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Question Paper Code: 31043

B.E. / B.Tech. DEGREE EXAMINATION, APRIL 2015.

Third Semester

Electronics and Communication Engineering

01UEC303 - CIRCUIT THEORY

(Regulation 2013)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions.

PART A - (10 x 2 = 20 Marks)

1. For the circuit shown in fig 1 determine the voltage V_1.

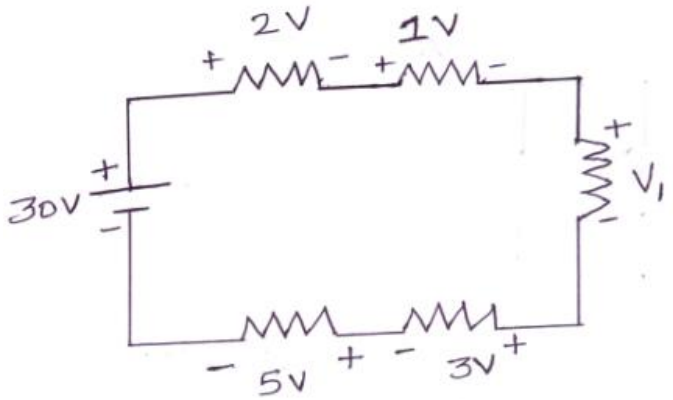

Fig. 1

2. Convert the circuit shown in fig 2 into single current source and resistance.

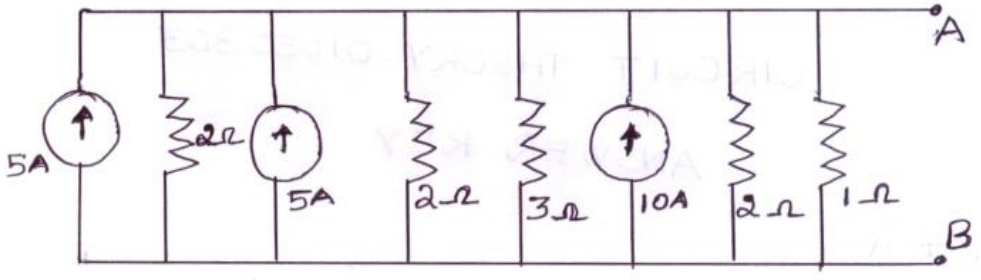

Fig. 2

3. Find the Thevenin's equivalent resistance across *AB* fig 3.

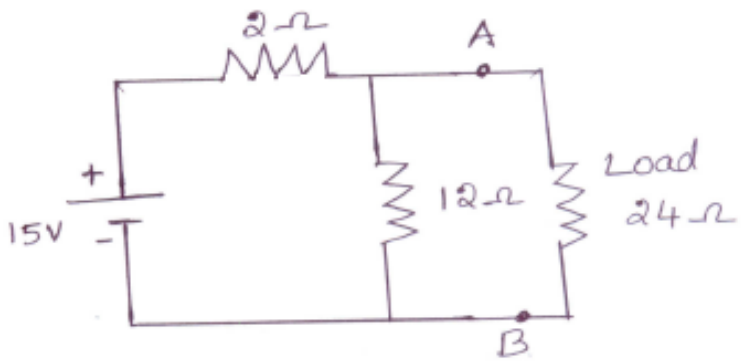

Fig. 3

4. State maximum power transfer theorem and determine the value of load resistance R_L When its draw maximum power in fig 4.

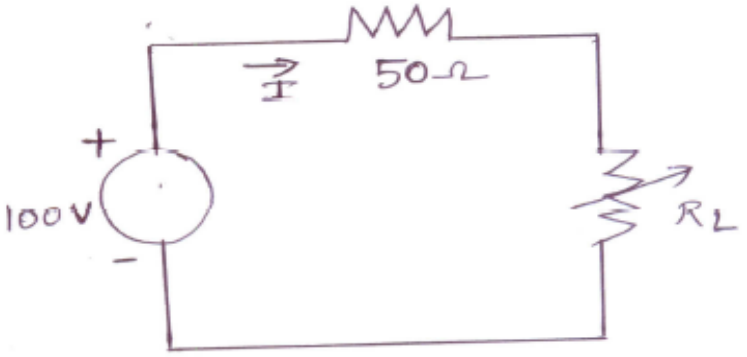

Fig. 4

5. Define resonance. Determine the values of impedance at resonance for circuit shown in fig 5.

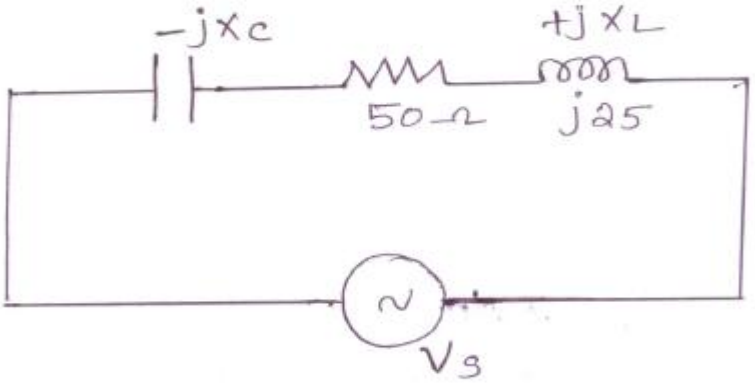

Fig. 5

6. Distinguish between natural and forced response.

7. Two inductively coupled coils have self inductances L_1= 50mH and L_2= 200mH. If the coefficient of coupling is 0.5. Find the value of mutual inductance between the coils.

8. Two wattmeter method is used to measure power in a three phase load. The wattmeter readings are 400W and -35W, Calculate the power factor.

9. Define driving point and transfer point impedances.

10. Express Z parameters in terms of Y parameters.

PART - B (5 x 16 = 80 Marks)

11. (a) (i) Find the current I and voltage across 30Ω resistor for the circuit shown in fig 6. (8)

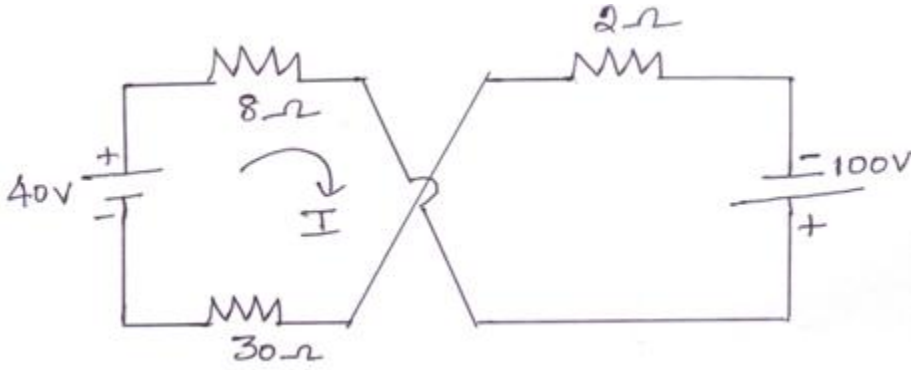

Fig. 6

(ii) Determine the power dissipation in the 4Ω resistor of circuit shown in fig 7 using mesh analysis. (8)

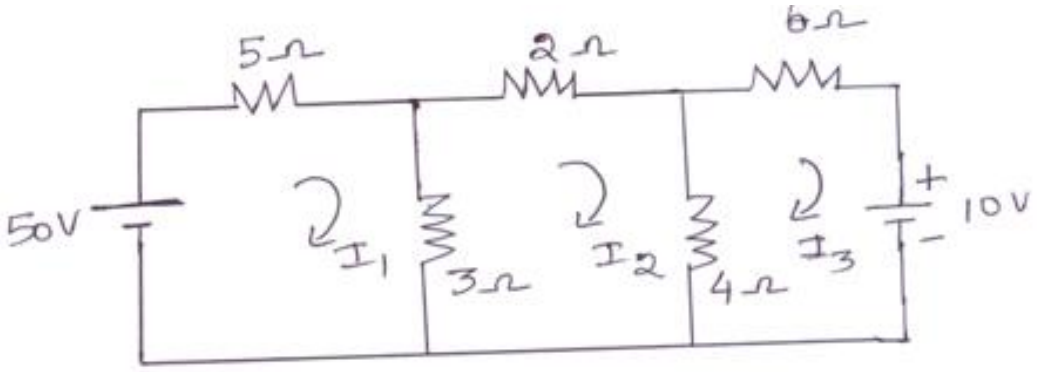

Fig. 7

Or

(b) (i) Find the voltage V in the circuit shown in fig 8 which makes the current in the 10Ω resistor to be zero by using nodal analysis. (12)

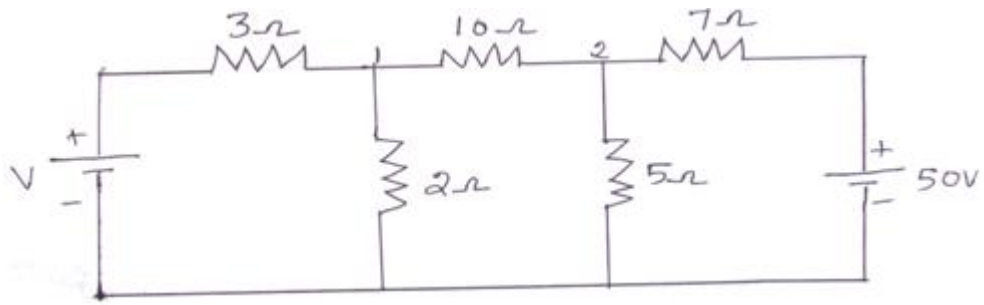

Fig. 8

(ii) Determine the current in all the resistors of the circuit shown in fig 9. (4)

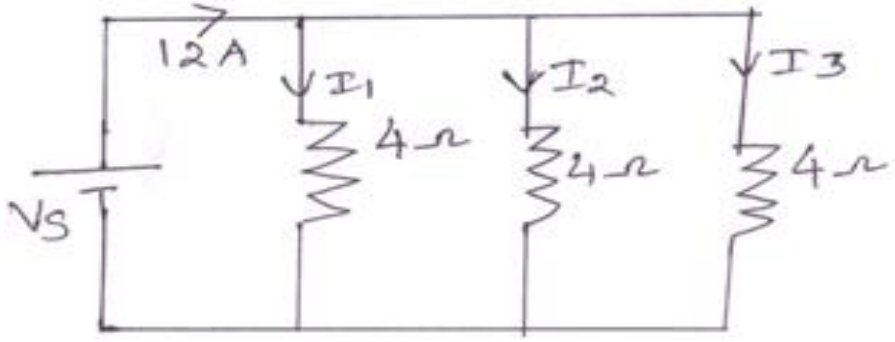

Fig. 9

12. (a) (i) Find the current through 5Ω resistor by superposition theorem in fig 10. (8)

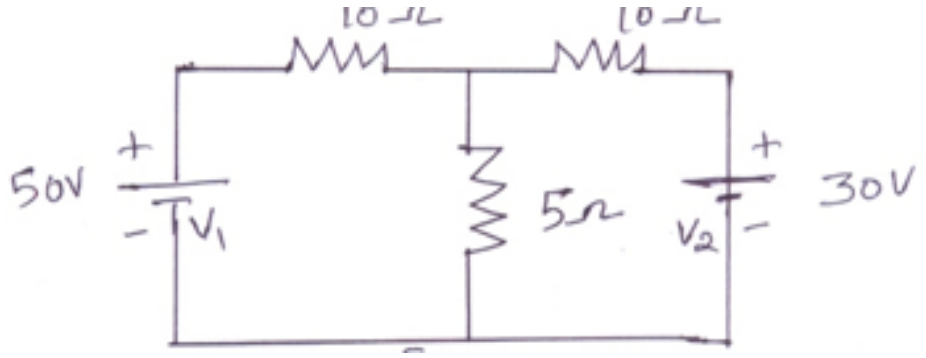

Fig. 10

(ii) Find the current in 3Ω resistor using superposition theorem in fig 11. (8)

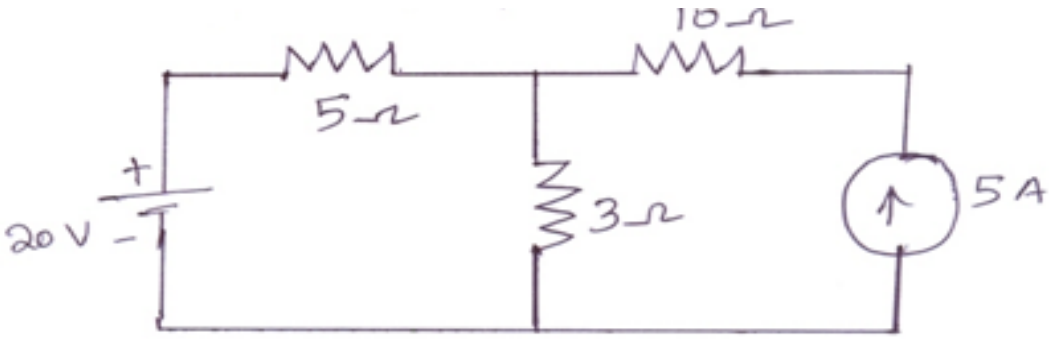

Fig. 11

Or

(b) (i) Define Thevenin's theorem and Norton's theorem. (4)

(ii) Determine the Thevenin's equivalent circuit across *AB* in fig12. (12)

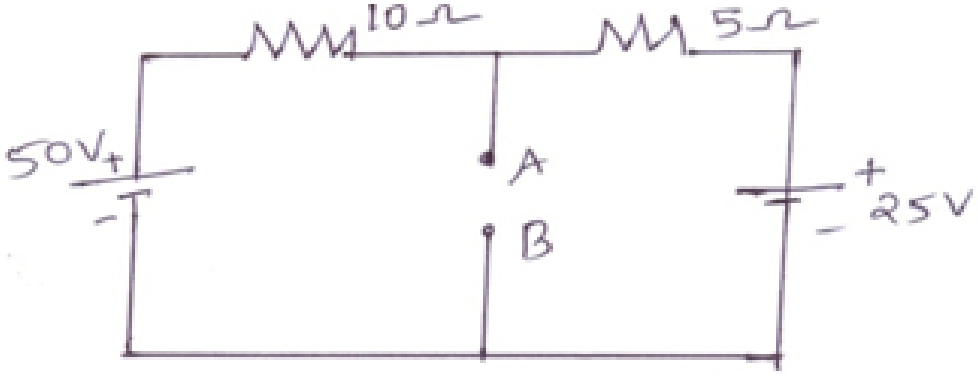

Fig. 12

13. (a) (i) Discuss the quality factor *Q* and its effect on bandwidth. Determine the value of *Q* at resonance and bandwidth of the circuit shown in fig 13. (8)

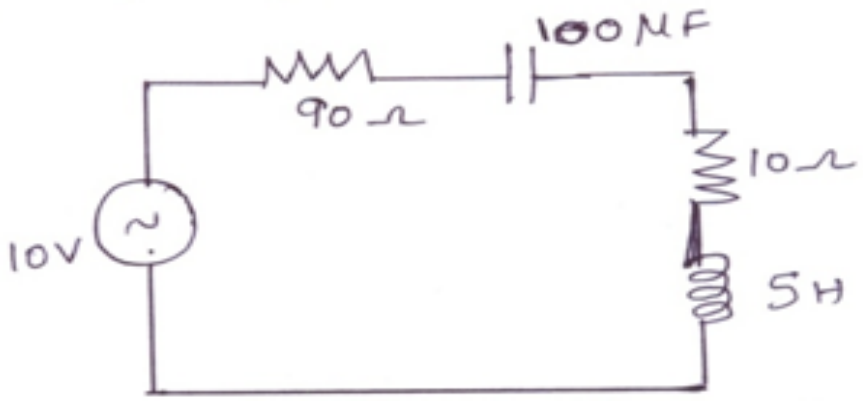

Fig. 13

(ii) A voltage $v\ (t)=10\ sin\omega t$ is applied to a series RLC circuit. At the resonant frequency of the circuit, the maximum voltage across the capacitor is found to be 500*V*. Moreover the bandwidth is known to be *400 rad/sec* and the impedance at resonance is 100Ω. Find the resonant frequency. Also find the values of *L* and *C* of the circuit. (8)

Or

(b) (i) A series *RL* circuit with R= 30Ω and L= 15*H* has a constant voltage V= *60V* applied at t= *0* as shown in fig 14. Determine the current *i*, the voltage across resistor and the voltage across inductor. (8)

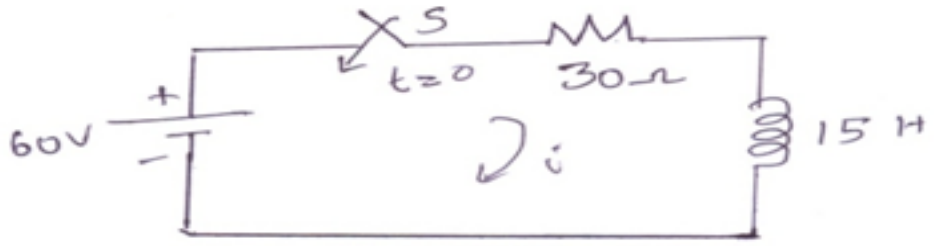

Fig. 14

(ii) Discuss the response of circuits for non sinusoidal period inputs with an example. (8)

14. (a) Explain in detail about single and double tuned circuits. (16)

Or

(b) A symmetrical 3 phase 3 wire 440*V* supply is connected to a star connected load. The impedance in each branch are Z_R= *2+j3*, Z_Y= *1-j2*, Z_B= *3+j4*. Find its equivalent delta connected load. The phase sequence is *RYB*. (16)

15. (a) Find the transmission parameters for the circuit shown in fig 15. (16)

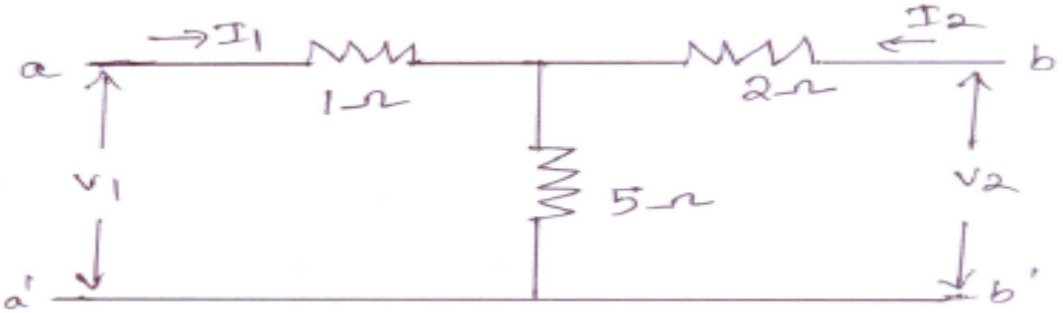

Fig. 15

Or

(b) (i) The impedance parameters of a 2 port network are

$Z_{11} = 6\Omega$, $Z_{22} = 4\Omega$, $Z_{12} = Z_{21} = 3\Omega$

Compute *Y* parameters and *ABCD* parameters. (8)

(ii) Explain the characteristics of ideal filter. Define high pass filter and passive filter. (8)

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