CBCS SCHEME

USN | | | | | | | | | | |

18EE32

Third Semester B.E. Degree Examination, July/August 2022
Electric Circuit Analysis

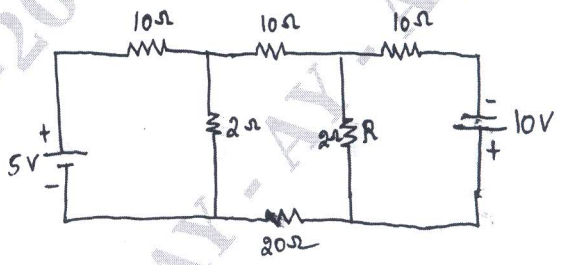
Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Module-1

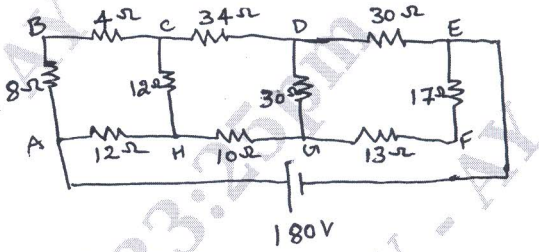
1 a. Find the Voltage across resistance R in the network Fig. Q1(a) by Mesh analysis. **(08 Marks)**

Fig. Q1(a)



b. Find the current in the 10Ω resistor in the given network shown in Fig. Q1(b) by using Star – delta transformation. **(06 Marks)**

Fig. Q1(b)

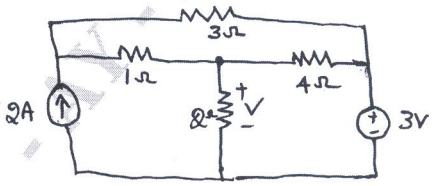


c. Distinguish between : i) Active and Passive Elements ii) Ideal and Practical sources iii) Lumped and distributed network. **(06 Marks)**

OR

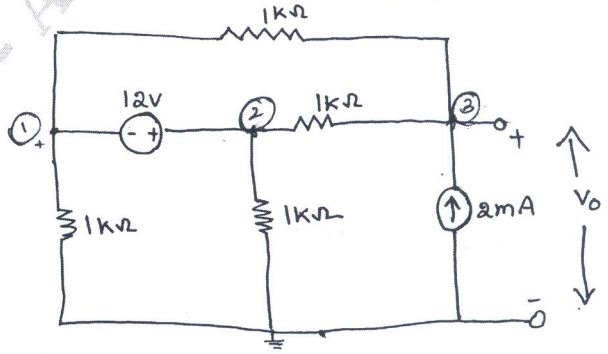
2 a. Use source shifting and transformation techniques to find voltage across 2Ω resistor show in Fig. Q2(a). **(08 Marks)**

Fig. Q2(a)



b. Use the nodal analysis to find V_o in the network shown in Fig. Q2(b). **(06 Marks)**

Fig. Q2(b)



c. Determine the current I_o in the circuit of Fig. Q2(c) using Mesh analysis. **(06 Marks)**

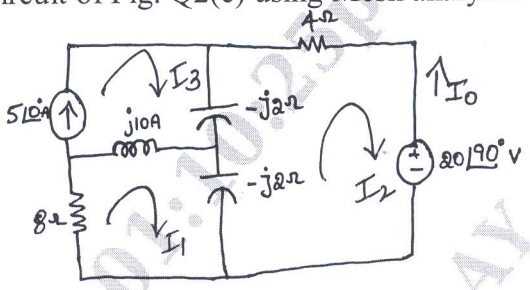


Fig. Q2(c)

Module-2

3 a. State and explain Super Position theorem with example. **(08 Marks)**

b. Verify the Reciprocity theorem for current I in the network given in Fig. Q3(b). **(06 Marks)**

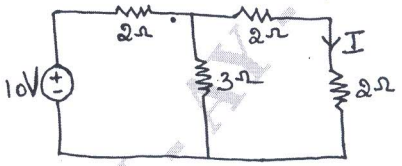


Fig. Q3(b)

c. State and explain Thevenin's theorem. **(06 Marks)**

OR

4 a. Find the current i using Super Position theorem for the Fig. Q4(a). **(10 Marks)**

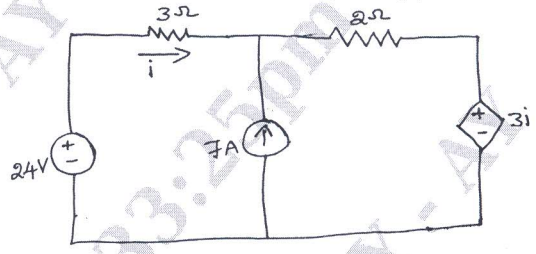


Fig. Q4(a)

b. State and prove Millman's theorem. **(10 Marks)**

Module-3

5 a. Derive the expression for resonant frequency and quality factor (Q_S). Write expression for W_1 and W_2 and show that $\sqrt{W_1 * W_2} = W_0$. **(08 Marks)**

b. An RLC series circuit has resistance of 10Ω a capacitance of 100μf and a variable inductance.

i) Find the value of inductance for which, the voltage across resistance is maximum

ii) Q factor.

iii) Voltage drops across R, L and C. The applied voltage is 230V, 50Hz. **(08 Marks)**

c. What are initial conditions and their use in Network Analysis? **(04 Marks)**

OR

6 a. What is Resonance? Derive expression for cut – off frequencies. **(10 Marks)**

b. In the Fig. Q6(b), the switch S is closed at t = 0, find the time when the current from the battery reaches to 500mA. **(10 Marks)**

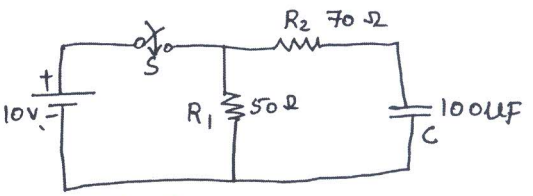


Fig. Q6(b)

Module-4

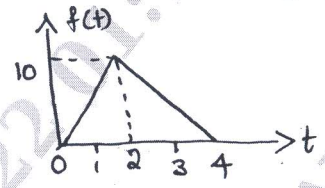
7 a. State and prove initial value theorem and Final Value theorem. **(08 Marks)**

b. Obtain the Laplace transform of :

i) Unit step functions f(t) = u(t) ii) f(t) = Sin wt iii) f(t) = Sin h wt. **(06 Marks)**

c. Obtain the Laplace transform of the function shown in Fig. Q7(c). **(06 Marks)**

Fig. Q7(c)

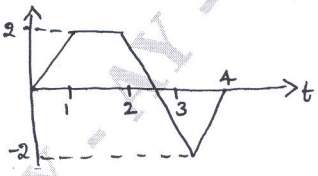


OR

8 a. Find the Laplace transform of i) $f(t) = te^{-3t} u(t)$ ii) $5 + 4e^{-2t}$ iii) e^{-at} Sinwt iv) t cos at. **(10 Marks)**

b. Find the Laplace transform for the waveform shown in Fig. Q8(b). **(10 Marks)**

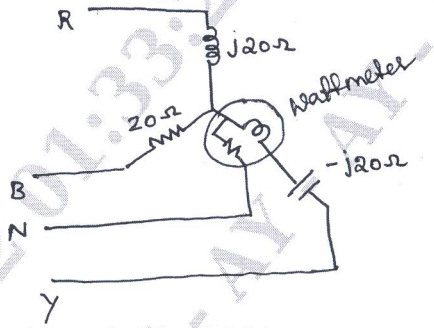
Fig. Q8(b)



Module-5

9 a. Find the reading on the Wattmeter in Fig. Q9(a). When the circuit is connected to a 400V , 3 - ϕ supply. The phase sequence is RYB. Neglect Wattmeter losses. **(10 Marks)**

Fig. Q9(a)



b. Find Z parameters of the network shown in Fig. Q9(b). **(10 Marks)**

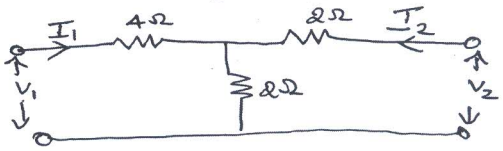
Fig. Q9(b)

OR

10 a. Define Y and Z parameters. Derive relation between Z and Y parameters. **(10 Marks)**

b. Find Y parameters for the network shown in Fig. Q10(b). **(10 Marks)**

Fig. Q10(b)



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