

Total No. of printed pages = 4

CAI-301/POE&EE/3rd Sem/2015/M

## PRINCIPLES OF ELECTRICAL AND ELECTRONICS ENGINEERING

Full Marks – 70

Pass Marks – 28

Time – Three hours

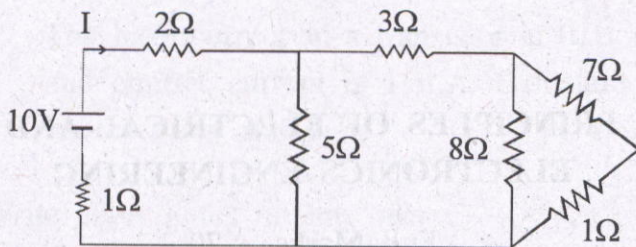
The figures in the margin indicate full marks  
for the questions.

Answer any *five* questions.

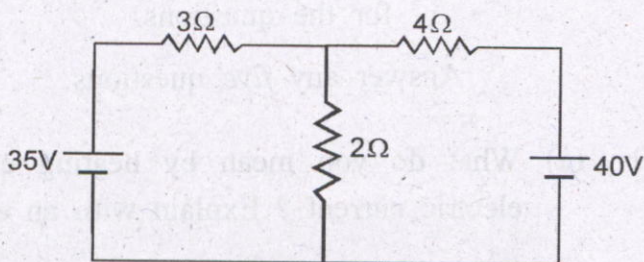
1. (a) What do you mean by heating effect of electric current ? Explain with an example. 5
  
- (b) An electric kettle marked 1 kW, 230V takes 7.5 minutes to bring 1 kg of water at 15°C to boiling point. Find the efficiency of the kettle. 7
  
- (c) Explain the Fleming's left hand rule. 2

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2. (a) In the following circuit, calculate the current I. 4



- (b) Write Kirchhoff's current law and Kirchhoff's voltage law. Calculate the current in each resistor in the given circuit using KCL and KVL. 2+2+6=10



3. (a) A resistance of  $5\Omega$  is connected in series with a pure inductance of  $0.01\text{H}$  to a  $100\text{V}$ ,  $50\text{Hz}$  supply. Calculate :
- (i) impedance
  - (ii) current and
  - (iii) power absorbed.
- 9

- (b) Define the following terms : 5
- (i) Instantaneous value
  - (ii) RMS value
  - (iii) Cycle
  - (iv) Peak factor
  - (v) Average value.
4. (a) Write the different characteristics of a lead acid cell. 5
- (b) Write the names of different parts of a lead acid cell. 5
- (c) What are the indications of a fully charged lead acid cell ? 4
5. (a) Explain the working of PN junction diode in forward and reverse bias mode. 6
- (b) Explain the operation of full-wave bridge type rectifier with necessary diagrams. 8
6. (a) What are the different types of transistor connections ? Discuss the CB-connection for NPN transistor with necessary diagrams. 10

- (b) What do you mean by leakage current in PN junction ?

The base current in a transistor is 0.01 mA and emitter current is 1 mA. Calculate the values of  $\alpha$  and  $\beta$ . 1+3=4

7. Write short notes on any *two* : 7×2=14

(a) RC series circuit with sinusoidal supply

(b) Significance of J-operator

(c) Zener diode.