Total No. of printed pages = 4

EI-401/ECN/4th Sem/Elect/2017/M

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 any *five* questions.

1. (a) Define resistor and capacitor used in a circuit. 2

   (b) A Wheatstone bridge circuit has $R_{AB} = 60\Omega = R_{CD}$; $R_{BC} = R_{AD} = 40\Omega$; $R_{BD} = 100\Omega$. Supply is connected between A and C. If the current drawn from the supply is 100 mA, find the current through R_{CD}, R_{BC} and R_{BD}. 6

   (c) Define parameters, linear circuits, bilateral circuit and electric network. 6

2. (a) State and explain Thevenin's theorem with suitable diagrams. How does it differ from Norton's theorem ? 5+2=7

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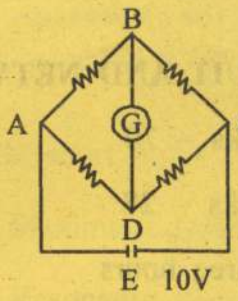
(b) The galvanometer in Fig.1 has a resistance of 5Ω. Find the current through the galvanometer using Thevenin's theorem. All resistances are in ohm. 7



Here R_{AB}= 10Ω, R_{BC}= 15Ω, R_{CD}= 16Ω, R_{AD}= 12Ω

Fig. 1

3. (a) Deduce the expression of current, power angle, power and power curve when an A.C circuit containing resistance, pure inductance and capacitors only. 6

(b) A chock coil having a resistance of 10Ω and inductance of 0.05H is connected in series with a capacitance of 100 μF. The whole circuit is connected to 200V, 50 Hz supply. Calculate

(i) impedance

(ii) current

(iii) power factor

(iv) power input

(v) apparent and reactive power. 8

4. (a) Describe any one method of solving parallel A.C circuits. 4

(b) In a series– parallel circuit shown in Fig. 2, calculate

(i) Z_{AC}

(ii) I and branch current I_1 and I_2

(iii) power taken by each impedance and the total power

(iv) overall power factor of the circuit

(v) V_{AB} and V_{BC}. 10

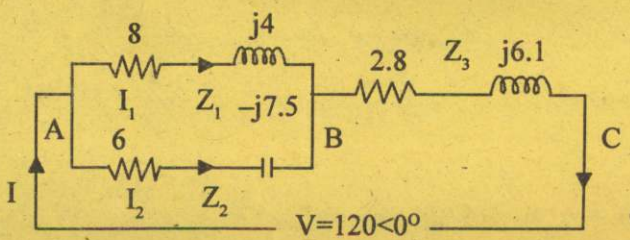


Fig. 2

5. (a) What do you mean by real, apparent and reactive power ? 6

(b) What are the differences between series and parallel resonance ? 3

(c) What are the different types of transients occur in a power system ? 5

6. (a) How delta can be converted into star connection ? 5

(b) What are the relationship of line and phase parameters in case of 3-phase balanced star and delta connected system ? 9

7. Write short notes on : 2×7=14

(a) Maximum power transfer theorem

(b) Resonance in parallel circuits.