Model Question Paper 3

Heat and Thermodynamics 3

11th Standard

**Physics**

Reg.No. : | | | | | | |

Answer all the Questions

Time : 01:00:00 Hrs

Total Marks : 50

## Part A

3 x 1 = 3

1) A beaker full of hot water is kept in a room. If it cools from $80^oC$ to $75^oC$ in $t_1$ minutes, from $75^oC$ to $70^oC$ in $t_2$ minutes and from $70^oC$ to $65^oC$ in $t_3$ minutes, then_____

   (a) $t_1=t_2=t_3$ (b) $t_1< t_2 = t_3$ (c) $t_1< t_2 < t_3$ (d) $t_1> t_2 > t_3$

2) Which of the following will radiate heat to the large extent?

   (a) white polished surface (b) White rough surface (c) Black polished surface (d) Black rough surface

3) A block of ice in a room at normal temperature _____

   (a) does not radiate (b) radiates less but absorbs more (c) radiates more than it absorbs (d) radiates as much as it absorbs

## Part B

6 x 2 = 12

4) Define absorptive power.

5) Define Stefan's law.

6) Explain Fery's concept of a perfect black body.

7) Write the application of Kirchoff's law

   Application of Kirchoff's law.

8) Define isothermal process. Derive an expression for the work done during the process.

9) State Wien's displacement law.

## Part C

5 x 3 = 15

10) State Kelvin's Planck's statement of second law of thermodynamics.

11) What is heat engine?

12) Define conduction.

13) What is radiation?

14) What is a perfect black body?

## Part D

4 x 5 = 20

15) The surface temperature of a spherical hot body is 1000 K. Calculate the rate at which energy is radiated. (Given $\sigma = 5.67X10^{-8} \quad Wm^{-2}K^{-4}$)

16) Compare the rate of loss of heat from a black metal sphere at $227^0$ C with the rate of loss of heat from the same sphere at $127^0$ C.The temperature of the surroundings is $27^0$ C.

17) Calculate the surface temperature of the Sun $\left(\lambda_m = 4753\mathring{A}\right)$.

18) An object is heated and then allowed to cool when its temperature is $70^0$ C, its rate of cooling is $3^0$ C per minute and when the temperature is $60^0$ C, the rate of cooling is $2.5^0$ C per minute.Determine the temperature of the surroundings.

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