DPP
DAILY PRACTICE PROBLEMS

CLASS : XITH **SUBJECT : PHYSICS**
DATE : **DPP NO. :4**

Topic :- THERMAL PROPERTIES OF MATTER

1. A body of length $1m$ having cross sectional area $0.75m^2$ has heat flow through it at the rate of $6000\ Joule/s$. Then find the temperature difference if $K = 200\ Jm^{-1}K^{-1}$
   a) 20°C b) 40°C c) 80°C d) 100°C

2. In Searle's method for finding conductivity of metals, the temperature gradient along the bar
   a) Is greater nearer the hot end b) Is greater nearer to the cold end
   c) Is the same at all points along the bar d) Increases as we go from hot end to cold end

3. Which of the following is the unit of specific heat
   a) $J\ kg°C^{-1}$ b) $J/kg°C$ c) $kg°C/J$ d) $J/kg°C^{-2}$

4. A black body radiates at the rate of W watts at a temperature T. If the temperature of the body is reduced to $T/3$, it will radiate at the rate of (in $Watts$)
   a) $\frac{W}{81}$ b) $\frac{W}{27}$ c) $\frac{W}{9}$ d) $\frac{W}{3}$

5. The intensity of radiation emitted by the sun has its maximum value at a wavelength of 510 nm and that emitted by the north star has the maximum value at wavelength of 350 nm. If these stars behave like black bodies, then the ratio of surface temperatures of the sun and north star is
   a) 1.46 b) 0.69 c) 1.21 d) 0.83

6. An electric kettle takes $4A$ current at 220 V. How much time will it take to boil 1 kg of water from temperature 20°C? The temperature of boiling water is 100°C
   a) 12.6 min b) 4.2 min c) 6.3 min d) 8.4 min

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

8. If the ratio of densities of two substances is 5 : 6 and that of the specific heats is 3 : 5. Then the ratio between heat capacities per unit volume is

a) 1 : 1 b) 2 : 1 c) 1 : 2 d) 1 : 3

9. One end of a metal rod of length 1.0 m and area of cross-section 100cm^2 is maintained at 100 °C. If the other end of the rod is maintained at 0°C, the quantity of heat transmitted through the rod per minute is (coefficient of thermal conductivity of material of rod =100W/m-K)

a) 3×10^3 J b) 6×10^3 J c) 9×10^3 J d) 12×10^3 J

10. The freezer in a refrigerator is located at the top section so that

a) The entire of the refrigerator is cooled quickly due to convection
b) The motor is not heated
c) The heat gained from the environment is high
d) The heat gained from the environment is low

11. If there are no heat losses, the heat released by the condensation of x g of steam at 100°C into water at 100°C can be used to convert y gm of ice at 0°C into water at 100°C. Then the ratio $y : x$ is nearly

a) 1 : 1 b) 2.5 : 1 c) 2 : 1 d) 3 : 1

12. The thermal conductivity of a material in CGS system is 0.4. In steady state, the rate of flow of heat is 10 $cal/s\text{-}cm^2$, then the thermal gradient will be

a) 10°C/cm b) 12°C/cm c) 25°C/cm d) 20°C/cm

13. In MKS system, Stefan's constant is denoted by σ. In CGS system multiplying factor of σ will be

a) 1 b) 10^3 c) 10^5 d) 10^2

14. A body cools from 60°C to 50°C in 10 min. if the room temperature is 25°C and assuming Newton's law of cooling to hold good, the temperature of the body at the end of the next 10 min will be

a) 45°C b) 42.85°C c) 40°C d) 38.5°C

15. The temperature at which a black body ceases to radiate energy, is

a) Zero b) 273 K c) 30 K d) 100 K

16. 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 worst d) P is best, Q worst

17. An ice box made of Styrofoam (Thermal conductivity=$0.01 Jm^{-1}s^{-1}K^{-1}$) is used to keep liquids cool. It has a total wall area including lid of 0.8 m^2 and wall thickness of 0.2 cm. A bottle of water is placed in the box and filled with ice. If the outside temperature is 30°C the rate flow of heat into the box is (in Js^{-1})
    a) 16 b) 14 c) 12 d) 10

18. In heat transfer, which method is based on gravitation
    a) Natural convection b) Conduction c) Radiation d) Stirring of liquids

19. 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

20. Newton's law of cooling holds good only, if the temperature difference between the body and the surroundings is
    a) Less than 10°C b) More than 10°C c) Less than 100°C d) More than 100°C