DPP

DAILY PRACTICE PROBLEMS

CLASS : XITH **SUBJECT : PHYSICS**

DATE : **DPP NO. :2**

Topic :- THERMAL PROPERTIES OF MATTER

1. A metal ball of surface area 200 cm^2 and temperature 527°C is surrounded by a vessel at 27°C. If the emissivity of the metal is 0.4, then the rate of loss of heat from the ball is ($\sigma = 5.67 \times 10^{-8} J/m^2 - s - K^4$)
   a) 108 joules approx b) 168 joules approx c) 182 joules approx d) 192 joules approx

2. Two vessels of different materials are similar in size in every respect. The same quantity of ice filled in them gets melted in 20 minutes and 30 minutes. The ratio of their thermal conductivities will be
   a) 1.5 b) 1 c) 2/3 d) 4

3. Solar radiation emitted by sun correspond to that emitted by black body at a temperature of 6000 K. Maximum intensity is emitted at wavelength of 4800Å. If the sun was to cool down from 6000 K to 3000 K, then the peak intensity of emitted radiation would occur at a wavelength
   a) 4800Å b) 9600Å c) 2400Å d) 19200Å

4. Hot water cools from 60°C to 50°C in the first 10 min and to 42°C in the next 10 min. The temperature of the surroundings is
   a) 10°C b) 5°C c) 15°C d) 20°C

5. Water of volume 2 L in a container is heated with a coil of 1 kW at 27°C . The lid of the container is open and energy dissipates at rate of 160 Js^{-1}. In how much time temperature will rise from 27°C to 77°C [Given specific heat of water is 4.2 kJ kg^{-1}]
   a) 8 min 20 s b) 6 min 2 s c) 7 min d) 14 min

6. A lead ball moving with a velocity V strikes a wall and stops. If 50% of its energy is converted into heat, then what will be the increase in temperature (Specific heat of lead is S)
   a) $\frac{2V^2}{JS}$ b) $\frac{V^2}{4JS}$ c) $\frac{V^2}{J}$ d) $\frac{V^2S}{2J}$

7. Two metal cubes A and B of same size are arranged as shown in the figure. The extreme ends of the combination are maintained at the indicated temperatures. The arrangement is thermally insulated. The coefficients of thermal conductivity of A and B are $300 W/m$°C and $200 W/m$°C, respectively. After steady state is reached, the temperature of the interface will be

a) 45°C b) 90°C c) 30°C d) 60°C

8. The surface temperature of the sun is
a) 2900 K b) 4000 K c) 5800 K d) 9000 K

9. The mechanical equivalent of heat J is
a) A constant b) A physical quantity c) A conversion factor d) None of the above

10. On a hilly region, water boils at 95 °C.The temperature expressed in Fahrenheit is
a) 100 °F b) 20.3 °F c) 150 °F d) 203°F

11. At a certain temperature for given wave length, the ratio of emissive power of a body to emissive power of black body in same circumstances is known as
a) Relative emissivity b) Emissivity
c) Absorption coefficient d) Coefficient of reflection

12. Recently, the phenomenon of superconductivity has been observed at 95 K. This temperature is nearly equal to
a) $-288^{o}F$ b) $-146^{o}F$ c) $-368^{o}F$ d) $+178^{o}F$

13. The maximum wavelength of radiation emitted at $2000K$ is $4\mu m$. What will be the maximum wavelength of radiation emitted at 2400 K
a) $3.33\mu m$ b) $0.66\mu m$ c) $1\mu m$ d) $1m$

14. For proper ventilation of building, windows must be open near the bottom and top of the walls so as to let pass
a) In more air
b) In cool air near the bottom and hot air out near the roof
c) In hot air near the roof and cool air out near the bottom
d) Out hot air near the roof

15. A gas in an airtight container is heated from 25°C to 90°C. The density of the gas will
a) Increase slightly b) Increase considerably
c) Remain the same d) Decrease slightly

16. At NTP water boils at 100°C. Deep down the mine, water will boil at a temperature
    a) 100°C b) > 100°C c) < 100°C d) Will not boil at all

17. Calorie is defined as the amount of heat required to raise temperature of 1 g of water by 1 °C and it is defined under which of the following conditions?
    a) From 14.5°C to 15.5°C at 760 mm of Hg b) From 98.5°C to 99.5°C at 760 mm of Hg
    c) From 13.5°C to 14.5°C at 76 mm of Hg d) From 3.5°C to 4.5°C at 76 mm of Hg

18. According to the experiment of Ingen Hausz the relation between the thermal conductivity of a metal rod is K and the length of the rod whenever the wax melts is
    a) $K/l =$ constant b) $K^2/l =$ constant c) $K/l^2 =$ constant d) $Kl =$ constant

19. Two solid spheres of the same material have the same radius but one is hollow while the other is solid. Both spheres are heated to same temperature. Then
    a) The solid sphere expands more
    b) The hollow sphere expands more
    c) Expansion is same for both
    d) Nothing can be said about their relative expansion if their masses are not given

20. Three very large plates of same area are kept parallel and close to each other. They are considered as ideal black surfaces and have very high thermal conductivity. The first and third plates are maintained at temperatures $2T$ and $3T$ respectively. The temperature of the middle (i.e. second) plate under steady state condition is
    a) $\left(\frac{65}{2}\right)^{\frac{1}{4}} T$ b) $\left(\frac{97}{4}\right)^{\frac{1}{4}} T$ c) $\left(\frac{97}{2}\right)^{\frac{1}{4}} T$ d) $(97)^{\frac{1}{4}} T$