AQ – 2648

First Semester M. Sc. (Applied Electronics) (CBS) Examination

(New)

ELECTRICAL ENGINEERING AND NETWORK ANALYSIS

[AE]

P. Pages : 6

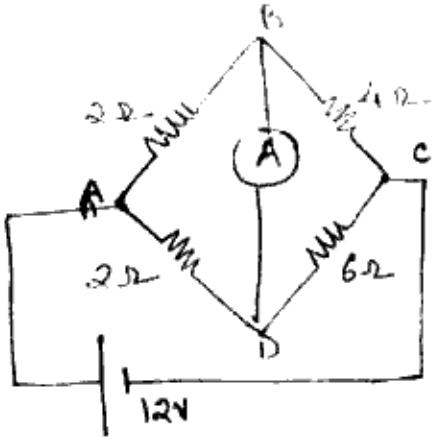
Time : Three Hours] [Max. Marks : 80

Note : (1) Separate answer book must be used for each section in the subject Geology, Engineering material of civil branch and Separate answer book must be used for Section A and B in Pharmacy and Cosmetic Tech.
(2) All question carry equal marks.
(3) Due credit will be given to neatness and adequate dimensions.
(4) Assume suitable data wherever necessary.
(5) Diagrams and Chemical equations should be given wherever necessary.
(6) Retain the construction lines.
(7) Illustrate your answer wherever necessary with the help of neat sketches.
(8) Use of slide rule, logarithmic tables, Steam tables, Mollier's Chart, Drawing instrument, Thermodynamic table for moist air, Psychrometric Charts and Refrigeration charts is permitted.
(9) Discuss the reaction, mechanism wherever necessary.
(10) Use pen of Blue/Black ink/refill only for writing the answer book.

SECTION A

1. (a) Derive the relationship for conversion from delta to star. 6

(b) Determine the current through the ammeter of resistance 2 ohms connected in the Wheatstone bridge between terminals A and B.



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OR

2. (a) Define the terms :—

(i) RMS value

(ii) Average value

(iii) Instantaneous value

(iv) Phase 8

(b) An induction circuit supplied with 100 V at 50 Hz is found to take 10 A and when supplied with 100 V at 200 Hz, it takes 5A. Determine the circuit constants assuming sinusoidal current. 6

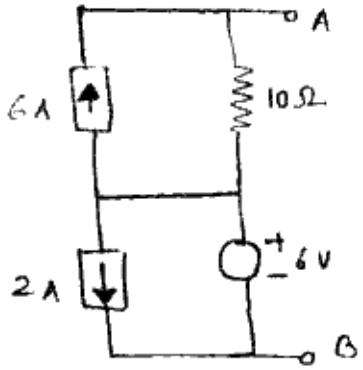
3. (a) Derive the expression for induced emf in single phase transformer. 3

(b) Practical transformer differs from an ideal transformer. Explain. 4

(c) What are the different types of losses in a transformer ? 6

OR

4. (a) Reduce the network to a single source and single resistance.



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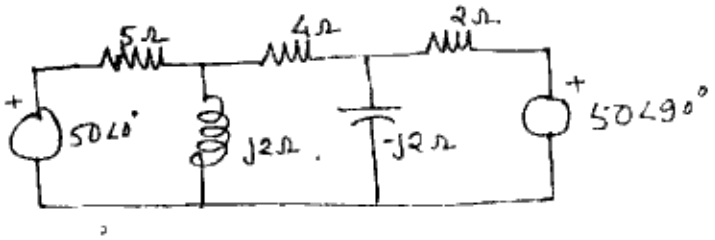
(b) In the network shown below determine currents in the impedances J2 and –J2 using nodal analysis.



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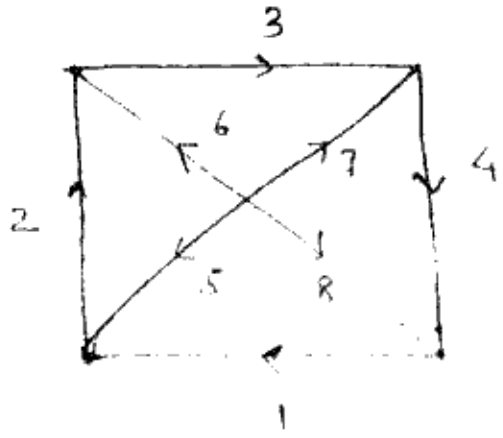
5. (a) For the network given below develope the cut-set schedule and write the equations expressing branch voltages in terms of tree branch voltages.



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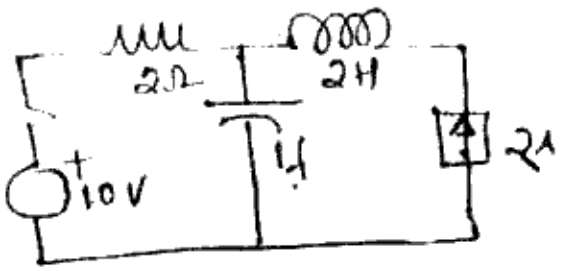
(b) Explain Duality. Draw the dual of the network given below.



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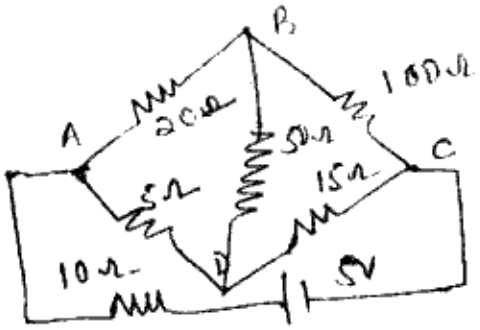
OR

6. (a) Explain the terms (i) Tree (ii) Tie set matrix (iii) Reduced incidence matrix with examples. 6

(b) Draw the graph and tree and hence current through 50 Ω resistance by using current variable method.



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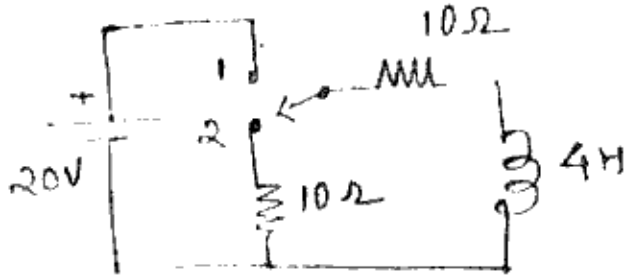
SECTION B

7. (a) A circuit shown below is initially under steady condition. Switch is moved from position 1 to 2 at t = 0, find current through L after switching.



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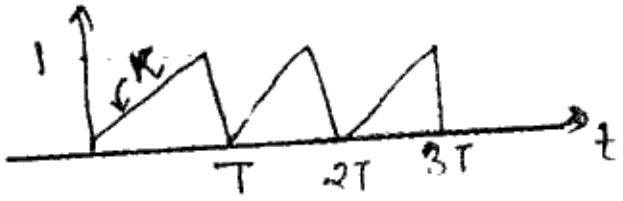
(b) Find the initial and final value of current

$$I(S) = \frac{17s^3+7s^2+s+6}{s^5+3s^4+5s^3+4s^2+2s}$$

6

OR

8. (a) Find the Laplace transform of periodic wave shown in fig.



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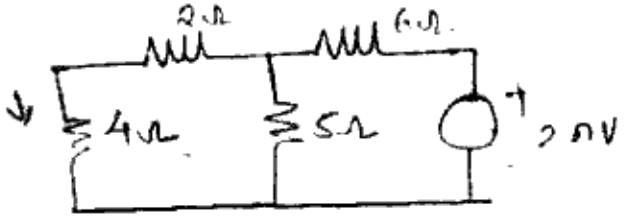
(b) Obtain the response of the R-L-C series circuit subjected to input f(t) = Su (t – 2) 7

9. (a) Verify reciprocity theorem for given network below.



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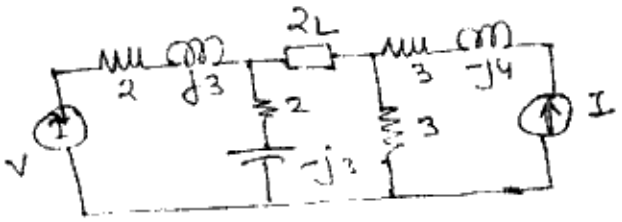
(b) Find out the value of 2_L shown in fig. below for maximum power transfer.



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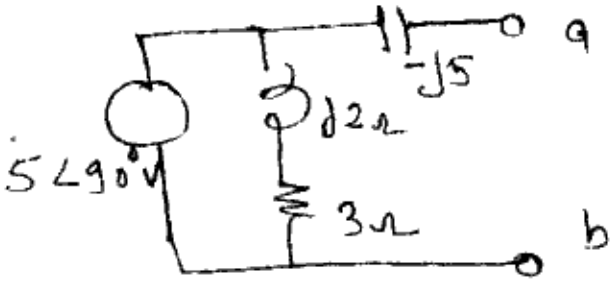
OR

10. (a) Obtain the Thevenin's equivalent for the given network points a and b in fig below.



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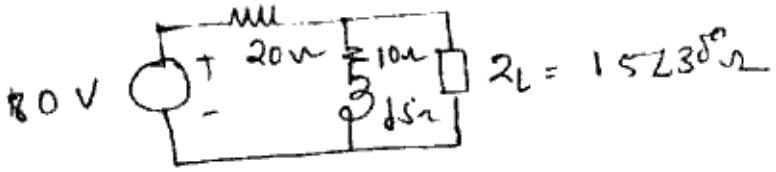
(b) Using Norton's theorem find the current through load impedance 2L in fig. 7(a)



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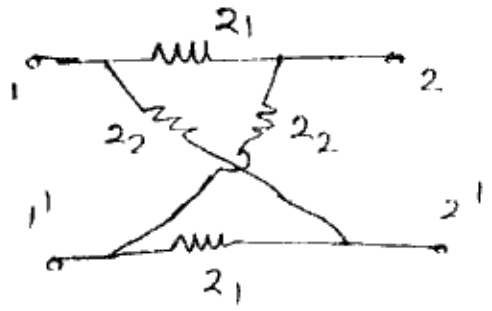
11. (a) Derive the condition of reciprocity for AB CD parameters. 6

(b) Find the 2-parameters for the following network given below.



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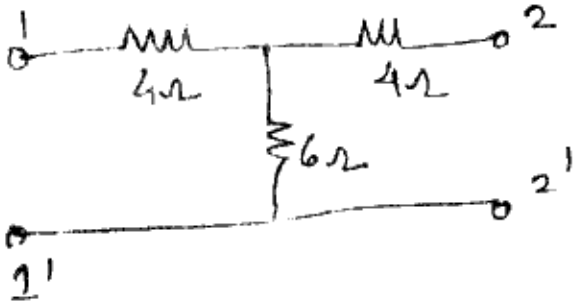
OR

12. (a) What is output impedance ? Determine the output impedance in terms of transmission parameters. 7

(b) Find hybrid parameters for the network shown below.



Comment on the symmetry and reciprocity. 6