THERMAL PHYSICS

1. A gas at the temperature 250 K is contained in a closed vessel. If the gas is heated through 1K, then the percentage increase in its pressure will be–

(1) 0.4% (2) 0.2%

(3) 0.1% (4) 0.8%

2. Two identical rooms in a house are connected by an open doorway. The temperatures in the two rooms are maintained at different values. Which room contains more air?

(1) the room with higher temperature

(2) the room with lower temperature

(3) the room with higher pressure

(4) same, as both have the same pressure & volume

3. Total number of air molecules (inclusive of oxygen, nitrogen, water vapour and other constituents) in a room of capacity 25 m^3 at a temperature of 27° and 1 atm pressure is :-

(1) 6×10^{26} (2) 6×10^{25}

(3) 6×10^{24} (4) 6×10^{27}

4. Three identical closed containers are filled with gases at the same temperature. Container A is filled with 64 g of oxygen, container B is filled with 84 g of nitrogen, and container C is filled with 8 g of hydrogen. Which is the correct ranking of the pressures in the containers ?

(1) $P_A > P_B > P_C$ (2) $P_A > P_C > P_B$

(3) $P_A < P_C < P_B$ (4) $P_A < P_B < P_C$

5. An ideal gas expands in such a way that PV^2 = constant throughout the process. Select correct alternative

(1) This expansion is not possible without heating

(2) This expansion is not possible without cooling

(3) Internal energy remains constant in this expansion

(4) Internal energy increases in this expansion

6. Number of collisions of molecules of a gas on the wall of a container per m^2 will:

(1) Increase if temperature and volume both are doubled

(2) Increase if temperature and volume both are halved

(3) Increase if pressure and temperature both are doubled

(4) Increase if pressure and temperature both are halved

7. Two containers of equal volume contain identical gases at pressures P_1 and P_2 and absolute temperatures, T_1 and T_2 respectively. The vessels are joined and the gas reaches a common pressure P and a common temperature T. Then

(1) $P = \left(\frac{P_1}{T_1} + \frac{P_2}{T_2}\right)T$ (2) $P = \frac{1}{2}\left(\frac{P_1}{T_1} + \frac{P_2}{T_2}\right)T$

(3) $T = \frac{PT_1T_2}{P_1T_2 + P_2T_1}$ (4) $T = \frac{2PT_1T_2}{P_1T_1 + P_2T_2}$

8. You have two closed containers of equal volume. One is full of helium gas. The other holds an equal mass of nitrogen gas. Both gases have the same pressure. How does the temperature of the helium compare to the temperature of nitrogen ? (Assume gases to be have as ideal gas)

(1) $T_{helium} > T_{nitrogen}$

(2) $T_{helium} = T_{nitrogen}$

(3) $T_{helium} < T_{nitrogen}$

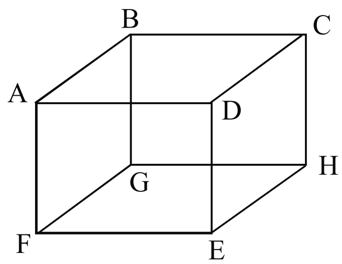
(4) cannot be compared

9. At pressure P and absolute temperature T a mass M of an ideal gas fills a closed container of volume V. An additional mass 2M of the same gas is added into the container and the volume is then reduced to $\frac{V}{3}$ and the temperature to $\frac{T}{3}$. The pressure of the gas will now be:

(1) $\frac{P}{3}$ (2) P

(3) 3 P (4) 9 P

10. 1 mole of an ideal gas is contained in a cubical volume V, ABCDEFGH at 300 K. One face of the cube (EFGH) is made up of a material which totally absorbs any gas molecule incident on it. At any given time,

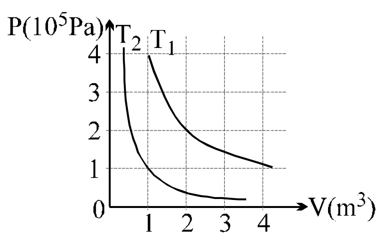


(1) the pressure on EFGH would be zero.
(2) the pressure on all the faces will the equal.
(3) the pressure on EFGH would be double the pressure on ABCD.
(4) the pressure on EFGH would be half that on ABCD

11. When a gas is heated in a vessel of constant volume, the pressure increases because
(1) The average force per impact of a molecule on a wall of the vessel increases
(2) Molecules collide with each other more frequently
(3) The number of molecules per unit volume of the gas increases
(4) All of these

12. A sample of 0.177 g of an ideal gas occupies 1000 cm^3 at STP. Calculate the rms speed of the gas molecules.
(1) 1300 m/s (2) 1500 m/s
(3) 1700 m/s (4) 2000 m/s

13. The following graphs shows two isotherms for a fixed mass of an ideal gas. The ratio of r.m.s. speed of the molecules at temperatures T_1 and T_2 is



(1) $2\sqrt{2}$ (2) $\sqrt{2}$ (3) 2 (4) 4

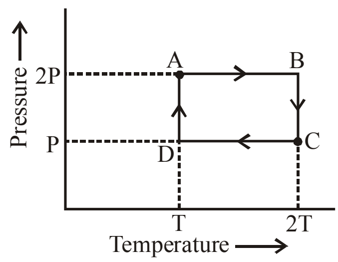
14. Number of degrees of freedom of molecules of hydrogen in 1 cc of hydrogen at NTP is :-
(1) 1.8×10^{19} (2) 1.5×10^{21}
(3) 1.3×10^{20} (4) 1.6×10^{23}

15. For a gas molecule, its degree of freedom for translation is 3, for rotation is 2 and for vibration is 2. If its rotational K.E is related to total energy by $K.E_R = nE$, then n would be :
(1) $\frac{3}{2}$ (2) $\frac{7}{2}$
(3) $\frac{3}{7}$ (4) $\frac{2}{7}$

16. In a diatomic molecule, the rotational energy at a given temperature :
(1) does not Obey Maxwell's distribution law
(2) have the same value for all molecules
(3) equal to the translational kinetic energy of each molecule
(4) (2/3)rd of the translational kinetic energy of each molecule

17. A diatomic gas ($\gamma = 1.4$) does 2000 J of work when it is expanded isobaricaly. Find the heat given to the gas in the above process (in kJ).
(1) 7000 (2) 7
(3) 5000 (4) 5

18. An ideal monoatomic gas is taken through the thermodynamic states $A \rightarrow B \rightarrow C \rightarrow D$ *via* the paths shown in the figure. If U_A, U_B, U_C and U_D represent the internal energy of the gas in state A, B C and D respectively, then which of the following is not true?



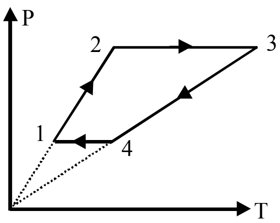
(1) $U_A - U_D = 0$
(2) $U_B - U_C = 0$
(3) $U_C - U_D > 0$
(4) $U_B - U_A < 0$

19. 5n, n and 5n moles of a monoatomic, diatomic and non-linear polyatomic gases (which do not react chemically with each other) are mixed at room temperature. The equivalent degree of freedom for the mixture is-

(1) $\frac{25}{7}$ (2) $\frac{48}{11}$

(3) $\frac{52}{11}$ (4) $\frac{50}{11}$

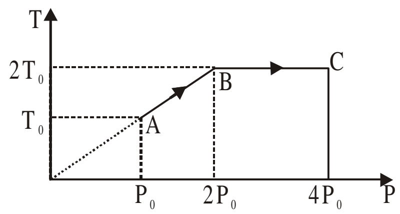
20. Three moles of an ideal monatomic gas performs a cyclic process as shown in the figure. The temperatures in different states are $T_1 = 400$ K, $T_2 = 800$ K, $T_3 = 2400$ K & $T_4 = 1200$ K. Determine the work done by the gas during the cycle [Given R = 8.31 J-mole^{-1}K^{-1})



(1) 19.94 kJ (2) 22.65 kJ

(3) 15.81 kJ (4) 10.37 kJ

21. One mole of an ideal gas is taken through the process ABC as shown in the figure. The total work done on the gas is:



(1) zero (2) $2RT_0\ell n2$

(3) $-2RT_0\ell n2$ (4) $4RT_0\ell n2$

22. C_p and C_v are specific heats at constant pressure and constant volume respectively. It is observed that

$C_p - C_v = a$ for hydrogen gas

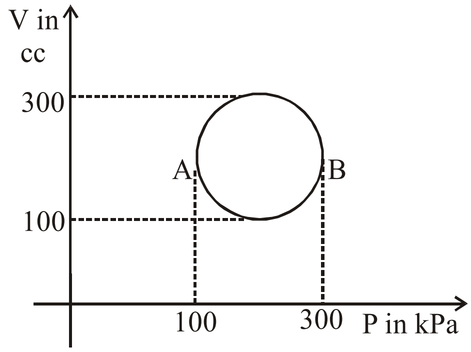
$C_p - C_v = b$ for nitrogen gas

The correct relation between a and b is :

(1) a = 14 b (2) a = 28 b

(3) $a = \frac{1}{14}b$ (4) a = b

23. Calculate heat given to gas during process ABA in figure :-



(1) 3.14 J (2) 314 J

(3) 31.4 J (4) None of these

24. The ratio C_P/C_V for a gas mixture consisting of 8g of helium and 16g of oxygen is :-

(1) 23/15 (2) 15/23

(3) 27/17 (4) 17/27

25. Four moles of carbon monoxide (f = 5) are mixed with four moles of carbon dioxide (f = 7). Assuming the gases to be ideal, the ratio of specific heats is

(1) 15/11 (2) 41/30

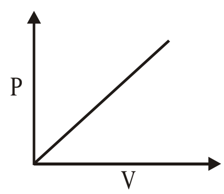
(3) 4/3 (4) 7/4

26. A mixture of n_1 moles of monoatomic gas and n_2 moles of diatomic gas has $\gamma = 1.5$ then :-

(1) $n_1 = n_2$ (2) $2n_1 = n_2$

(3) $2n_2 = n_1$ (4) $2n_1 = 3n_2$

27. 1 mole of monoatomic ideal gas is expanded as per following process. What will be molar heat capacity ?



(1) R (2) 0.303 R (3) 5R (4) 2R

28. P–V diagram of a diatomic gas is a straight line passing through origin. The molar heat capacity of the gas in the process will be :

(1) 4 R (2) 2.5 R (3) 3 R (4) $\frac{4R}{3}$

29. 5.6 litre of helium gas at STP is adiabatically compressed to 0.7 liter. Taking the initial temperature to be T_1, the work done in the process is

(1) $\frac{9}{8}RT_1$ (2) $\frac{3}{2}RT_1$

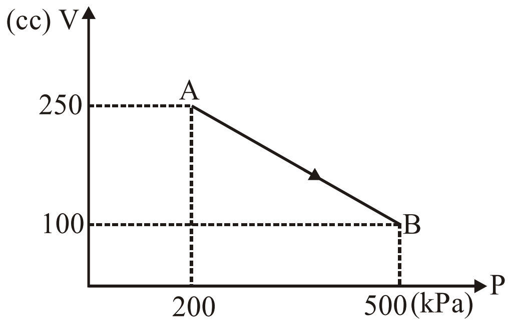
(3) $\frac{15}{8}RT_1$ (4) $\frac{9}{2}RT_1$

30. For a process, relation between temperature and volume is TV^3 = constant. If a monatomic gas follows this process, then find the molar specific heat for this process [R is a gas constant].

(1) $\frac{7R}{6}$ (2) $\frac{R}{3}$

(3) $\frac{11R}{6}$ (4) Zero

31. A monoatomic gas is taken along path AB as shown. Calculate change in internal energy of system :-



(1) 279.8 J (2) 341 J

(3) 241 J (4) Zero

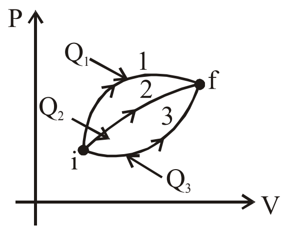
32. Ideal mono-atomic gas is taken through process such that dQ= 3dU. The molar heat capacity for this process is :-

(1) 3 R (2) 4.5 R (3) 4 R (4) 2 R

33. One mole of an ideal monoatomic gas at temperature T_0 expands slowly according to law P= kV (k is constant). If final temperature is $2T_0$ heat supplied to gas is :-

(1) 2 RT_0 (2) 3/2 RT_0 (3) RT_0 (4) $RT_0/2$

34. A diatomic gas undergoes three processes as shown in figure. In process 1, W_1 = 200 J, in process 2, W_2 = 100 J and in process 3, Q_3= 250 J, W_3 = 50 J. Find the ratio of Q_1 and Q_2:



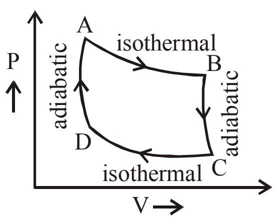
(1) $\frac{4}{3}$ (2) 2

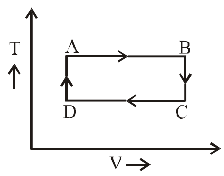
(3) $\frac{5}{2}$ (4) $\frac{4}{5}$

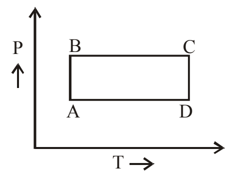
35. In an adiabatic process, pressure is increased by $\frac{2}{3}\%$. If $\frac{C_P}{C_V}=\frac{3}{2}$ then the volume decreased by about :

(1) $\frac{4}{9}\%$ (2) $\frac{2}{9}\%$ (3) 4% (4) $\frac{9}{4}\%$

36. The P-V diagram of a certain process (Carnot cycle) is as shown in the figure. The process is represented as:-



(1)


(2)


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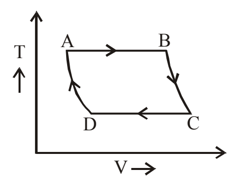
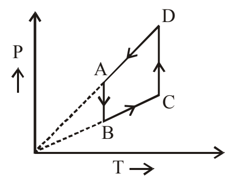


(4)


37. Aheat engine is having a source at temperature 527°C and sink at temperature 127°C. If the useful work is required to be done by the engine at the rate of 750 watt, then the amount of heat absorbed per second from the source in calories and the efficiency of heat engine are :-

(1) 482.2 cal/s, 50%

(2) 482.2 cal/s, 25%

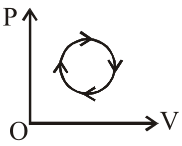
(3) 357.14 cal/s, 50%

(4) 357.14 cal/s, 25%

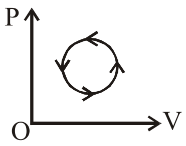
38. Consider a carnot's cycle operating between T_1 = 500 K and T_2 = 300 K producing 1 kJ of mechanical work per cycle. Find the heat transferred to the engine by the reservoirs.

(1) 2000 J (2) 2500 J (3) 1500 J (4) 1000 J

39. If the P-V diagrams of two thermodynamics devices working in a cyclic process are as shown in the figure, then :-



(A)



(B)

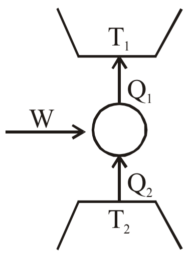
(1) A is a heat engine, B is a heat pump/ refrigerator

(2) B is a heat engine, A is a heat pump/ refrigerator

(3) both A and B are heat engines

(4) both A and B are heat pumps/refrigerator

40. Consider a heat engine as shown in figure. Q_1 and Q_2 are heat added to heat bath T_1 and heat taken from T_2 in one cycle of engine respectively. W is the mechanical work done on the engine. If W > 0, then possibilities are:



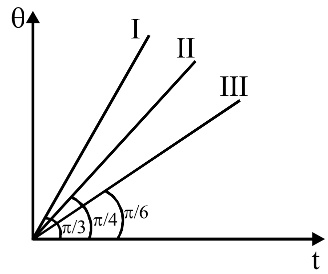
(1) $Q_1 > Q_2 > 0$

(2) $Q_2 > Q_1 > 0$

(3) $Q_2 < Q_1 < 0$

(4) $Q_1 < 0, Q_2 > 0$

41. Three bodies A, B and C of masses m, m and $\sqrt{3}$m respectively are supplied heat at a constant rate. The change in temperature θ versus time t graph for A, B and C are shown by I, II and III respectively. If their specific heat capacities are S_A, S_B and S_C respectively then which of the following relation is correct ? (Initial temperature of body is 0°C) :-



(1) $S_A > S_B > S_C$

(2) $S_B = S_C < S_A$

(3) $S_A = S_B = S_C$

(4) $S_B = S_C > S_A$

42. A copper block of mass 2.5 kg is heated in a furnace to a temperature of 500° C and then placed on a large ice block. What is the maximum amount of ice that can melt. (Specific heat of copper is 0.39 J/gm)

(1) 1.5 kg (2) 2.5 kg

(3) 3.5 kg (4) 4.5 kg

43. During the melting of a slab of ice at 273 K at atmospheric pressure. Consider the following statements

(A) positive work is done by the ice-water system on the atmosphere

(B) positive work is done on the ice-water system by the atmosphere

(C) the internal energy of the ice-water system increases

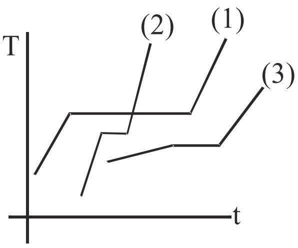
(D) the internal energy of the ice-water system decreases

The correct statements are : -

(1) A & C (2) A & D

(3) B & C (4) B & D

44. Three different materials of identical masses are placed in turn in a special oven where a material absorbs energy at a certain constant rate. During heating process, each material begins in the liquid state and ends in gaseous state. Following figure gives the temperature T verses time t for three materials, C represents specific heats in liquid state & L represent latent heat of vaporization. Then



(1) $C_1 > C_2 > C_3$, $L_1 = L_2 = L_3$
(2) $C_1 > C_2 > C_3$, $L_1 > L_3 > L_2$
(3) $C_3 > C_1 > C_2$, $L_1 > L_3 > L_2$
(4) $C_1 = C_2 = C_3$, $L_1 > L_2 > L_3$

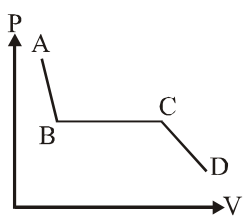
45. When 20 kJ of heat is removed from 1.2 kg of ice originally at –15°C, its new temperature is (approximately) :- (Given : C_{ice} = 2100 J/kg K)

(1) –18°C (2) –26°C
(3) –23°C (4) –35°C

46. Steam at 100°C is more dangerous than the same mass of water at 100°C because the steam:-

(1) moves faster
(2) is less dense
(3) contains more internal energy
(4) has a higher specific heat capacity

47. The portion AB of the indicator diagram representing the state of matter denotes:-

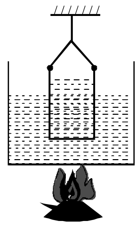


(1) The liquid state of matter
(2) Gaseous state of matter
(3) Change from liquid to gaseous state
(4) Change from gaseous state to liquid state

48. Heat is associated with

(1) Kinetic energy of random motion of molecules
(2) Kinetic energy of orderly motion of molecules
(3) Total kinetic energy of random motion in some cases and kinetic energy of orderly motion in other
(4) Total kinetic energy of random motion and orderly motion of molecules

49. Water is boiling in a large vessel as shown in figure. If another vessel containing water is dipped in the bigger vessel as shown. Choose correct option for water in smaller vessel

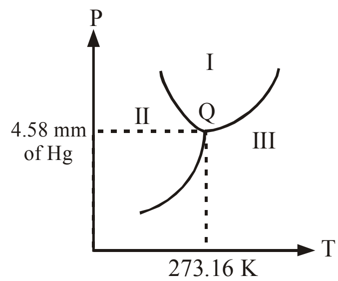


(1) will not boil
(2) will boil below 100°C
(3) will boil above 100°C
(4) will boil at 100°C

50. A small quantity, mass m, of water at a temperature θ (in °C) is poured on to a large mass M of ice which is at its melting point. If c is the specific heat of water and L the latent heat of fusion of ice, then the mass of ice melted is given by :-

(1) $\frac{ML}{mc\theta}$ (2) $\frac{mc\theta}{ML}$ (3) $\frac{Mc\theta}{L}$ (4) $\frac{mc\theta}{L}$

51. In the phase diagram shown, the point Q corresponds to the triple point of water. The regions I, II and III respectively correspond to phases



(1) liquid, solid, vapour
(2) solid, liquid, vapour
(3) liquid, vapour, solid
(4) solid, vapour, liquid

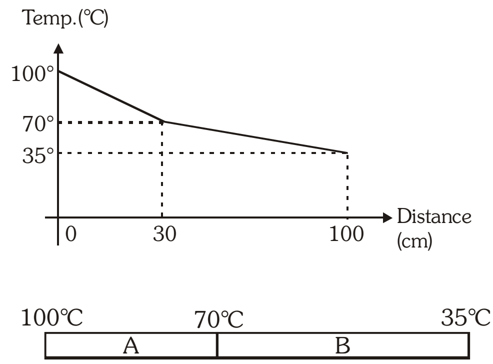
52. An experiment takes 10 minutes to raise the temperature of water in a container from 0°C to 100°C and another 55 minutes to convert it totally into steam by a heater supplying heat at a uniform rate. Neglecting the specific heat of the container and taking specific heat of water to be 1 cal/g °C, the heat of vapourization according to this experiment will come out to be :-

(1) 530 cal/g (2) 540 cal/g
(3) 550 cal/g (4) 460 cal/g

53. 2 kg of metal at 100°C is cooled by 1 kg of water at 0°C. If specific heat capacity of metal is $\frac{1}{2}$ of specific heat capacity of water, final temperature of mixture would be :-

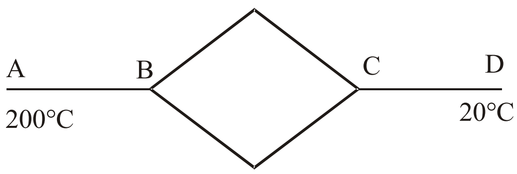
(1) 50°C (2) More than 50°C
(3) Less than 50°C (4) None of the above

54. Two different rods A and B are kept as shown in figure. The variation of temperature of different cross sections is plotted in a graph shown in figure. The ratio of thermal conductivities of A and B is



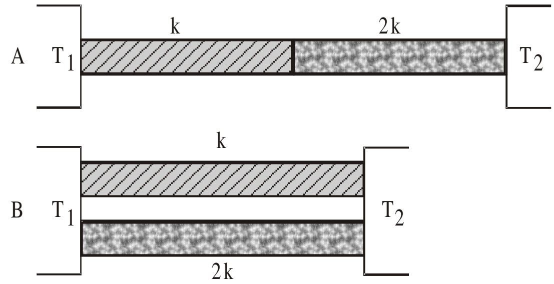
(1) 2 (2) 0.5 (3) 1 (4) 2/3

55. Six identical conducting rods are joined as shown. The ends A and D are maintained at 200° C and 20 °C respectively. No heat is lost to surroundings. The temperature of the junction C will be



(1) 60° C (2) 80°C
(3) 100°C (4) 120°C

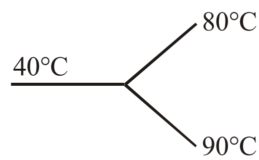
56. Two rods with the same dimensions have thermal conductivities in the ratio 1 : 2. They are arranged between heat reservoirs with the same temperature difference, in two different configurations, A and B. The rates of heat flow in A and B are I_A and I_B respectively. The ratio $\frac{I_A}{I_B}$ is equal to



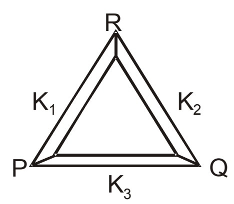
(1) 1 : 2 (2) 1 : 3 (3) 2 : 5 (4) 2 : 9

57. Three rods made of the same material and having the same cross-section have been joined as shown in the figure. Each rod is of the same length. The temperature of the junction of the three rods will be :-

(1) 55° C
(2) 60° C
(3) 75° C
(4) 70° C



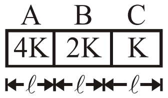
58. Three rods of same dimensions are arranged as shown in figure they have thermal conductivities K_1, K_2 and K_3. The points P and Q are maintained at different temperatures for the heat to flow at the same rate along PRQ and PQ then which of the following option is correct-



(1) $K_3 = \frac{1}{2}(K_1 + K_2)$ (2) $K_3 = K_1 + K_2$

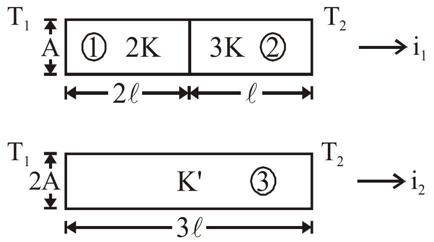
(3) $K_3 = \frac{K_1K_2}{K_1 + K_2}$ (4) $K_3 = 2(K_1 + K_2)$

59. Three rods having same length and cross-section area are joined as shown in figure. Find equivalent thermal conductivity



(1) $\frac{K_A}{7}$ (2) $\frac{6K_B}{7}$ (3) $\frac{7K_B}{3}$ (4) $7K_C$

60.



Find value of $\frac{K'}{K}$ such that slab (3) conduct double thermal current w.r.t. (1) + (2) for same temperature difference :

(1) $\frac{9}{4}$ (2) $\frac{5}{3}$ (3) 5 (4) 2

61. Two spheres of same material are having surfaces blackened and placed in space separately. Their radii are R and 2R respectively and the most dominating wavelengths in their spectrum are observed to be in the ratio 1 : 2. Choose incorrect statement :-

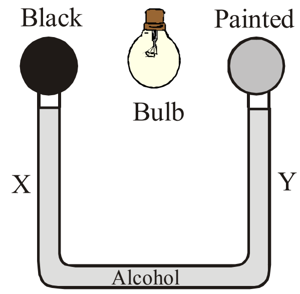
(1) The ratio of their temperatures is 2 : 1
(2) The ratio of their emissive powers is 4 : 1
(3) The ratio of their rates of heat loss is 4 : 1
(4) The ratio rates of cooling is 32 : 1

62. A copper sphere is suspended in an evacuated chamber maintained at 300 K. The sphere is maintained at a constant temperature of 500 K by heating it electrically. A total of 300 W of electric power is needed to do it. When **half** of the surface of the copper sphere is completely blackened, 600W is needed to maintain the same temperature of the sphere. Calculate the emissivity of copper.

(1) $e = \frac{1}{3}$ (2) $e = \frac{2}{3}$

(3) $e = \frac{1}{2}$ (4) $e = \frac{1}{6}$

63. The following figure shows two air-filled bulbs connected by a U-tube partly filled with alcohol. What happened to the levels of alcohol in the limbs X and Y when an electric bulb placed midway between the bulbs is lighted?



(1) The level of alcohol in limb X falls while that in limb Y rises
(2) The level of alcohol in limb X rises while that in limb Y falls
(3) The level of alcohol falls in both limbs
(4) The level of alcohol rises in both limbs

64. Assume that the entire surface of a burning log of wood is at the same temperature. Some small spots on the wood appear brighter than the rest of the surface. At such a spot–

(1) there is a small cavity in the wood.
(2) there is a small hump (convex portion) in the wood.
(3) less ash has formed than on the rest of the wood.
(4) more ash has formed than on the rest of the wood.

65. A solid sphere of radius R and a hollow sphere of inner radius r and outer radius R made of copper are heated to the same temperature and are allowed to cool in the same environment. Then, choose the **CORRECT** statement :-

(1) Hollow sphere cools faster
(2) Solid sphere cools faster
(3) Both the spheres attain room temperature at the same time
(4) The rate of loss of heat of the solid sphere is twice that of the hollow sphere

66. Two spheres A and B have the same radii but the heat capacity of A is greater than that of B. The surfaces of both are painted black. They are heated to the same temperature and allowed to cool in vacuum. Then :

(1) A cools faster than B

(2) both A and B cool at the same rate

(3) at any temperature the ratio of their rates of cooling is a constant

(4) B cools faster than A

67. Which of the following statements is/are **CORRECT**:

(i) a body with large reflectivity is a poor emitter

(ii) a brass tumbler feels much colder than a wooden tray on a chilly day

(iii) the earth without its atmosphere would be inhospitably cold

(iv) heating systems based on circulation of steam are more efficient in warming a building than those based on circulation of hot water

Find correct option :-

(1) i & ii only (2) i, ii & iv

(3) i & iv only (4) i, ii, iii & iv

68. The temperature of a body falls from 52°C to 36°C in 10 minutes when placed in a surrounding of constant temperature 20°C. What will be the temperature of the body after another 10 min.

(1) 28°C (2) 20°C

(3) 32°C (4) 24°C

69. A black body emits 10 watt per cm^2 at 427°C. The sun radiates 10^5 watt per cm^2. Then what is the temperature of the sun?

(1) 5000 K (2) 6000 K

(3) 7000 K (4) 8000 K

70. A red star and a green star radiate energy at the same rate which star is bigger in size.

(1) red

(2) green

(3) both have same size

(4) Can't say anything

71. Hot coffee in a mug cools from 90° to 70°C in 4.8 minutes. The room temperature is 20°C. Applying Newton's law of cooling the time needed to cool it further by 10°C should be nearly

(1) 4.2 min (2) 3.8 min

(3) 3.2 min (4) 2.4 min

72. A planet having average surface temperature T_0 is at an average distance d from the sun. Assuming that the planet receives radiant energy from the sun on unit area in unit time is S and it loses radiant energy only from its surface and neglecting all other atmospheric effects we conclude.

(1) $S \propto d^2$ (2) $S \propto d^{-2}$

(3) $S_0 \propto d$ (4) $S_0 \propto d^4$

73. In Newton's law of cooling $\frac{d\theta}{dt} = -k\Delta\theta$, the proportionality constant k is k_1 and k_2 for two substances A and B having mass m_1 and m_2 area A_1 and A_2, specific heat s_1 and s_2, emissivity e_1 and e_2 respectively, it is given that $\frac{e_1}{e_2} = 1$, $\frac{A_1}{A_2} = 1$, $\frac{m_1}{m_2} = 2$, $\frac{s_1}{s_2} = \frac{1}{3}$, while surrounding temperature remains constant. Then $\frac{k_1}{k_2}$:-

(1) $\frac{1}{3}$ (2) $\frac{2}{9}$ (3) $\frac{3}{2}$ (4) $\frac{3}{4}$

74. In the given table are shown initial lengths, change in temperature and final lengths of there different rods.

Rod	**Initial Length**	**Temperature Change**	**Change in Length**
P	2L	ΔT	ℓ
Q	3L	$2\Delta T$	3ℓ
R	4L	ΔT	ℓ

Which of the following statements is/are true?

(1) All the three rods are of different materials.

(2) Rods P and Q may be of the same material.

(3) Rods Q and R may be of the same material.

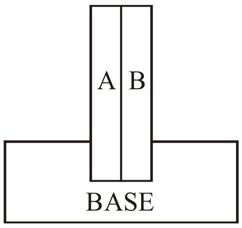
(4) Rods P and R may be of the same material.

75. When water is heated from 0°C to 4°C and C_p and C_v are its specific heats at constant pressure and constant volume respectively, then :

(1) $C_p > C_v$ (2) $C_p < C_v$

(3) $C_p = C_v$ (4) $C_p - C_v = R$

76. A bimetallic strip consists of metals A and B. It is mounted rigidly at the base as shown. The metal A has a higher coefficient of expansion to that for metal B. When bimetallic strip is placed in a cold bath it will



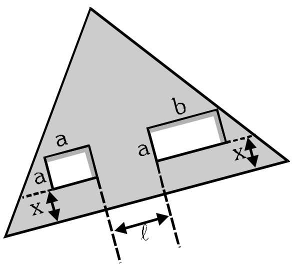
(1) bend towards the right

(2) bend towards the left

(3) not bend but shrink

(4) neither bend nor shrink

77. A triangular plate has two cavities, one square and one rectangular as shown. The plate is heated.



(1) a increases, b decreases

(2) a and b both increase

(3) a and b increase, x and ℓ decrease

(4) a, b, x and ℓ all increase

78. On a temperature scale Y, water freezes at –160 °Y and boils at – 50 °Y. On this Y scale, a temperature of 340 K would be read as

(1) –106.3°Y (2) –96.3°Y

(3) –86.3°Y (4) –76.3°Y

79. 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_1, the coefficient of linear expansion of the vessel B is

(1) $\dfrac{\alpha_1\gamma_1\gamma_2}{\gamma_1+\gamma_2}$ (2) $\dfrac{\gamma_1-\gamma_2}{2\alpha_1}$

(3) $\dfrac{\gamma_1+\gamma_2+\alpha}{3}$ (4) $\dfrac{\gamma_1-\gamma_2+3\alpha_1}{3}$

80. For an ideal gas PT^{11} = constant then volume expansion coefficient is equal to-

(1) $\dfrac{11}{T}$ (2) $\dfrac{1}{T}$ (3) $\dfrac{12}{T}$ (4) $\dfrac{2}{T}$

81. A uniform metallic rod rotates about its perpendicular bisector with constant angular speed. If it is heated uniformaly to raise its temperature slightly :-

(1) Its speed of rotation increases

(2) Its speed of rotation decreases

(3) Its speed of rotation remains same

(4) Its speed of rotation increases because its moment of inertia increases

82. For ideal gas, the coefficient of volume expansion at constant pressure is :-

(1) directly proportional to absolute temp

(2) inversely proportional to absolute temp

(3) Does not depends on temp.

(4) Data is not sufficient

ANSWER KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ans.	**1**	**2**	**1**	**4**	**2**	**2,3**	**2**	**3**	**3**	**4**	**1**	**1**	**3**	**3**	**4**	**4**	**2**	**4**	**4**	**1**
Que.	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Ans.	**2**	**1**	**3**	**3**	**3**	**1**	**4**	**3**	**1**	**1**	**4**	**2**	**1**	**1**	**1**	**3**	**3**	**2**	**1**	**1**
Que.	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Ans.	**4**	**1**	**3**	**3**	**3**	**3**	**1**	**1**	**1**	**4**	**1**	**3**	**1**	**2**	**2**	**4**	**4**	**3**	**2**	**1**
Que.	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
Ans.	**2**	**1**	**1**	**1**	**1**	**4**	**4**	**1**	**3**	**1**	**3**	**2**	**3**	**2**	**2**	**2**	**4**	**3**	**4**	**3**
Que.	81	82																		
Ans.	**2**	**2**																		