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

Question Paper Code: 93403

B.E. / B.Tech. DEGREE EXAMINATION, DEC 2021

Third Semester

Electronics and Communication Engineering

19UEC303 - Circuit Theory

(Regulation 2019)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. Ohms law holds true only for ---------- circuits CO1- U

   (a) Linear (b) Non-linear (c) Unilateral (d) None

2. Superposition theorem is not valid for CO3- R

   (a) voltage responses (b) current responses (c) power responses (d) all the three

3. What is the total reactance of a series RLC circuit at resonance? CO4- R

   (a) Equal to X_L (b) Equal to X_C (c) Equal to R (d) Zero

4. Inductor does not allow sudden changes CO5- R

   (a) in currents (b) in voltages (c) in both (a) and (b) (d) in none of the above

5. For a two-port network to be reciprocal, CO6- R

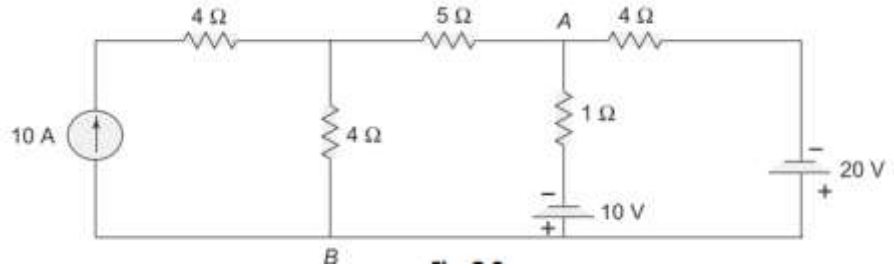
   (a) Z11=Z22 (b) y21 = y22 (c) h21 = – h12 (d) AD – BC =0

PART – B (5 x 3= 15 Marks)

6. State and explain Kirchhoff's Laws CO1 U
7. Explain dual with reference to network. CO3 U
8. What do you understand by resonance? CO4 U
9. Distinguish between natural and forced response CO5 U
10. Define ABCD parameters for a two-port network. CO6 U

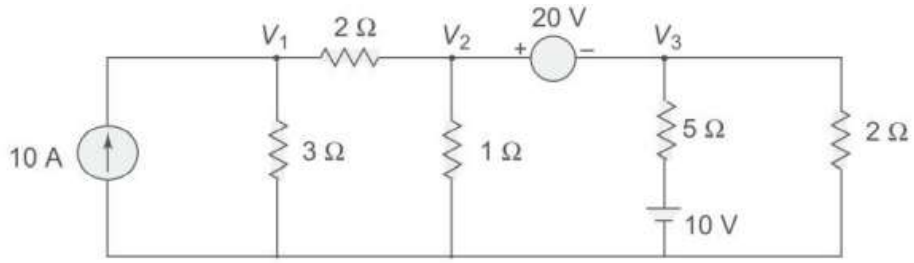
PART – C (5 x 16= 80 Marks)

11. (a) Find the voltage between A and B of the circuit shown in Fig. by mesh analysis. CO2- App (16)



Or

(b) Determine the current in the 5 V resistor for the circuit shown in Fig CO2- App (16)



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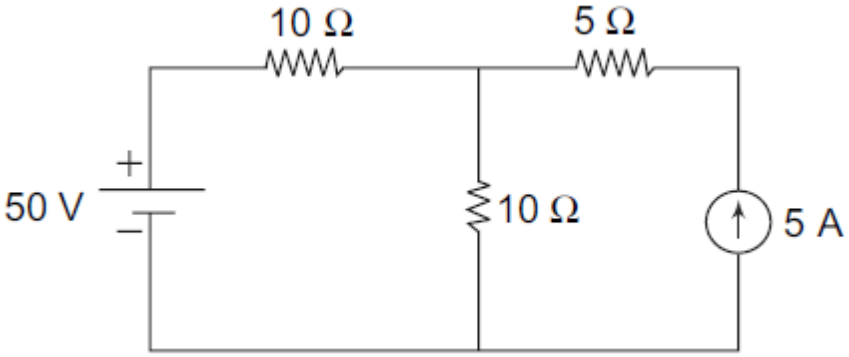
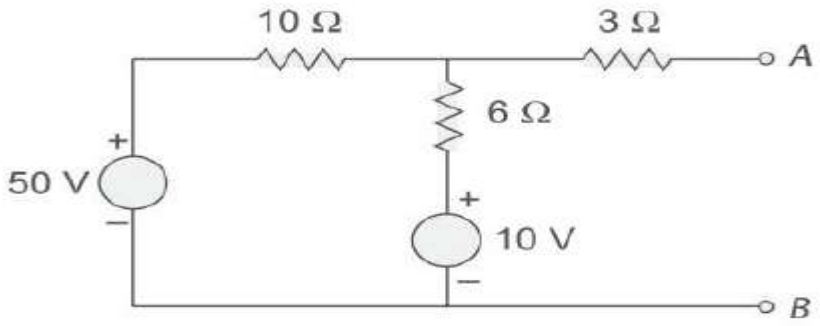
12. (a) Find the current through various branches of the circuit shown in Fig by employing the superposition theorem. CO3- App (16)



Or

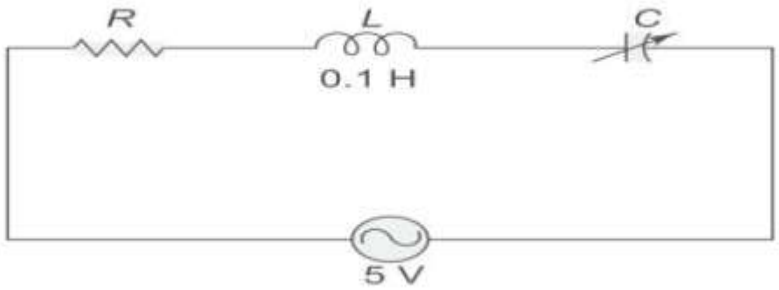
(b) Find Thevenin's equivalent circuit for the circuit shown in Fig. CO3- App (16)



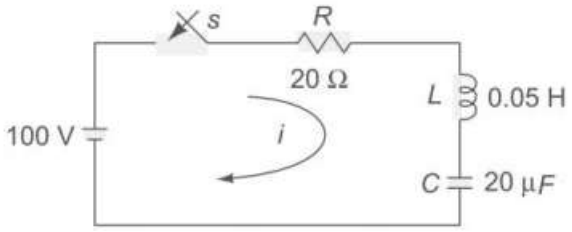
13. (a) A series RLC circuit has a quality factor of 5 at 50 rad/s. The current flowing through the circuit at resonance is 10 A and the supply voltage is 100 V. The total impedance of the circuit is 20 V. Find the circuit constants CO4- App (16)

Or

(b) In the circuit shown in Fig. a maximum current of 0.1 A flows through the circuit when the capacitor is at 5 μF with a fixed frequency and a voltage of 5 V. Determine the frequency at which the circuit resonates, the bandwidth, the quality factor Q and the value of resistance at resonant frequency CO4- App (16)

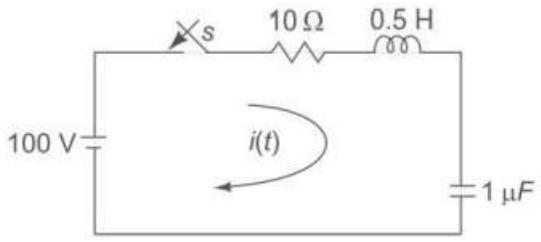


14. (a) The circuit shown in Fig consists of resistance, inductance, and capacitance in series with a 100 V constant source when the switch is closed at t =0. Find the current transient. CO5- App (16)



Or

(b) A series RLC circuit shown in Fig, comprising R =10V, L = 0.5H, and C = 1μF, is excited by a constant voltage source of 100v. Obtain the expression for the current. Assume that the circuit is relaxed initially. CO5- App (16)



15. (a) The impedance parameters of a two-port network are Z11 = 6Ω; Z22 =4 Ω; Z12 = Z21= 3 Ω. Compute the Y-parameters and ABCD- parameters and write the describing equations CO6- App (16)

Or

(b) Determine the Z parameters of the network shown in fig CO6- App (16)