C **Reg. No. :** | | | | | | | | | | |

Question Paper Code: 53403

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2018

Third Semester

Electronics and Communication Engineering

15UEC303 - CIRCUIT THEORY

(Regulation 2015)

Duration: Three hours Maximum: 100 Marks

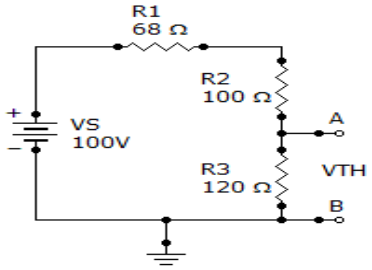
Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. A resistor is connected across a 50 V source. What is the current in the resistor if the color code is red, orange, orange, silver? CO1- R

   (a) 2 mA (b) 2.2 mA (c) 214 mA (d) 21.4 mA

2. Find the Thevenin equivalent (V_{TH} and R_{TH}) between terminals A and B of the circuit given below. CO2- U



   (a) 4.16 V, 120 Ω (b) 41.6 V, 120 Ω (c) 4.16 V, 70 Ω (d) 41.67 V, 70 Ω

3. In a series *RLC* circuit that is operating above the resonant frequency, the current CO3-U

   (a) Lags the applied voltage (b) leads the applied voltage

   (c) is in phase with the applied voltage (d) is zero

4. To increase the current in a series *RL* circuit, the frequency CO4-R

   (a) Should be increased (b) Should be decreased

   (c) Should be constant (d) Cannot be determined without values

5. In a Y-connected circuit, the magnitude of each line current is CO5-R

   (a) One-third the phase current (b) Three times the corresponding phase current

   (c) Equal to the corresponding phase current (d) Zero

PART – B (5 x 3= 15Marks)

6. State Kirchoff's circuital laws. CO1- R

7. State Compensation theorem. CO2- R

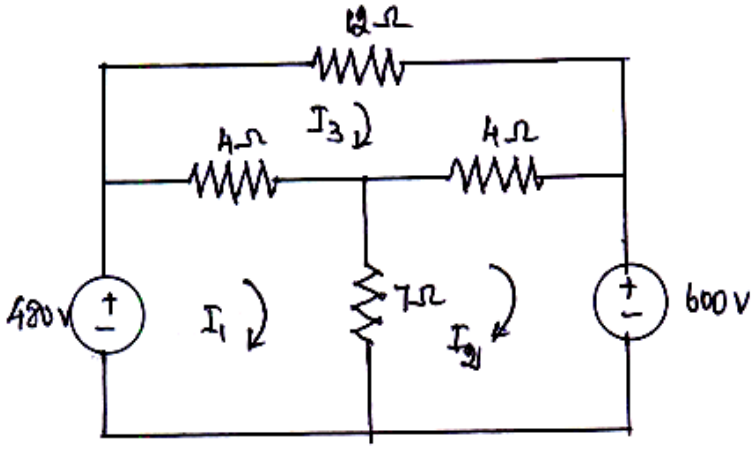
8. Define bandwidth. CO3- U

9. In a series RLC circuit L=2H, and C=5μf.Determine the value of R to give critical damping. CO4- App

10. What is meant by coupling coefficient? CO5- R

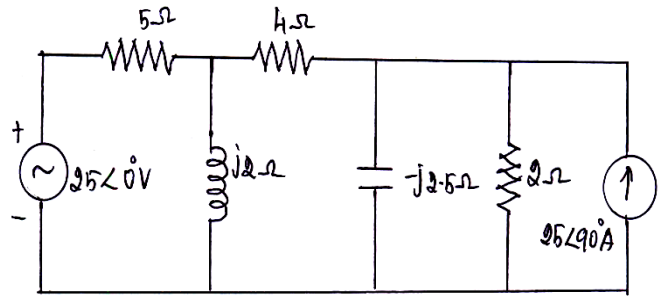
PART – C (5 x 16= 80 Marks)

11. (a) Write the mesh equations for the circuit shown in the figure and solve for the current in the 12 ohm resistor. CO1-App (16)

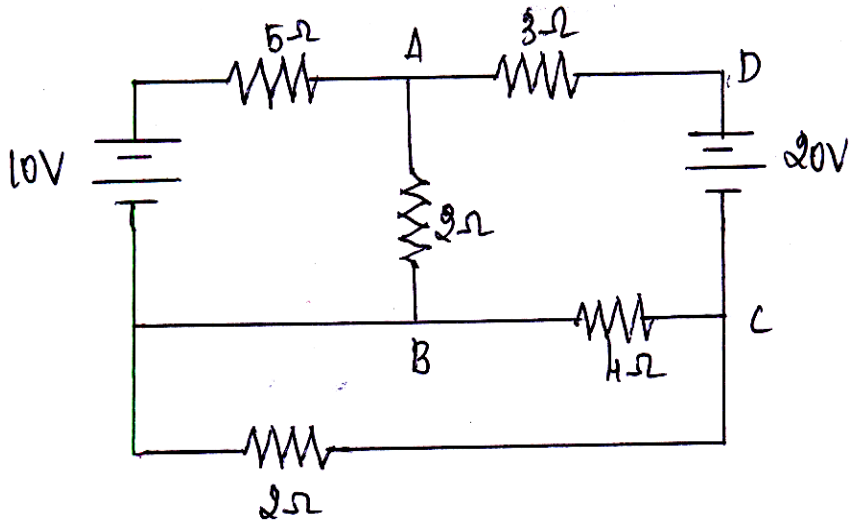


Or

(b) Using nodal analysis, find the current through the 4 ohm resistor in the circuit shown in figure. CO1-App (16)

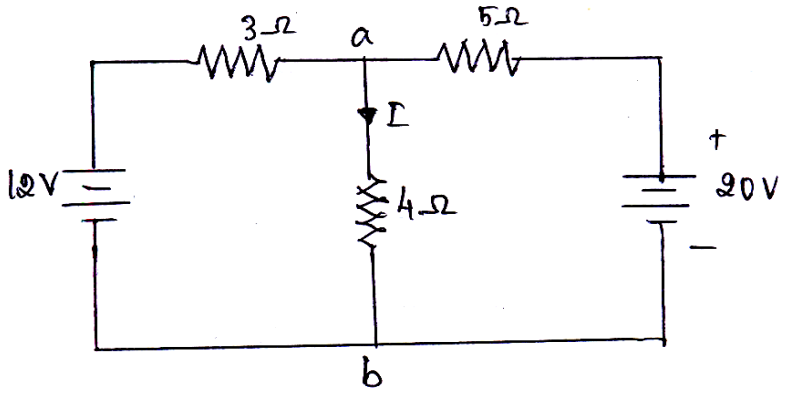


12. (a) Find the current in the 2 ohm resistor between A and B for the network using superposition theorem. CO2- App (16)



Or

(b) Calculate the current I in 4 ohm resistor in the figure using Millman's theorem. CO2- App (16)



13. (a) (i) Derive the expression for resonant frequency of a series RLC circuit. CO3- U (10)

(ii) A series RLC circuit with Q=250 is resonant at 1.5MHZ.Find the frequencies at half power points and also band width. CO3- App (6)

Or

(b) (i) Derive the expression for resonant frequency of a parallel RLC circuit. CO3- U (10)

(ii) A current source is applied to a parallel combination of R,L and C,where R=10Ω,L=1H and C=1μf. CO3- App (6)

(a) Compute the resonant frequency.

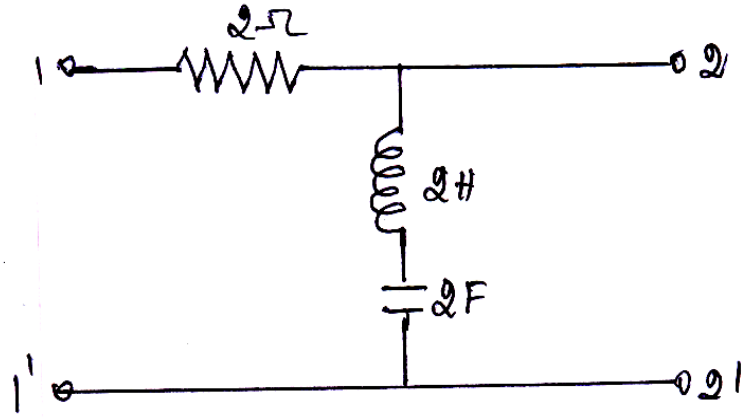
(b) Find the quality factor.

(c) Calculate the value of the bandwidth.

14. (a) A resistance R and a 2μf capacitor are connected in series across a 200V direct supply. Across the capacitor is a neon lamp that strikes at 120V.calculate R to make the lamp strike 5 sec after the switch has been closed.If R=5MΩ,how long will it take the lamp to strike? CO4 E (16)

Or

(b) Determine the admittance parameters of the two port network shown. CO4-App (16)



15. (a) Explain the single tuned and double tuned circuit. CO5- U (16)

Or

(b) (i) A balanced star connected load of (8+j6) Ω/phase is connected to a 3 phase, 230V, and 50Hz supply. Determine the line currents, power factor, power, reactive volt amperes and total volt amperes. CO5- App (10)

(ii) A wye load with. Z_A= (3+j0) Ω, Z_B= (2+j3) Ω and Z_C= (2-j1) Ω is connected to a 3phase 4 wire, 100volts, CBA system. Find the currents in all four lines. CO5- App (6)