

Total No. of printed pages = 4

El-401/EC&N/4th Sem/2013/N

ELECTRICAL CIRCUIT AND NETWORK

Full Marks - 70

Pass Marks - 28

Time - Three hours

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

Answer question No. 1 and any four from the rest.

1. (a) Define the following terms : $5 \times 2 = 10$

(i) Circuit

(ii) Linear circuit

(iii) Non-linear circuit

(iv) Bilateral network

(v) Active network

(b) Define Ohm's law. What are the limitations of Ohm's law? 4

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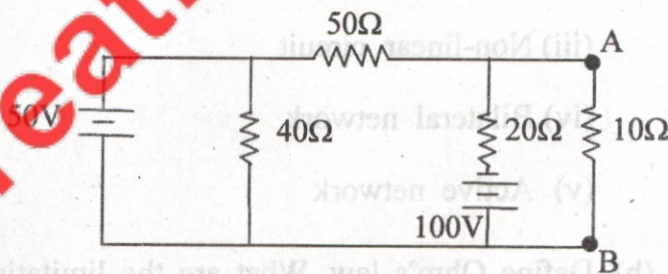
2. (a) State and explain Kirchoff's laws. 8

(b) A bridge network ABCD is arranged as follows :

Resistances between terminals A-B, B-C, C-D, D-A and B-D are 10, 20, 15, 5 and 40 ohms respectively. A 20V battery of negligible internal resistance is connected between terminals A and C. Determine the current in each resistor. 6

3. (a) State and explain superposition theorem. 7

(b) Find the voltage across points A and B in the network shown below by using Norton's theorem. 7



4. A coil having resistance of 20Ω and inductance of 31.8 mH is connected across 230 volts 50 c/s supply. Calculate 14

- (i) Power factor
- (ii) Current taken
- (iii) Power consumed.

5. (a) An alternating voltage is represented by
 $V = 141.4 \sin 377 t$.

Find :

- (i) The maximum value
- (ii) Frequency
- (iii) The instantaneous value of voltage when $t = 3\text{ ms}$. 7

(b) A coil of negligible resistance and inductance of $200\ \mu\text{H}$ is in parallel with a variable capacitor. The voltage of the supply is 200V at a frequency of 10^4 Hz .

Calculate the value of C to give resonance. 7

6. (a) Describe star-connection and delta connection of 3-phase system with diagram. 8

- (b) Enumerate the advantages of 3-phase system over single phase system. 6
7. Write short notes on any two : $7 \times 2 = 14$
- (a) R-L-C series circuit
 - (b) Maximum power transfer theorem
 - (c) Significance of J-operator.