DPP – 4

Video Solution on Website:- https://physicsaholics.com/home/courseDetails/47

Video Solution on YouTube:- https://youtu.be/gqfA9uwpV3U

Q 1. Hot water cools from 60°C to 50°C in the first 10 minutes and to 42°C in the next 10 minutes. The temperature of the surrounding is
(a) 5 °C (b) 10 °C
(c) 15 °C (d) 20°C

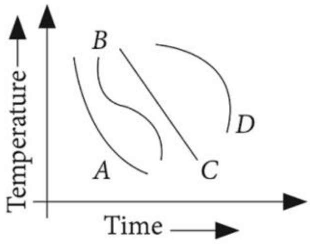
Q 2. A body cools down from 45°C to 40°C in 5 minutes and to 35°C in next 8 minutes. Find the temperature of the surrounding (nearly)
(a) 30 °C (b) -30 °C
(c) 58 °C (d) 50 °C

Q 3. A body cools from 80 °C to 50 °C in 5 minutes. Calculate the time it takes to cool from 60 °C to 30 °C. The temperature of the surroundings is 20°C ?
(a) 5 min (b) 10 min
(c) 15 min (d) 20 min

Q 4. A bucket full of hot water is kept in a room and it cools from 75°C to 70°C in T_1 minutes, from 70°C to 65°C in T_2 minutes and from 65°C to 60°C 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) $T_1 < T_2 > T_3$

Q 5. A body with an initial temperature θ_1 is allowed to cool in a surrounding which is at a constant temperature of θ_o $(\theta_o < \theta_1)$. Assume that Newton's law of cooling is obeyed. The temperature of the body after time t is best expressed by, Let k=constant.
(a) $(\theta_o - \theta_1)\, e^{-kt}$ (b) $(\theta_1 - \theta_0)\ln(kt)$
(c) $\theta_0 + (\theta_1 - \theta_0)\, e^{-kt}$ (d) $\theta_1\, e^{-kt} - \theta_0$

Q 6. A block of steel is heated at 100°C is left in room to cool. Which of the curves shown in figure best represents the correct cooling behavior?



(a) A (b) B
(c) C (d) D

Q 7. A body takes 10 minutes to cool from 60°C to 50°C. The temperature of surroundings is constant at 25°C. Then, the temperature of the body after next 10 minutes will be approximately

(a) 43°C (b) 47°C
(c) 40°C (d) 45°C

Q 8. The solar constant for the earth is about 1.8 J/m^2-s. What is the solar constant for a black body situated on a planet which is situated at a distance of 0.3 times the distance of the earth from the sun?

(a) 9 J/m^2-s (b) 12 J/m^2-s
(c) 15 J/m^2-s (d) 20 J/m^2-s

Q 9. If wavelengths of maximum intensity of radiations emitted by the sun and the moon are $0.5 \times 10^{-6} m$ and $10^{-4} m$ respectively, the ratio of their temperatures is

(a) $\frac{1}{100}$ (b) $\frac{1}{200}$
(c) 100 (d) 200

Q 10. The wavelength of maximum energy released during an atomic explosion was $2.93 \times 10^{-10} m$. Given that Wein's constant is 2.93×10^{-3} m-K, the maximum temperature attained must be of the order of

(a) 10^{-7}K (b) 10^{7}K
(c) 10^{-13}K (d) 5.86×10^{8}K

Q 11. A black body at a temperature of 1640 K has the wavelength corresponding to maximum emission equal to 1.75 μm. Assuming the moon to be a perfectly black body, the temperature of the moon, if the wavelength corresponding to maximum emission is 14.35 μm is

(a) 100K (b) 150K
(c) 200K (d) 250K

Answer Key

Q.1 b	Q.2 a	Q.3 b	Q.4 b	Q.5 c
Q.6 a	Q.7 a	Q.8 d	Q.9 d	Q.10 b
Q.11 c				