2016

BASIC ELECTRICAL ENGINEERING
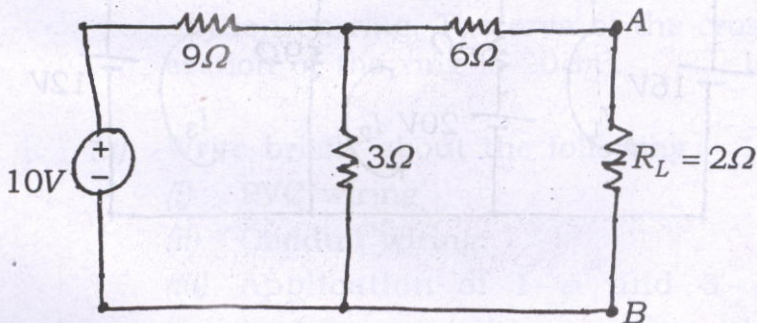
Paper : EE 201

Full Marks : 100

Time : Three hours

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

*Answer **any five** questions.*

1. *(a)* Write the maximum power transfer
   theorem and explain. 6

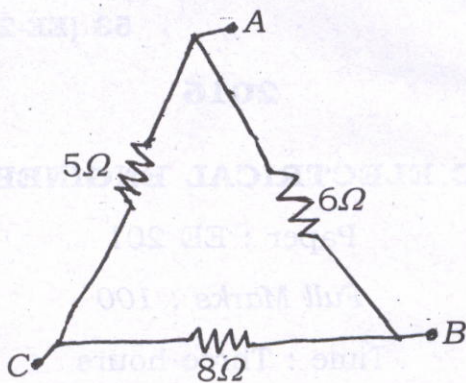   *(b)* Find current I using the Thevenin's
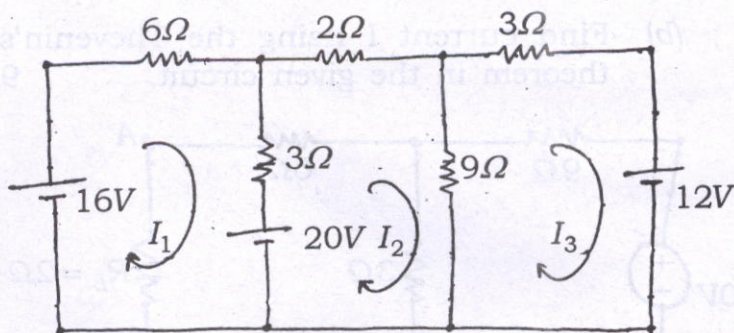   theorem in the given circuit. 9
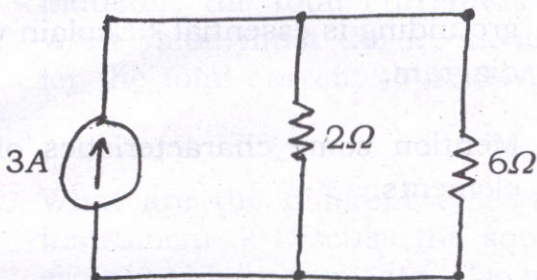
(c) Convert the given delta to star — 5

2. (a) State and explain KCL and KVL. 5

(b) Find the current through each resistor in the given network using mesh analysis. 12

(c) Find the voltage drop in the 6Ω resistor. 3

3. (a) Discuss about the following : 5+5=10

   (i) Faraday's laws of electromagnetic induction.

   (ii) Comparison between electric and magnetic circuits.

   (b) An iron ring wound with 500 turns of solenoid produces a flux density of 0·94 *tesla* in the ring, which carries a current of 2·4 *amp*. The mean length of the iron path is 80 *cm* and that of the air-gap is 1 *mm*. Calculate the relative permeability of the iron ring. The area of the cross section of the ring is 20 *cm²*. 10

4. (a) Write briefly about the following : 10

   (i) PVC wiring

   (ii) Conduit wiring.

   (iii) Application of 1 – φ and 3 – φ system. 10

(c)

(b) What do you mean by grounding of electrical appliances ? Why this grounding is essential ? Explain with a diagram. 8

(c) Mention some characteristics of fuse elements. 2

5. (a) A 50Hz sinusoidal current has a peak amplitude of 100A. Find the rate of change in amperes per second at time t where (a) $t = 0.0025$ sec. (b) t=0.005 sec. (c) $t = 0.01$ sec. after current is equal to zero and is increasing. 10

2. (a

(b

(b) A voltage $e = 200 \sin 100\pi t$ is applied to a coil having $R = 200\Omega$ and $L = 638mH$. Find the expression for the current and the power taken by the coil. 10

6. (a) An alternating voltage $(80 + 60j)V$ is applied to a circuit and the current flowing is $(-4 + 10j)A$. Find (a) the impedance of the circuit (b) the power consumed and (c) the phase angle. 10

(b) When a 240V, 50Hz supply is applied to a resistor of 15Ω in parallel with an inductor, the total current is 22·1A. What value must the frequency have for the total current to be 34A?

10

7. (a) What are the different types of M.I. instruments? Discuss the sources of error in M.I. instruments. Also mention the advantages and disadvantages of M. I. instruments. 10

(b) A balanced star-connected load of $(8 + 6j)\,\Omega$ per phase is connected to a 3-phase, 230V supply. Find the load current, power factor, power, reactive volt-amperes and total volt-amperes.

10

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