BOARD DIPLOMA EXAMINATION, (C-09)
OCTOBER/NOVEMBER-2018
DEE-THIRD SEMESTER EXAMINATION

ELECTRICAL CIRCUITS

Time : 3 Hours] [Total Marks: 80

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PART-A

3X10=30

Instructions : 1. Answer **All** questions.

2. Each question carries THREE marks

3. Answer should be brief and straight to the point

1. How do you convert the given ideal current source into ideal voltage source?

2. Three resistors having resistance of 20Ω, 30Ω and 50Ω are connected in delta as branches of AB, BC and CA respectively. Calculate the resistance of equivalent star values.

3. State the relation between no.of poles, speed and frequency of a simple loop generator.

4. Perform the following operations

   (i) A +B and (ii) A/B if A=3+j4 and B=10$\lfloor$ 60^0

5. Two currents are given by the expressions i_1=10Sin(314t+450) A and, i_2=8Sin(314t-60^0)A. Determine i_1 + i_2 and represent in the similar form.

6. Derive the formula for impedance for the R-C series circuit when it is connected to a 1-∅ AC supply.

7. Why a parallel resonant circuit is called rejector circuit.

8. What are the different methods by which a parallel AC circuit can be solved?

9. Drive an expression for the total power consumption in a 3-phase balanced circuit.

10. A 3phase, 415V, 50Hz supply is given to a balanced delta connected load. The current in each branch circuit is 30A and phase angle is 30^0 lag calculate.
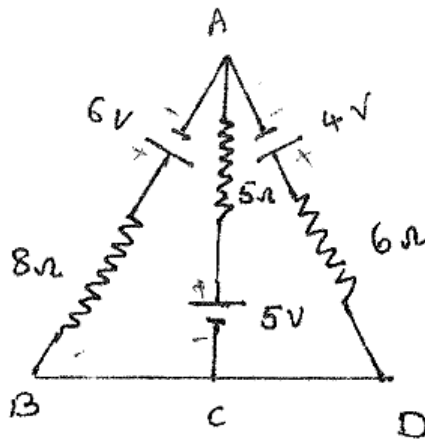
    (i) The line current and (ii) Total power consumed

PART-B

Instructions : 1. Answer any **five** questions. Each question carries **ten** marks.

2. Answer should be comprehensive and the criterion for valuation is the content but not the length of the answer

11. (a) Determine the branch currents in the network shown.

(b) Two batteries A & B having emfs of 20V & 24V respectively and internal resistance of 0.8Ω and 0.2Ω respectively are connected in parallel across a 60Ω resistor. Calculate (i) The current through each battery and (ii) The terminal voltage.

12. Determine the value of R to receive maximum power and also calculate the maximum power.
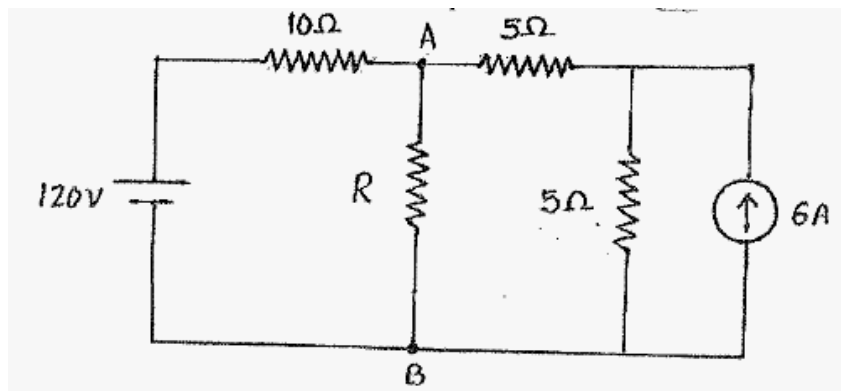
13. Calculate the r.m.s value, the form factor and peak factor of a periodic voltage having following values for equal time interval changing suddenly from one value to the next: 0, 5, 10, 20, 50, 20, 10, 5, 0, -5, -10 What would be the r.m.s value of a sine wave having the same peak value.

14. Two choke coils A and B are connected in series and the resistance and inductance of coil A is 4Ω and 8Ω respectively with a supply voltage of 200V. Total power consumed in the circuit is 2.2 KW and reactive power consumed is 1.5 KVA. Calculate the resistance and inductive reactance of coil B.

15. A coil having a fixed resistance of 5Ω and inductive reactance of 20Ω are connected in series with a variable resistor. The whole circuit is connected across a 230V 50Hz. A.C supply. Calculate the (i) current drawn (ii) power factor (iii) active power and (iv) reactive power.

16. A 20Ω resistor is connected in series with an inductive coil of 0.2H and a capacitor of 150μF across a 200V variable frequency supply. Determine (a) Resonant frequency (b) Current drawn at resonant frequency (c) voltage across inductance and (d) voltage across the capacitance.

17. Three identical coils each having a reactance of 31.42Ω and resistance of 10Ω are connected in Delta across a 440V, 50Hz,3-∅ line. Calculate the line current, phase current, power factor, active power and reactive power of the circuit.

18. (a) State and explain Thevenins theorem.

    (b) The current flowing through a pure inductor is 30 A calculate the inductance and power consumption, if the voltage across the inductor is v=200Sin314t. draw the waveforms of v&i.

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