

10th Chapter: Electricity and Heating Effect of Current Numerical With Answer

SHORT SOLUTION TYPE PROBLEMS (2 Marks)

1. A radio set of 60 W runs for 50 hours. How much electrical energy is consumed ?
2. How much energy is consumed when a current of J amperes flows through the filament (or element) of a heater having a resistance of 100 ohms for two hours ? Express it in joules.
3. An electric kettle rated at 220 V – 2.2 kW works for 3 hours. Find the energy consumed and the current drawn.
4. A 1000 W toaster is used everyday for 30 minutes. How many units of energy will it consume in 30 days ?
5. Calculate the energy consumed by a 100 W refrigerator in 30 days, if it works for 16 hours every day.
6. How many units of energy will be consumed by a person in 30 days, if he lights a 100 W bulb for 10 hours everyday ?
7. An electric kettle of 500 W is used to heat water everyday for 2 hours. Calculate the number of units of electrical energy consumed by it in 10 days.
8. A 1000 W electric geyser is used everyday for half an hour. Calculate the number of electrical energy in kWh consumed by it in 30 days.
9. A 500 W electric iron is used every day for half an hour. Calculate the number of units of electrical energy in kWh consumed by it in 30 days.
10. An electric heater is used for 120 minutes. The electricity bill for 30 days is 60 units. Calculate the power of the electric heater.
11. A 1000 W electric oven is used every day for 90 minutes. Calculate the unit of electrical energy this oven will consume in 30 days of use.

SHORT SOLUTION TYPE PROBLEMS (3 Marks)

1. A bulb is rated at 200 V, and 100 W. What is its resistance ? Five such bulbs are lit for 4 hours. How much electrical energy is consumed ? Calculate the cost if the rate is 50 paise per unit.
2. If an electric bulb has a rating 200 W – 220 V and if it is used for 5 hours daily for 10 days, calculate the cost of using the bulb at 40 paise per kWh.
3. Calculate the cost of operating of a heater of 500 W for 20 hours at the rate of 35 paise per unit.
4. In which of the following cases more electrical energy is consumed per hour ?
 - (i) A current of 1 ampere passed through a resistance of 300 ohms.
 - (ii) A current of 2 amperes passed through a resistance of 100 ohms.
5. A household has a 100 W lamp lighted for 2 hours, two 60 W lamps lighted for 4 hours and an electric fan of 50 W working for 8 hours every day.
6. The domestic consumption of electrical energy is measured in kWh. Calculate the cost of using a 2 kW immersion rod for heating water in a house for one hour each day for 60 days if the rate is rupees 1.50 per kWh.
7. One gram of coal burning liberates 18 kJ of energy. How many kilograms of coal will produce as much energy as an electric bulb of 200 W consumed in 10 hours ?
8. In a house, an electric bulb of 60 W is used for 15 hours and an electric heater of 750 W is used for 10 hours every day. Calculate the cost of using the bulb and heater for 30 days, if the cost of one unit of electrical energy is Rs. 2.
9. A shopkeeper used 1000 W electric heater for 5 hours and 200 W electric bulb for 10 hours everyday. Calculate the cost of using the heater and the bulb for 20 days if the cost of one unit of electrical energy is one rupee.

10. A 100 watt electric bulb is lighted for 2 hours everyday and five 40 W tubes are lighted for 4 hours everyday. Calculate
 (i) the energy consumed in 60 days.
 and (ii) the cost of electricity consumed at the rate of Rs. 1.50 per kWh.
11. Name the unit used for measuring consumption of electrical energy. Calculate the cost of using five 60 watt bulbs for 5 hours a day and a 2 kW immersion rod for heating water for one hour everyday for 30 days, if the rate of electrical energy is Rs. 1.50 per unit.

Short Solution Type Problems (2 Marks)

1. 3 kWh 2. 18×10^6 J
 5. 48 kWh 6. 30 units
 9. 7.5 kWh 10. 1 kW

Short Solution Type Problems (3 Marks)

1. 400 Ω , 2 kWh, Re. 1.00
 4. Second case 5. 1.08 unit
 8. Rs. 504 9. Rs. 340

ANSWERS

3. 6.6 kWh, 10 A 4. 15 kWh
 7. 10 units 8. 30 kWh
 11. 4.5 kWh.
 2. Rs. 4.00 3. Rs. 3.00
 6. Rs. 180 7. 0.4 kg
 10. Rs. 90 11. Rs. 157.50.

Numericals

JSUNIL TUTORIAL

1. Specific resistances of copper and silver are $1.18 \times 10^{-6} \Omega \text{ cm}$ and $1.6 \times 10^{-6} \Omega \text{ cm}$ respectively. Which is the best electrical conductor and why? [Ans. Silver]
2. How much current will an electric heater rated 1 kW draw when connected to a 220 V supply? [Ans. 4.55 A]
3. A current of 5.0 A flows through an electric press of resistance 44 Ω . Calculate the energy consumed by the press in 5 minutes. [Ans. 330 kJ]
4. There are two bulbs marked 60 W-220 V and 100 W-220 V respectively. Which one of the two has greater resistance? [Ans. 60 W bulb will have higher resistance]
5. An electric bulb is marked 100 W, 230 V. What is the energy produced by the bulb in 20 minutes when operated at 230 V? [Ans. 1.2×10^5 J]
6. A 200 W bulb is lighted for 2 hours. How much energy is consumed? [Ans. 0.4 kWh]
7. A house is fitted with ten 60 W lamps. How much electric energy is consumed for lighting these lamps for a month of 30 days at a rate of 5 hours a day? [Ans. 90 kWh]
8. An electric heater is used every day for 120 minutes. The electricity bill for 30 days is 60 units. Calculate the power of electric heater. [Ans. 1 kW]
9. In a house, an electric bulb of 60 W is used for 15 hours and an electric heater of 750 W is used for 10 hours every day. Calculate the cost of using the bulb and the heater for 30 days if the cost of 1 unit of electrical energy is Rs 2. [Ans. Rs 504]
10. When two resistors of resistances R_1 and R_2 are connected in parallel, the net resistance is 3 Ω . When connected in series, its value is 16 Ω . Calculate the values of R_1 and R_2 . [Ans. $R_1 = 4 \Omega$, $R_2 = 12 \Omega$]
11. An electric bulb is rated at 200 V-100 W. What is its resistance? Five such bulbs burn for 4 hours. Calculate the cost of electrical energy consumed if the rate is 50 paise per unit. [Ans. 400 Ω , Re 1]
12. A torch bulb is rated 50 V and 50 mA. Calculate its a. power b. resistance and c. energy consumed when it is lighted for 4 hours. [Ans. a. 2.5 W, b. 10 Ω , c. 36 kJ]

13. If a 12 V battery is connected to the arrangement of resistances given alongside, calculate a. the total effective resistances of the arrangement b. the total current flowing in the circuit.

[Ans. a. 15 Ω , b. 0.8 A]

