C

Question Paper Code: 53403

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2024

Third Semester

Electronics and Communication Engineering

15UEC303 - CIRCUIT THEORY

(Regulation 2015)

Duration: Three hours   Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. The complementary set of branches of the tree is called the _____ of the graph   CO1- R

    (a) Co-tree   (b) Twigs   (c) Links   (d) Chords

2. Thevenin's equivalent circuit consists of _____ with impedance.   CO2- R

    (a) Voltage source in parallel   (b) Voltage source in series.

    (c) Current source in series   (d) Current source in parallel

3. In a series RLC circuit , the current _____ the applied voltage when $X_L < X_C$ CO3- R

    (a) Lag behind   (b) Leads   (c) In phase with   (d) Not related to

4. Transmission parameters are also called as_____   CO4- R

    (a) ABCD parameter   (b) Y- parameters   (c) Z-parameters   (d) H-parameters

5. A tuned amplifier uses _____ load   CO5- R

    (a) Resistive   (b) Capacitive   (c) Inductive   (d)LC tank

PART – B (5 x 3= 15 Marks)

6. The resistance of 1.5Ω and 3.5Ω are connected in parallel and this parallel   CO1- R
    combination is connected in series with a resistance of 1.95Ω. Calculate the
    equivalent resistance value.

7. State maximum power transfer theorem.   CO2- R

8. Draw the frequency response of an RL circuit.   CO3- R

9. State the difference between driving point impedance and transfer impedance.   CO4- R

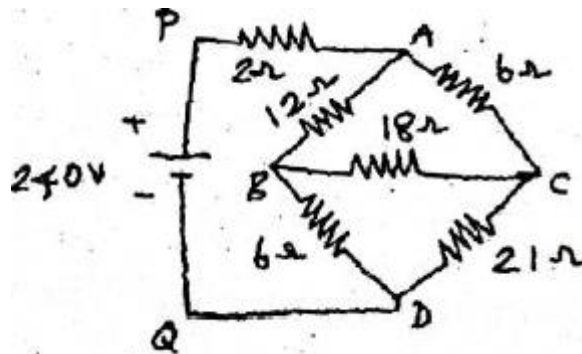10. Define coefficient of coupling.   CO5- R

PART – C (5 x 16= 80 Marks)

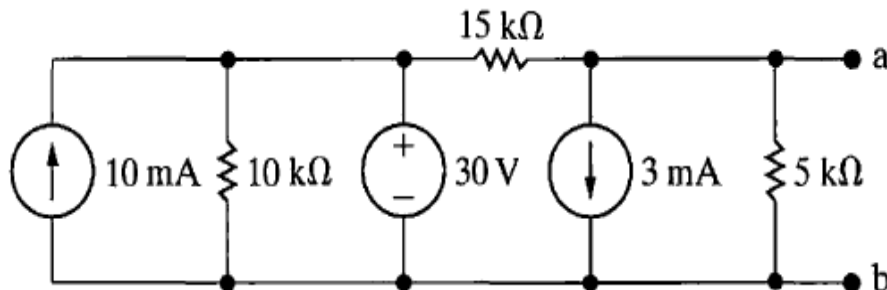11. (a) Calculate loop currents by mesh analysis   CO1- App   (16)
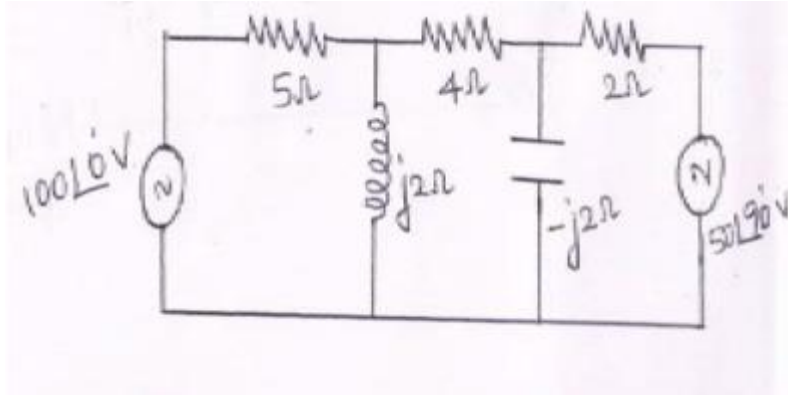
Or

(b) Using star-delta transformation, in the following wheat stone   CO1- App   (16)
bridge circuit of figure. Calculate (i) the equivalent resistance
between P&Q (ii) the total current (iii) the current through the
18Ω resistor.

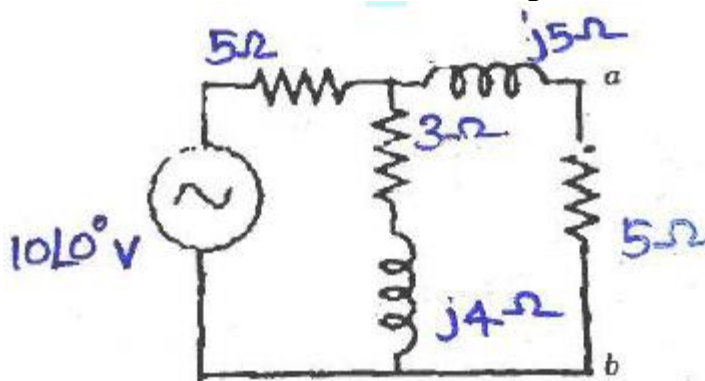12. (a) (i) Obtain the Norton's equivalent across the terminal ab.   CO2- App   (8)

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(ii) Using the superposition theorem, determine the voltage drop   CO2- App   (8)
and current across the resistor 3.3K as shown in figure below.
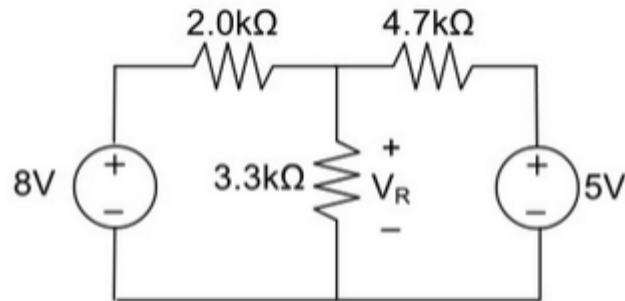
Or

(b)   Define Thevenin's theorem and find the current through the   CO2- App   (16)
branch a-b of the network shown in fig

13. (a)   For the series resonant circuit with R=2 Ω, $X_L = X_C = 10\Omega$ and   CO3- Ana   (16)
E=10V. find I, V_R, V_L and V_C at resonance. Also, if resonant
frequency is 5000Hz, determine bandwidth, Q factor, half power
frequencies and power dissipated in the circuit at resonance and at
the half power frequencies. Derive the expression for resonant
frequency.

Or

(b)   Impedance Z1 and Z2 are parallel and this combination is in   CO3- Ana   (16)
series with an impedance Z3 connected to a 100V, 50 Hz ac
supply. Z1= (5-jXc) ohm, Z2= (5+j0) ohm, Z3= (6.25+j1.25)
ohm. Calculate the value of capacitance such that the total current
of the circuit will bein phase with the total voltage. Find the
circuit current and power.

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14. (a) Find Z parameters for the following network. CO4- App (16)
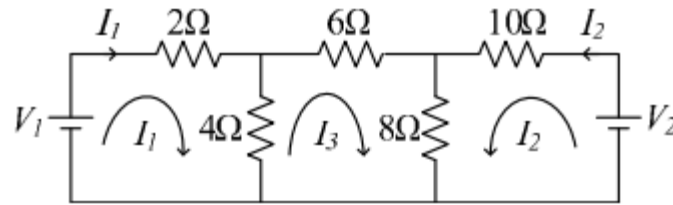
Or

(b) Derive the expression for hybrid parameters in terms of CO4- App (16) admittance parameters

15. (a) Derive the mutual inductance and the coupling coefficient of the CO5- U (16) transformer with necessary illustration

Or

(b) Explain three phase power measurement by 2 wattmeter method CO5- U (16) for star and delta connected load and determine the power equation and draw the phasor diagram.

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