Reg. No. : | | | | | | | | | | | | |

Question Paper Code : X 60492

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2020
Second Semester
Electrical and Electronics Engineering
EE 2151/EE 25/EE 1151/080280005/10133 EE 205 – CIRCUIT THEORY
(Common to Electronics and Instrumentation Engineering/Instrumentation and Control Engineering)
(Regulations 2008/2010)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A **(10×2=20 Marks)**

1. State Ohm's law.

2. State Kirchhoff's laws.

3. Write the objective of star delta transformation.

4. Define Reciprocity theorem.

5. A series resonant circuit has a bandwidth of 20 kHz and a quality factor of 40. The resistor value is 10 kΩ. Find the value of L of this circuit.

6. Define mutual inductance.

7. Find the time constant of RL circuit having R = 10 Ω and L = 0.1 mH.

8. A RLC series circuit has R = 10 Ω. L = 2 H. What value of capacitance will make the circuit critically damped ?

9. What are the advantages of three phase system ?

10. Define line voltage and line current.

PART – B **(5×16=80 Marks)**

11. a) In the circuits of Fig. 1, find the current I by the mesh method. **(16)**

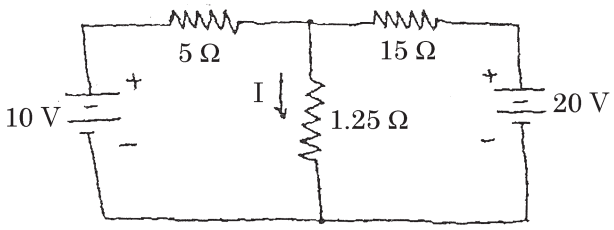


Fig. 1

(OR)

b) Write the nodal equations for the network of Fig. 2. Hence find the potential difference between nodes 2 and 4.

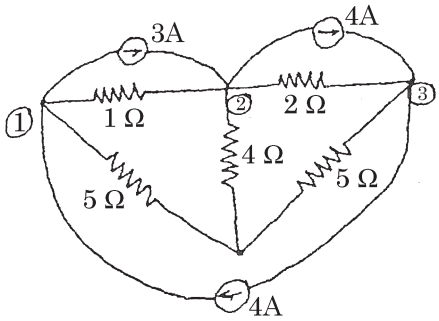
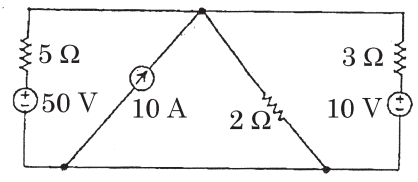
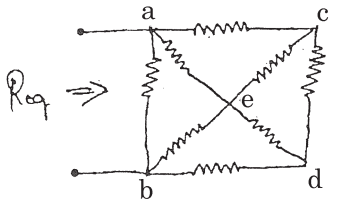


Fig. 2

12. a) i) Using source transformation, replace the current source in the circuit shown below by a voltage source and find the current delivered by the 50 V voltage source. **(8)**

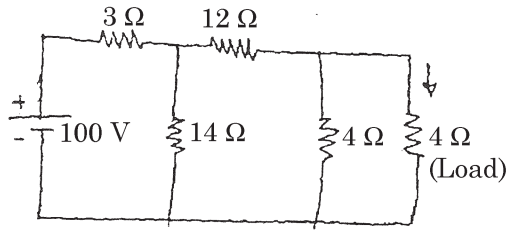


ii) Calculate the equivalent resistance R_{ab} when all the resistance values are equal to 1 Ω for the circuit shown below. **(8)**

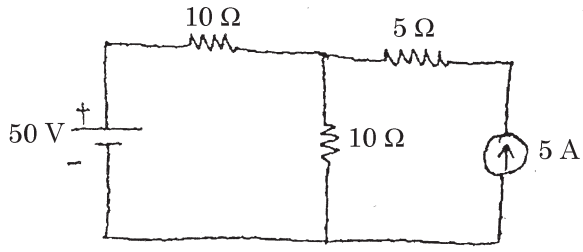


(OR)

b) i) Verify Reciprocity theorem for the circuit shown below. **(8)**



ii) Find the current through various branches of the circuit shown below, by employing superposition theorem. **(8)**



13. a) Obtain the expression for voltage, current and frequency in a series resonant circuit and draw its frequency response curve. **(16)**

(OR)

b) Explain the single tuned circuit and obtain expression for maximum amplification. **(16)**

14. a) Derive the step responses of RL and RC circuits. Compare their performances. **(16)**

(OR)

b) Derive an expression for the current response of RLC series circuit with sinusoidal excitation. Assume that the circuit is working in critical damping condition. **(16)**

15. a) Define power, power factor. Explain the two Wattmeter method of measuring power in 3-phase circuits with neat sketch. **(16)**

(OR)

b) Derive the current, voltage and power equation for the star connection system and delta connection system. **(16)**

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