Contents

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1 Assignment #1

1.1 Question 1

1. The power supplied at 10ms

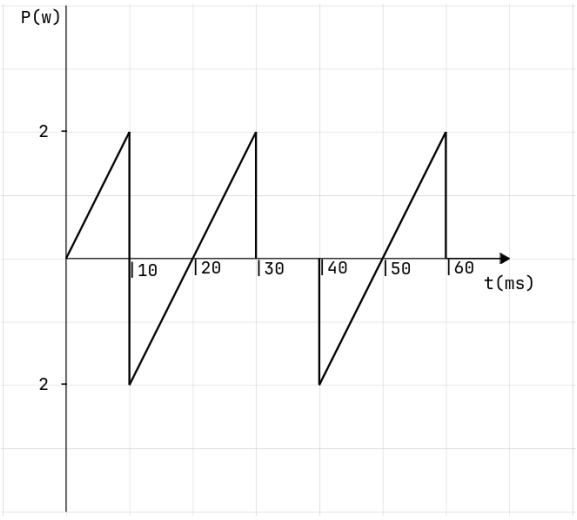
$$P = V \times I = 15e^{-250t} \times 0.04e^{-250t} = 0.6e^{-500t} W \rightarrow P(0.01) = 0.6^{-500 \times 0.1} = 0.00404W$$

2. Total energy supplied

$$\int P(t) \cdot dt = \int 0.6^{-500t} \cdot dt = -\frac{0.6}{500} e^{-500t}$$

1.2 Question 2

1.



1. Energy (Area under the curve) delivered to the circuit at:
   t = 10ms

$$E(0.01) = \frac{1}{2} \times 2 \times 0.01 = 10mJ$$

t = 30ms

$$E(0.03) = E(0.01) - \frac{1}{2} \times 2 \times 0.01 + E(0.01) = 10mJ$$

t = 80ms

$$E(0.08) = E(0.03) - \frac{1}{2} \times 2 \times 0.01 + E(0.01) = 10mJ$$

1.3 Question 3

$\because$ The sum of power absorbed and power delivered equals zero

$$P_1 + P_2 + P_4 + P_5 = -205 + 60 + 45 + 30 = -70 \rightarrow P_3 = 70$$

1.4 Question 4

$$P = 1.5kW, \qquad t = \frac{3.5}{60}$$

Energy per hour:

$$E = P \times t = 1.5 \times \frac{3.5}{60} = 0.0875J$$

Energy per month:

$$E \times 30 = 0.0875 \times 30 = 2.625J$$

Cost per month:

$$E_{month} \times Cost_{hour} = 2.625 \times 8.2 = 21.525$$

$\therefore$ The cost of operating once a day for 30 days is 21.525 cents.