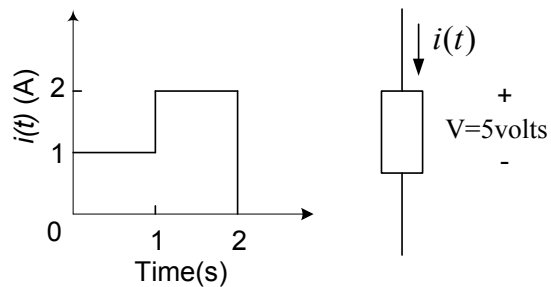**TOPIC**
Electricity and Magnetism – Section XI – Question 6

QUESTION
The energy in Joules absorbed by the electrical element at time 2 seconds most nearly is

(A) 5
(B) 15
(C) 30
(D) 40

HINT
The electrical power of any electrical element is the product of current and voltage;

$$p = iv.$$

Current is the rate of change of charge with respect to time,

$$i(t) = \frac{dq}{dt},$$

whereas voltage is the amount of energy required to take a single charge from point a to point b,

$$v = \frac{dw}{dq}.$$

Hence, power can be defined as the rate of change of energy

$$p = \frac{dw}{dt}.$$

Therefore, if power is the derivate of energy, then energy is the integral of power

$$w(t) = \int_0^t p(t)dt = \int_0^t (iv)dt$$

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