# DPP
DAILY PRACTICE PROBLEMS

CLASS : XITH

DATE :

SUBJECT : PHYSICS

DPP NO. :8

## Topic :- THERMAL PROPERTIES OF MATTER

1. A lead bullet of 10 g travelling at 300 m/s strikes against a block of wood and comes to rest.Assuming 50% of heat is absorbed by the bullet, the increase in its temperature is (specific heat of lead $= 150 J/kg, K$)

   a) 100°C　　　　　b) 125°C　　　　　c) 150°C　　　　　d) 200°C

2. Which one of the figure gives the temperature dependence of density water correctly?

   a)

   b)

   c)

   d)
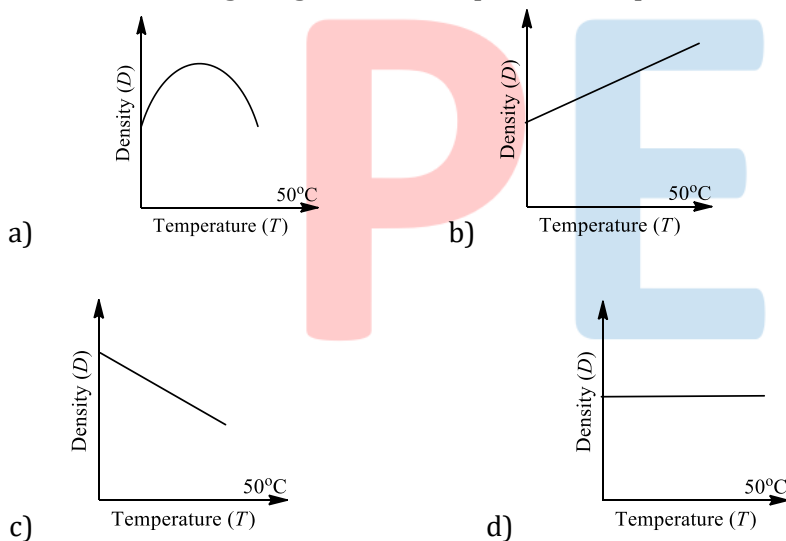
3. The spectrum of a black body at two temperatures 27°C and 327°C is shown in the figure. Let A_1 and A_2 be the areas under the two curves respectively. The value of $\frac{A_2}{A_1}$ is
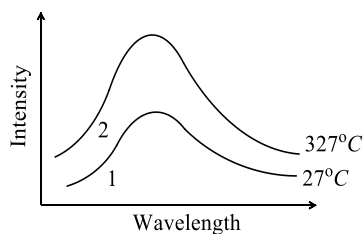
   a) 1 : 16　　　　　b) 4 : 1　　　　　c) 2 : 1　　　　　d) 16 : 1

4. 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
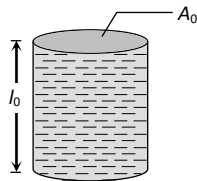
a) $\gamma = \alpha$
b) $\gamma = 2\alpha$
c) $\gamma = 3\alpha$
d) $\gamma = \frac{\alpha}{3}$

5. Which of the following statements is wrong
a) Rough surfaces are better radiators than smooth surface
b) Highly polished mirror like surfaces are very good radiators
c) Black surfaces are better absorbers than white ones
d) Black surfaces are better radiators than white

6. Two rods of same length and cross section are joined along the length. Thermal conductivities of first and second rod are K_1 and K_2. The temperature of the free ends of the first and second rods are maintained at θ_1 and θ_2 respectively. The temperature of the common junction is

a) $\frac{\theta_1 + \theta_2}{2}$
b) $\frac{K_2 K_1}{K_1 + K_2}(\theta_1 + \theta_2)$
c) $\frac{K_1 \theta_1 + K_2 \theta_2}{K_1 + K_2}$
d) $\frac{K_2 \theta_1 + K_1 \theta_2}{K_1 + K_2}$

7. Three rods made of same material and having same cross-section are joined as shown in the figure. Each rod is of same length. The temperature at the junction of the three rods is
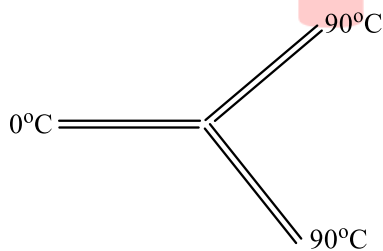

a) 45°C
b) 90°C
c) 30°C
d) 60°C

8. If the temperature of the sun (black body) is doubled, the rate of energy received on earth will be increased by a factor of
a) 2
b) 4
c) 8
d) 16

9. If a liquid is heated in weightlessness, the heat is transmitted through
a) Conduction
b) Convection
c) Radiation
d) Neither, because the liquid cannot be heated in weightlessness

10. The luminosity of the Rigel star is 17000 times that of the sun. Assume both to be perfectly black bodies. If the surface temperature of the sun is 6000 K, then the temperature of the star is

a) 68400 K   b) 1.02×10^8 K   c) 12000 K   d) 68400°C

11. Which one of the following is $v_m - T$ graph for perfectly black body? v_m is the frequency of radiation with maximum intensity, T is the absolute temperature.
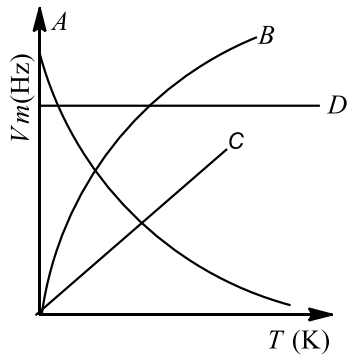
a) D b) C c) B d) A

12. Which of the following circular rods. (given radius r and length l) each made of the same material as whose ends are maintained at the same temperature will conduct most heat?

a) $r = 2r_0; l = 2l_0$ b) $r = 2r_0; l = l_0$ c) $r = r_0; l = l_0$ d) $r = r_0; l = 2l_0$

13. 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

14. 2 g of water condenses when passed through 40 g of water initially at 25°C. The condensation of steam raises the temperature of water to 54.3°C. What is the latent heat of steam?

a) 540 calg^{-1} b) 536 calg^{-1} c) 270 calg^{-1} d) 480 calg^{-1}

15. A sphere at temperature $600K$ is placed in an environment of temperature is $200K$. Its cooling rate is H. If its temperature reduced to $400K$ then cooling rate in same environment will become

a) $(3/16)H$ b) $(16/3)H$ c) $(9/27)H$ d) $(1/16)H$

16. 10 g of ice at 0°C is mixed with 100 g of water at 50°C. What is the resultant temperature of mixture

a) 31.2°C   b) 32.8°C   c) 36.7°C   d) 38.2°C

17. A rod of length 20 cm is made of metal. It expands by $0.075cm$ when its temperature is raised from 0°C to 100°C. Another rod of a different metal B having the same length expands by $0.045\ cm$ for the same change in temperature. A third rod of the same length is composed of two parts, one of metal A and the other of metal B. This rod expands by $0.060\ cm$ 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

18. A wall is made up of two layers A and B. The thickness of the two layers is the same, but materials are different. The thermal conductivity of A is double than that of B. In thermal equilibrium the temperature difference between the two ends is 36°C. Then the difference of temperature at the two surfaces of A will be
    a) 6°C　　　　　b) 12°C　　　　　c) 18°C　　　　　d) 24°C

19. A metal ball immersed in alcohol weighs W_1 at 0°C and W_2 at 59°C. The coefficient of cubical expansion of the metal is less than that of alcohol. Assuming that the density of 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) $W_2 = (W_1/2)$

20. Which of the following has maximum specific heat
    a) Water　　　　　b) Alcohol　　　　　c) Glycerine　　　　　d) Oil