10

20

10

1 A

10 V

20

20

0.5 A

Fig.1

Q1. Using Node Analysis, determine the current in each

branch of the network in fig 1. Also, find

total power loss in the network.

(Ans: - 0.6 A, 0.3 A, 0.4 A, 0.2 A, 0.6 A,

15 Watts)

Q2. A Wheatstone bridge ABCD has the following details: AB= 10 Ω BC = 30 Ω CD = 15 Ω &

DA = 20 Ω. A battery of e.m.f. 2 V and negligible internal resistance is connected between A & C with A positive. A galvanometer of 40-ohm resistance is connected between B & D. Determine the magnitude and direction of current in the galvanometer using Thevenin’s theorem.

 (Ans: - RTh = 16.07 Ω , VTh = 0.642 V, 11.5 mA from B to D)

Q3. Find the current in 10 Ω resistor using (Fig. 2)

1. Superposition Theorem

 (ii)Thevenin’s Theorem

1. Norton’s Theorem

 (Ans: - RTh = 5.35 Ω, VTh = 7 V, 0.46A)

Fig. 2

Q4. Find the current in 3 Ω resistor using (Fig. 3)

1. Superposition Theorem
2. Thevenin’s Theorem

(iii)Norton’s Theorem

 (Ans: - 1 A)

Fig. 3

Q5. Obtain the essential condition for maximum power

5

10

10

10

5

5 V

R

L

2 A

transfer to the load RL , and hence determine the

maximum power transferred. (Fig.4)

 (Ans: - RTh = RL = 4.3 Ω,VTh=10.71 V,

 Pmax= 26.68 W)

20 V

 Fig. 4



Q6. Find the current in 2 Ω connected between A & B

 resistor using (Fig. 5)

1. Superposition Theorem

(ii) Thevenin’s Theorem

(iii) Norton’s Theorem

 (Ans: - 1.36 A)

 Fig. 5



Q7. At P-Q find (fig 6)

1. Thevenin’s Equivalent circuit

(ii) Norton’s Equivalent circuit

 (Ans: - RTh = 7 Ω, VTh = 72 V, 7 Ω, IN = 10.29 A)

 Fig. 6



Q8. At P-Q find (fig 7)

(i) Thevenin’s Equivalent circuit

(ii) Norton’s Equivalent circuit

 (Ans: - RTh = 8.33 Ω, VTh = 10 V,

RN = 8.33 Ω, IN = 1.2 A)

 Fig. 7

Q9. Find resistance between P-Q (fig 8) and A-B (fig 9)

30

50

45

20

50

A

B

C

D

5

1.5

5

10

1.5

2.75

25

6

P

Q

 Fig. 8 Fig. 9

 (Ans: - 3 Ω) (Ans: - 36 Ω)

Q10. What are the similarities and dissimilarities between electrical and magnetic circuits?

Q11. An iron ring having a mean diameter of 25 cm and cross – section area 2 cm2 is uniformly wound with 400 turns and carries a current of 5 A. The permeability of iron is 450. Calculate (i) magneto motive force (ii) reluctance (iii) flux and (iv) flux density produced.

 (Ans.:- 2000 AT, 0.694 X 107 AT/Wb, 0.288 mWb , 1.44 T)

Q12. A rectangular magnetic core shown in fig. 10 has square cross

* section of area 16 cm2. An air gap of 2 mm is cut across one

of its limbs. Find the exciting current needed in the coil having

1000 turns wound on the core to create an air gap flux of 4 mWb.

The relative permeability of the core is 2000. (Ans.:- 4.713 A)

 Fig. 10

Q18. A cast steel magnetic structure made of a bar of section 2 cm X 2 cm is shown in fig. 11. Determine the current that the 500 turn magnetizing coil on the left  limb should carry so that a flux of 2 mWb is produced in the right limb. Take µr = 600 and neglect leakage. (Ans.:- 12.148 A)

54 cm

19 cm

Fig. 11