercury is $18 \times 10^{-5} / ^{\circ} C$. A thermometer bulb has a volume $10^{-6} m^3$ and cross section of stem is $0.004 cm^2$. Assuming that bulb is filled with mercury at $0^{\circ} C$ then the length of the mercury column at $100^{\circ} C$ is

A. $18.8 mm$

B. $9.2 mm$

C. $7.4 mm$

D. $4.5 cm$

Answer: D

Watch Video Solution

11. A piece of metal weighs 46 g in air and 30 g in lipuid of density $1.24 \times 10^3 kgm^{-3}$ kept at $27^0 C$. When the temperature of the liquid is raised to $42^0 C$ the metal piece weights 30.5 g . The density of the liqued at $42^0 C$ is $1.20 \times 10^3 kgm^{-3}$. Calculate the coefficient of linear expandsion of the metal.

A. $3.316 \times 10^{-5} / ^{\circ} C$

B. $2.316 \times 10^{-5} / ^{\circ} C$

C. $4.316 \times 10^{-5} / ^{\circ} C$

D. None of these

Answer: B

Watch Video Solution

12. 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 downward

B. It will start solidifying from the bottom upward

C. It will start solidifying from the middle, upward and downward at equal rates

D. The whole mass will solidify simultaneously

Answer: B

 Watch Video Solution

13. A substance of mass M kg requires a power input of P wants to remain in the molten state at its melting point. When the power source is turned off, the sample completely solidifies in time t seconds. The latent heat of fusion of the substance is .....

A. $\frac{Pm}{t}$

B. $\frac{Pt}{m}$

C. $\frac{m}{Pt}$

D. $\frac{t}{Pm}$

Answer: B

Watch Video Solution

14. Steam at $100^\circ C$ is passed into 1.1 kg of water contained in a calorimeter of water equivalent 0.02 kg at $15^\circ C$till the temperature of the calorimeter and its contents rises to $80^\circ C$. The mass of the steam condensed in kilogram is

A. 0.130

B. 0.065

C. 0.260

D. 0.135

Answer: A

Watch Video Solution

15. 2kg of ice at $20^\circ C$ is mixed with 5kg of water at $20^\circ C$ 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 & ice are $1 kcal/kg/^{\circ} C$ and 0.5 $kcal/kg/^{\circ} C$ while the latent heat of fusion of ice is $80 kcal/kg$

A. 7 kg

B. 6 kg

C. 4 kg

D. 2 kg

Answer: B

Watch Video Solution

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

A. 8 min 20 s

B. 6 min 2 s

C. 7 min

D. 14 min

Answer: A

 Watch Video Solution

17. A lead bullet just melts when stopped by an obstacle. Assuming that 25 per cent of the heat is absorbed by the obstacle, find the velocity of the bullet if its initial temperature is $27^\circ C$. (Melting point of lead $= 327^\circ C$,

specific heat of lead $= 0.03 cal/g.^{\circ} C$, latent heat of fusion of lead $= 6 cal/g$, $J = 4.2 J/cal$).

A. 410 m/sec

B. 1230 m/sec

C. $307.5 m/\sec$

D. None of these

Answer: A

Watch Video Solution

18. If two balls of same metal weighing 5 gm and 10 gm strike with a target with the same velocity. The heat energy so developed is used for raising their temperature alone, then the temperature will be higher

A. For bigger ball

B. For smaller ball

C. Equal for both the balls

D. None is correct from the above three

Answer: C

Watch Video Solution

19. The temperature of equal masses of three different liquids A,B and C are $12^\circ C, 19^\circ C$ and $28^\circ C$ respectively. The temperature when A and B are mixed is $16^\circ C$ and when B and C are mixed it is $23^\circ C$. What should be the temperature when A and C are mixed?

A. $18.2^\circ C$

B. $22^\circ C$

C. $20.2^\circ C$

D. $25.2^\circ C$

Answer: C

Watch Video Solution

20. In an industrial process 10 kg of water per hour is to be heated from $20^\circ C$ to $80^\circ C$. To do this steam at $150^\circ C$ is passed from a boiler into a copper coil immersed in water. The steam condenses in the coil and is

returned to the boiler as water at $90^\circ C$. How many kilograms of steam is required per hour (specific heat of steam $= 1cal/g^\circ C$, Latent heat of vapourization $= 540cal/g$)?

A. 1 gm

B. 1 kg

C. 10 gm

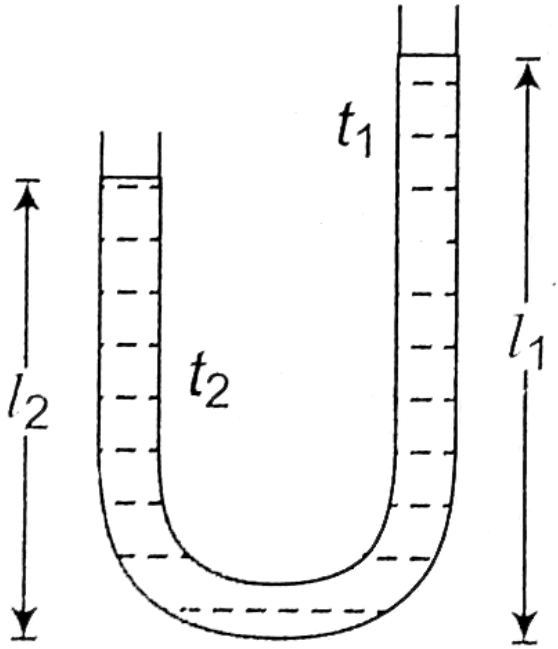
D. 10 kg

Answer: B

Watch Video Solution

21. In a vertical U-tube containing a luquid, the two arms are maintained at different temperatures, t_1 and t_2 . The liquid coplumns in the two arms have heights l_1 and l_2 respectively. The coefficient of volume

expansion of the liquid is equal to



A. $\dfrac{l_1 - l_2}{l_2 t_1 - l_1 t_2}$

B. $\dfrac{l_1 - l_2}{l_1 t_1 - l_2 t_2}$

C. $\dfrac{l_1 + l_2}{l_1 t_1 + l_1 t_2}$

D. $\frac{l_1 + l_2}{l_1 t_1 + l_2 t_2}$

Answer: A

Watch Video Solution

22. The coefficient of linear expansion of crystal in one direction is α_1 and that in every direction perpendicular to it is α_2. The coefficient of cubical expansion is

A. $\alpha_1 + \alpha_2$

B. $2\alpha_1 + \alpha_2$

C. $\alpha_1 + 2\alpha_2$

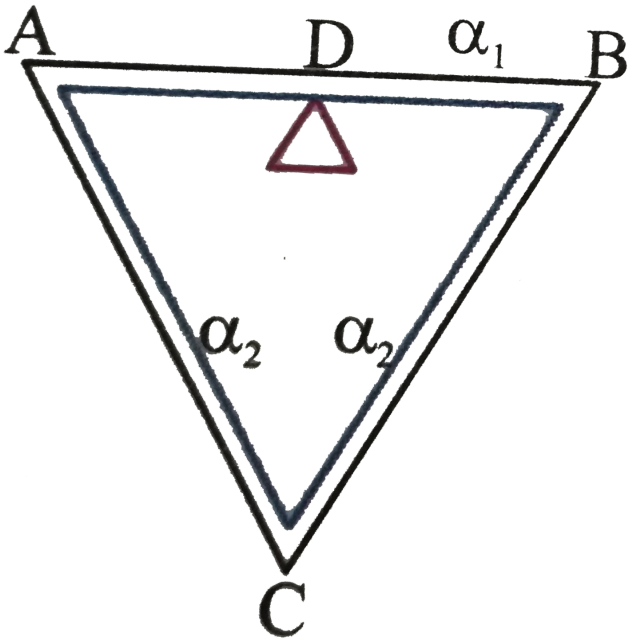
D. None of these

Answer: C

Watch Video Solution

23. An equilateral triangle ABC is formed by joining three rods of equal length and D is the mid-point of AB. The coefficient of linear expansion for AB is α_1 and for AC and BC is

α_2. The relation between α_1 and α_2, if distance DC remains constant for small changes in temperature is



A. $\alpha_2 = 3\alpha_1$

B. $\alpha_2 = 4\alpha_1$

C. $\alpha_1 = 3\alpha_2$

D. $\alpha_1 = 4\alpha_2$

Answer: D

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24. A 1-L flask contains some mercury. It is found that at different temperature, the volume of air inside the flask remains the same. What is the volume of mercury in the flask, given that the coefficient of linear expansion of glass $= 9 \times 10^{-6}/^{\circ} C$ and the

coefficient of volume expansion of $Hg = 1.8 \times 10^{-4} / ^{\circ} C$?

A. 50 cc

B. 100 cc

C. 150 cc

D. 200 cc

Answer: C

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25. $10gm$ of ice at $-20^\circ C$ is dropped into a calorimeter containing $10gm$ of water at $10^\circ C$, the specific heat of water is twice that of ice. When equilibrium is reached the calorimeter will contain:

A. 20 gm of water

B. 20 gm of ice

C. 10 gm ice and 10 gm water

D. 5 gm ice and 15 gm water

Answer: C

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26. A rod of length $20cm$ is made of metal. It expands by $0.075cm$ when its temperature is raised from $0^{\circ}C$ to $100^{\circ}C$. Another rod of different metal B having the same length expands by $0.045cm$ for the same change in temperature. A third rod of the same length is composed of two parts, one of metal A and the oher of metal B. This rod expandss by $0.060cm$ for the same change in temperature. The portion made of metal A has the length :

A. 20 cm

B. 10 cm

C. 15 cm

D. 18 cm

Answer: B

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27. Steam is passes into 22 g of water at $20^{\circ} C$.

The mass of water that will be present when

the water acquires a temperature of $90^{\circ}C$ (Latent heat of steam is $540cal/g$) is

A. $24.8gm$

B. 24 gm

C. $36.6gm$

D. 30 gm

Answer: A

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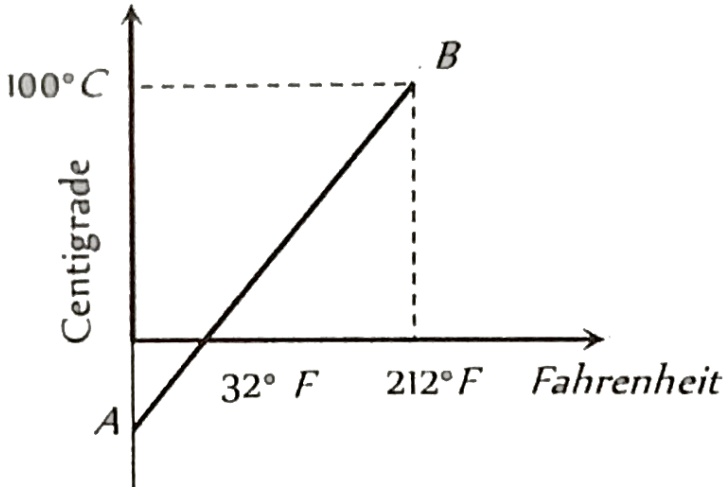
Graphical Questions

1. The graph AB shown in figure is a plot of temperature of a body in degree celsius and degree Fahrenheit. Then



A. Slope of line AB is 9/5

B. Slope of line AB is 5/9

C. Slope of line AB is 1/9

D. Slope of line AB is 3/9

Answer: B

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2. 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

Answer: C

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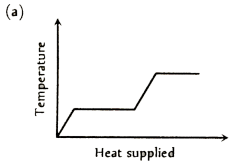
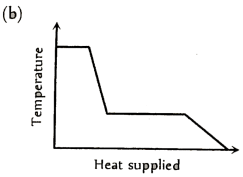
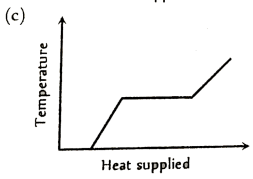
3. A block of ice at $-10^{\circ}C$ is slowly heated and converted to steam at $100^{\circ}C$. Which of the following curves represents the phenomenon qualitatively?

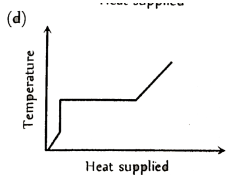
A.



B.



C. 

D. 

Answer: A

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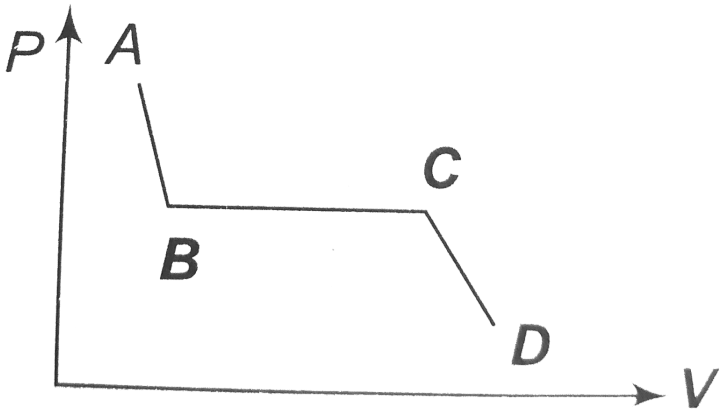
4. The portion AB of the indicator diagram representing the state of matter denots



A. The liquid state of matter

B. Gaseous state of matter

C. Change from liquid to gaseous state

D. Change from gaseous state to liquid state

Answer: A

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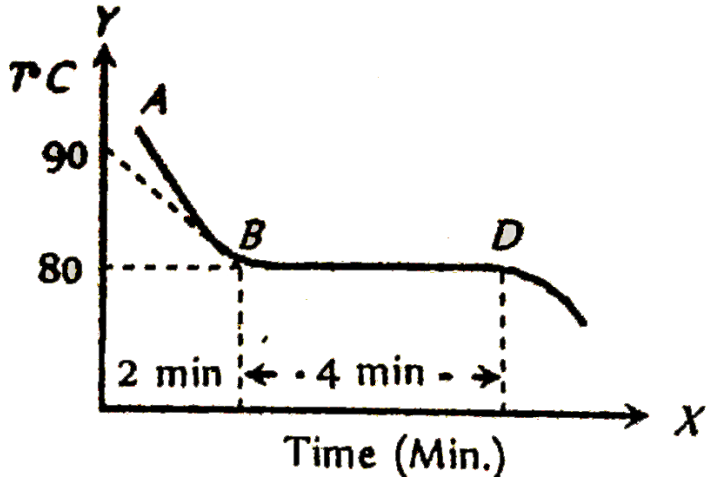
5. The figure given below shows the cooling curve of pure wax material after heating. It cools from A to B and solidifies along BD . If L and C are respective values of latent heat and the specific heat of the liquid wax, the ratio L /

C is



A. 40

B. 80

C. 100

D. 20

Answer: D

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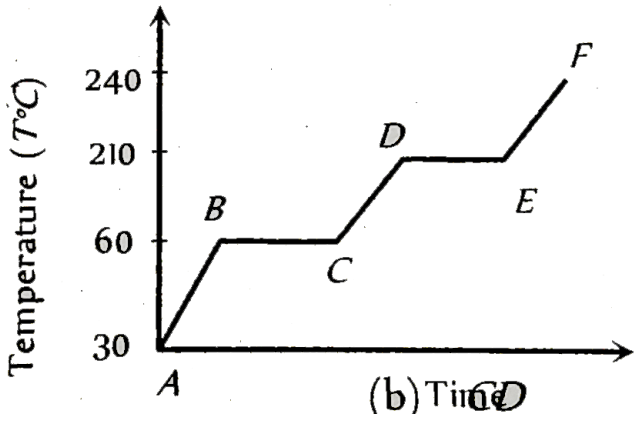
6. A solid substance is at $30^{\circ}C$. To this substance heat energy is supplied at a constant rate. Then temperature versus time graph is as shown in the figure. The substance is in liquid state for the portion (of the graph)



A. BC

B. CD

C. ED

D. EF

Answer: B

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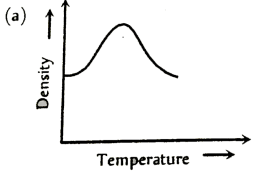
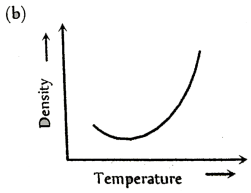
7. Which of the following curve represent variation of density of water with temperature best-

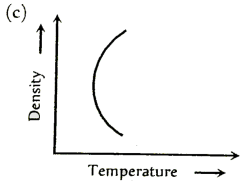
A.



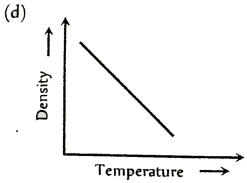
B.



C.



D.



Answer: A

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8. If a graph is plotted taking the temperature in Fahrenheit along the Y-axis and the corresponding temperature in Celsius along the X-axis, it will be a straight line

A. Having a + ve intercept on Y-axis

B. Having a + ve intercept on X-axis

C. Passing throught the origin

D. Having a - ve intercepts on both the axis

Answer: A

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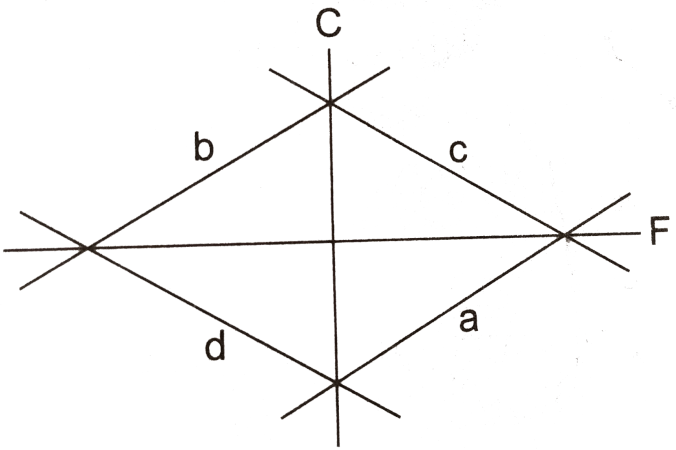
9. Which of the curves in figure represents the telation between Celsius and Fahrenheit temperatures?



A. 1

B. 2

C. 3

D. 4

Answer: A

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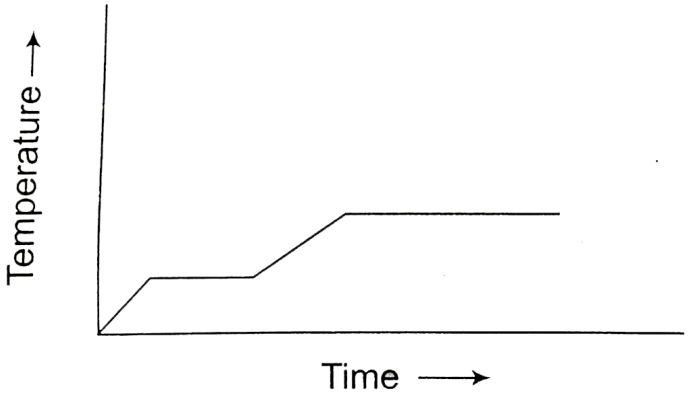

10.

Heat is supplied to a certain homogeneous

sample of matter, at a uniform rate. Its temperature is plotted against time, as shown Which of the following conclusions can be drawn?

(i) Its specific heat capacity is greater in the solid state than the liquid state.

(ii) Its specific heat capacity is greater in the liquid state than in the solid state.

(iii) Its latent heat of vaporization is greater than its latent heat of fusion.

(iv) Its latent heat of vaporization is smaller than its latent heat of fusion

A. Its specific heat capacity is greater in the solid state than in the liquid state

B. Its specific heat capacity is greater in the liquid state than in the solid state

C. Its latent heat of vaporization is greater than its latent heat of fusion

D. Its latent heat of vaporization is smaller than its latent of fusion

Answer: B::C

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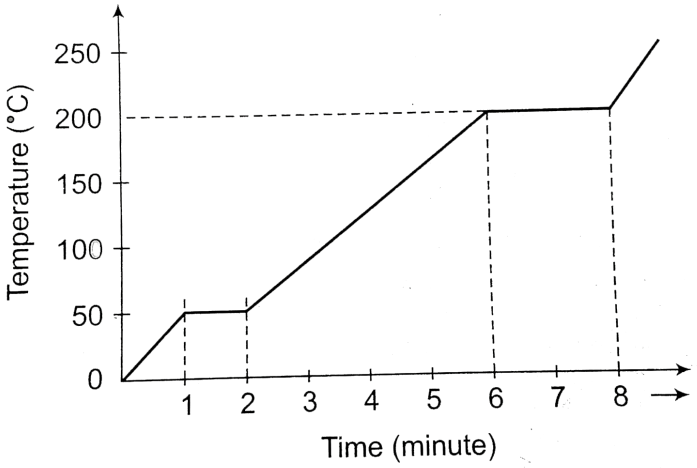

11.

A student takes 50 g wax (specific heat $= 0.6 kcal/kg^\circ C$) and heats it till it boils. The graph between temperature and time is as follows. Heat supplied to the wax per minute and boiling point are respectively.

A. $500 cal, 50^\circ C$

B. $1000cal, 100^\circ C$

C. $1500cal, 200^\circ C$

D. $200^\circ C$

Answer: C

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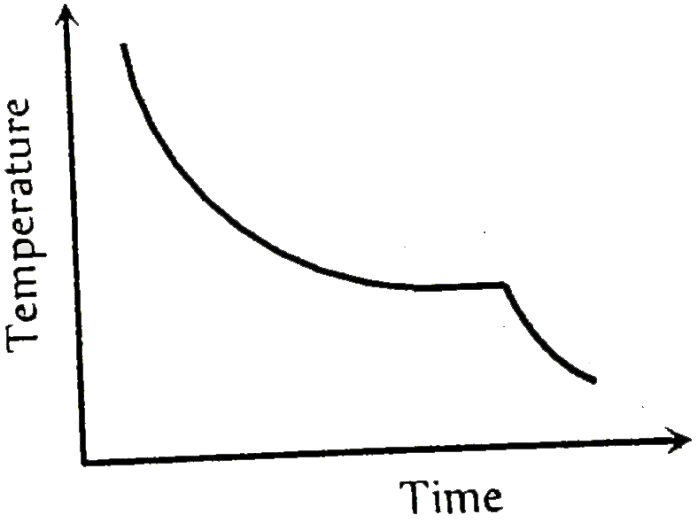
12. The graph signifies



A. Adiabatic expansion of a gas

B. Isothermal expansion of a gas

C. Change of state from liquid to solid

D. Cooling of a heated solid

Answer: C

Watch Video Solution

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

A. A

B. B

C. C

D. B

Answer: C

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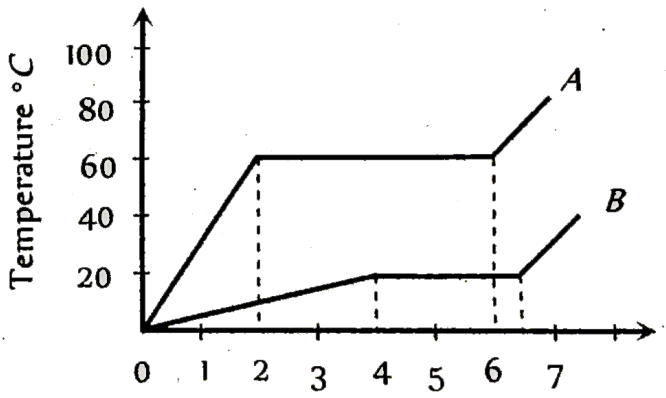
14. Two substances A and B of equal mass m are heated at uniform rate of $6cals^{-1}$ under similar conditions. A graph between temperature and time is shown in figure. Ratio of heat absorbed H_A/H_B by them for

complete fusion is



A. $\frac{9}{4}$

B. $\frac{4}{9}$

C. $\frac{8}{5}$

D. $\frac{5}{8}$

Answer: C

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Assertion Reason

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

Reason : Ice contract on melting.

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

Answer: A

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2. Statement-1: Fahrenheit is the smallest unit measuring temperature

Statement-2: Fahrenheit was the first temperature scale used for measuring temperature

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

Answer: C

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

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

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 assertion is false but reason is true.

Answer: D

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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.

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

Answer: A

 Watch Video Solution

5. Statement-1: A brass disc is just fitted in a hole in a steel plate. The system mst be cooled to loosen the disc from the hole

Statement-2: The coefficient of linear expansion for brass is greater than the coefficient of linear expansion for steel.

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

Answer: A

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6. Assertion : The coefficient of volume expansion has dimension K^{-1}.

Reason : The coefficient of volume expansion is defined as the change in volume per unit volume per unit change in temperature.

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

Answer: A

Watch Video Solution

7. Assertion : The temperature at which Centigrade and Fahrenheit thermometers read the same is -40°.

Reason : There is no relation between Fahrenheit and Centigrade temperature.

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

Answer: C

 Watch Video Solution

8. Assertion : When a solid iron ball is heated, percentage increase is its volume is largest.

Reason : Coefficient of superficial expansion is twice that of linear expansion where as

coefficient of volume expansion is three time of linear expansion.

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

Answer: A

Watch Video Solution

9. Assertion : A beaker is completely filled with water at $4^{\circ}C$. It will overflow, both when heated or cooled.

Reason : There is expansion of water below and above $4^{\circ}C$.

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

Answer: A

Watch Video Solution

10. Statement-1: Latent heat of fusion of ice is $336000 Jkg^{-1}$

Statement-2: Latent heat refers to change of state without any change in temperature.

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

Answer: B

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11. 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.

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

Answer: A

Watch Video Solution

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

Reason: Thermal capacity is the heat required

for raising temperature of unit mass of the body through unit degree

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

Answer: D

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13. 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.

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

Answer: A

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14. Assertion : The molecules at $0^\circ C$ ice and $0^\circ C$ water will have same potential energy.

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

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

Answer: D

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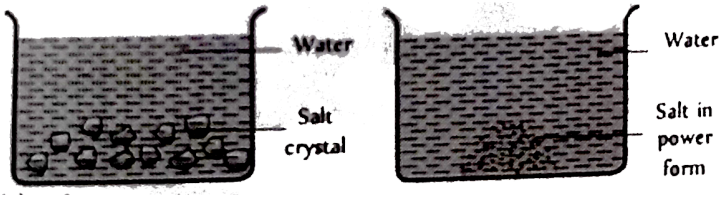
Self Evaluation Test

1. Out of the following, in which vessel will the temperature of the solution be higher after the salt is completely dissolved.



A. A

B. B

C. Equal in both

D. Information is sufficient

Answer: b

View Text Solution

2. Fire is extinguished more effectively by

A. Hot water

B. Cold water

C. Equally by both

D. Ice

Answer: a

View Text Solution

3. An ideal thermometer should have

A. Large heat capacity

B. Medium heat capacity

C. Small heat capacity

D. Variable heat capacity

Answer: c

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4. A steel meter scale is to be ruled so that millimeter intervals are accurate within about 5×10^{-5} mm at a certain temperature. The maximum temperature variation allowable during the ruling is (Coefficient of linear expansion of steel $= 10 \times 10^{-6} K^{-1}$)

A. $2^{\circ} C$

B. $5^\circ C$

C. $7^\circ C$

D. $10^\circ C$

Answer: b

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5. During illness an 80 kg man ran a fever of $102.2^\circ F$ instead of normal body temperature of $98.6^\circ F$. Assuming that human body is

mostly water, how much heat is required to raise his temperature by that amount

A. 100 kcal

B. 160 kcal

C. 50 kcal

D. 92 kcal

Answer: b

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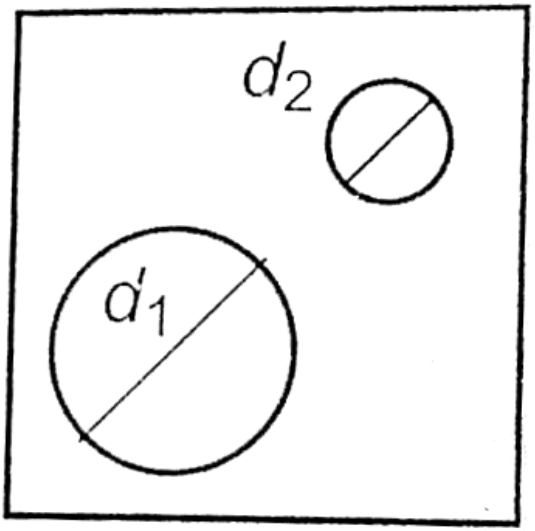
6. Two holes of unequal diameters d_1 and $d_2(d_1 > d_2)$ are cut in metal sheet is heated



A. Both d 1 and d 2 will decrease

B. Both d 1 and d 2 will increase

C. d 1 will increase, d 2 will decrease

D. d 1 will decrease, d 2 will increase

Answer: B

Watch Video Solution

7. If earth suddenly stops rotating about its own axis, the increase in it's temperature will be

A. $\frac{R^2\omega^2}{5Js}$

B. $\frac{R^2\omega^2}{Js}$

C. $\frac{Rm\omega^2}{5Js}$

D. None of these

Answer: A

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8. Latent heat of ice 80 cal/gm . A man melts 60 g of ice by chewing in 1 minute . His power is

A. 4800 W

B. 336 W

C. $1.33W$

D. $0.75W$

Answer: B

Watch Video Solution

9. A faulty thermometer has its lower fixed point marked as 110° and upper fixed point marked as 110° and upper fixed point marked as 110°. If the temperature of the body shown

in this scale is 62°, the temperature shown on the Celsius scale is

A. $72^\circ C$

B. $82^\circ C$

C. $60^\circ C$

D. $42^\circ C$

Answer: c

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10. If there is no heat loss, the heat released by the condensation of x gram of steam at $100^\circ C$ into water at $100^\circ C$ can be used to convert y gram of ice at $0^\circ C$ into water at $100^\circ C$. Then the ratio of y:x is nearly [Given $L_l = 80cal/gm$ and $L_v = 540cal/gm$]

A. $1:1$

B. $2.5:1$

C. $2:1$

D. $3:1$

Answer: d

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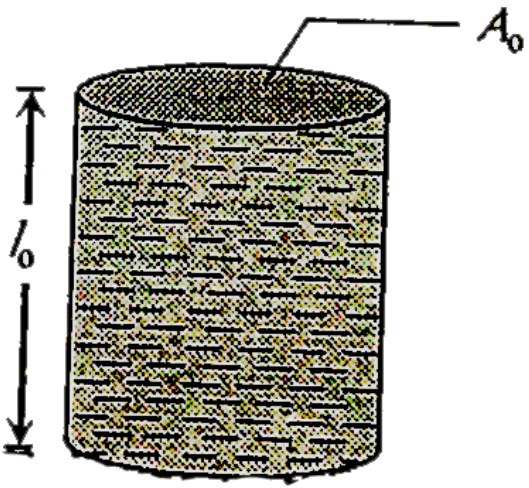
11. The figure shows a glass tube (linear co-efficient of expansion is α) completely filled with a liquid of volume expansion co-efficient γ . On heating length of the liquid column does not change. Choose the correct relation

between γ and α



A. $\gamma = \alpha$

B. $\gamma = 2\alpha$

C. $\gamma = 3\alpha$

D. $\gamma = \dfrac{\alpha}{3}$

Answer: B

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12. Water falls from a height $500m$, what is the rise in temperature of water at bottom if whole energy remains in the water ? $(J = 4.2)$

A. $0.96^\circ C$

B. $1.02^\circ C$

C. $1.16^\circ C$

D. $0.23^\circ C$

Answer: c

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13. A steel ball of mass 0.1 kg falls freely from a height of 10 m and bounces to a height of 5.4 m from the ground. If the dissipated energy in this process is absorbed by the ball, the rise in its temperature is (specific heat of steel $= 460K/kg^\circ/C, g = 10m/s^2$)

A. $0.01^\circ C$

B. $0.1^\circ C$

C. $1^\circ C$

D. $1.1^\circ C$

Answer: b

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14. 1gm of ice at $0^\circ C$ is mixed with 1 gm of water at $100^\circ C$ the resulting temperature will be

A. $5^\circ C$

B. $0^\circ C$

C. $10^\circ C$

D. ∞

Answer: C

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15. The amount of heat required to change $1gm(0^\circ C)$ of ice into water of $100^\circ C$, is

A. 716 cal

B. 500 cal

C. 180 cal

D. 100 cal

Answer: C

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