DPP

DAILY PRACTICE PROBLEMS

CLASS : XITH **SUBJECT : PHYSICS**

DATE : **DPP NO. :6**

Topic :- THERMAL PROPERTIES OF MATTER

1. The temperature at which a black body of unit area loses its energy at the rate of $1\frac{joule}{second}$ is

   a) $-65°C$ b) $65°C$ c) $65\ K$ d) None of these

2. The densities of a liquid at 0°C and 100°C are respectively 1.0127 and 1. A specific gravity bottle is filled with 300 g of the liquid at 0°C upto the brim and it is heated to 100°C. Then the mass of the liquid expelled in grams is (Coefficient of linear expansion of glass=$9 \times 10^{-6}\ °C^{-1}$)

   a) $\frac{3}{10.1}$ b) $\frac{3}{1.01}$ c) $\frac{3.81}{1.0127}$ d) $\frac{3.81}{0.0127}$

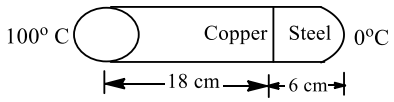
3. A clock with an iron pendulum keeps correct time at 15°C. What will be the error, insecondperday, if the room temperature is 20°C?
   (The coefficient of linear expansion of iron is $0.000012°C^{-1}$.)

   a) 2.6 s b) 6.2 s c) 1.3 s d) 3.1 s

4. Can we boil water inside the earth satellite by convection

   a) Yes b) No
   c) Nothing can be said d) In complete information is given

5. The coefficient of thermal conductivity of copper is nine times that of steel. In the composite cylindrical bar show in figure, what will be the temperature at the junction of copper ad steel?

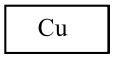


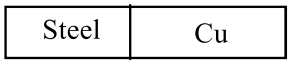
   a) 75°C b) 67°C c) 33°C d) 25°C

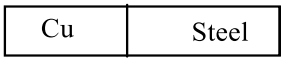
6. If the temperature of the sun becomes twice its present temperature, then
   a) Radiated energy would be predominantly in infrared
   b) Radiated energy would be predominantly in ultraviolet
   c) Radiated energy would be predominantly in X-ray region
   d) Radiated energy would become twice the present radiated energy

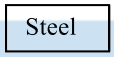
7. A black body of surface area $10cm^2$ is heated to 127°C and is suspended in a room at temperature 27°C. The initial rate of loss of heat from the body at the room temperature will be
   a) 2.99 W b) 1.89 W c) 1.18 W d) 0.99 W

8. A body of area $1cm^2$ is heated to a temperature $1000K$. The amount of energy radiated by the body in 1 s is (Stefan's constant $\sigma = 5.67 \times 10^{-8} Wm^{-2}K^{-4}$)
   a) 5.67 joule b) 0.567 joule c) 56.7 joule d) 567 joule

9. Heat current is maximum in which of the following (rods are of identical dimension)?
   a) 

   b) 

   c) 

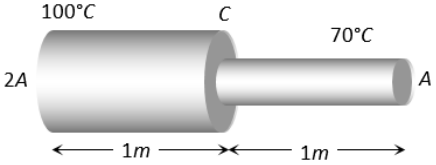
   d) 

10. Two spheres made of same material have radii in the ratio 1:2. Both are at same temperature. Ratio of heat radiation energy emitted per second by them is
    a) 1 : 2 b) 1 : 8 c) 1 : 4 d) 1 : 16

11. A body, which emits radiations of all possible wavelengths, is known as
    a) Good conductor b) Partial radiator c) Absorber of photons d) Perfectly black-body

12. The temperature of hot and cold end of a $20cm$ long rod in thermal steady state are at 100°C and 20°C respectively. Temperature at the centre of the rod is
    a) 50°C b) 60°C c) 40°C d) 30°C

13. The ends of two rods of different materials with their thermal conductivities, radii of cross-sections and lengths all are in the ratio 1:2 are maintained at the same temperature difference. If the rate of flow of heat in the larger rod is 4 cal/s, that in the shorter rod in cal/s will be
    a) 1 b) 2 c) 8 d) 16

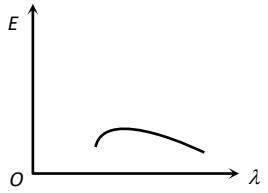
14. A metal rod of length $2m$ has cross sectional areas $2A$ and A as shown in figure. The ends are maintained at temperatures 100°C and 70°C. The temperature at middle point C is
    

    a) 80°C b) 85°C c) 90°C d) 95°C

15. Good absorbers of heat are
a) Poor emitters b) Non-emitters c) Good emitters d) Highly polished

16. A black body at a temperature of 227°C radiates heat at the rate of 5 cal $cm^{-2}s^{-1}$. At a temperature of 727°C the rate of heat radiated per unit area in cal $cm^{-2}s^{-1}$ is
a) 400 b) 80 c) 40 d) 15

17. The energy distribution E with the wavelength (λ) for the black body radiation at temperature T $kelvin$ is shown in the figure. As the temperature is increased the maxima will



a) Shift towards left and become higher
b) Rise high but will not shift
c) Shift towards right and become higher
d) Shift towards left and the curve will become broader

18. The wavelength of the radiation emitted by a body depends upon
a) The nature of the surface b) The area of the surface
c) The temperature of the surface d) All of the above factors

19. There is a rough black spot on a polished metallic plate. It is heated upto 1400 K approximately and then at once taken in a dark room. Which of the following statements is true
a) In comparison with the plate, the spot will shine more
b) In comparison with the plate, the spot will appear more black
c) The spot and the plate will be equally bright
d) The plate and the black spot can not be seen in the dark room

20. In which of the following process convection does not take place primarily
a) Sea and land breeze b) Boiling of water
c) Warming of glass of bulb due to filament d) Heating air around a furnace