

CBCS SCHEME

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15EC34

Third Semester B.E. Degree Examination, Feb./Mar. 2022 Network Analysis

Time: 3 hrs.

Max. Marks: 80

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

Module-1

- Derive the expression for Star to Delta and Delta to star transformation. (10 Marks)
 - Use loop analysis to determine I_x and V_x in the circuit shown in Fig.Q1(b).

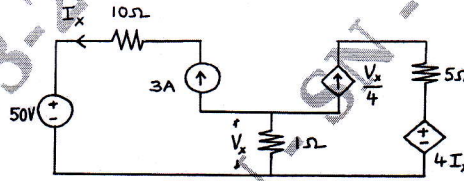


Fig.Q1(b)

(06 Marks)

OR

- Find the power loss in R (1Ω) resistor using star and delta transformation for the network shown in Fig.Q2(a).

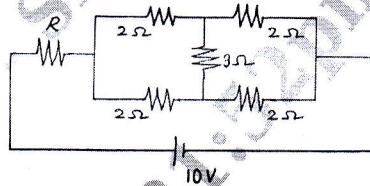


Fig.Q2(a)

(07 Marks)

- For the circuit shown in Fig.Q2(b), determine the node voltages.

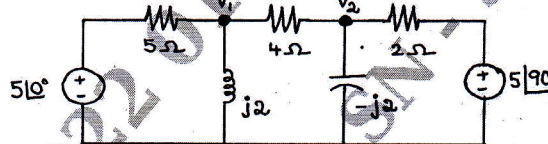


Fig.Q2(b)

(09 Marks)

Module-2

- Using Norton's theorem, find the current through the resistance of 16Ω for the circuit shown in Fig.Q3(a).

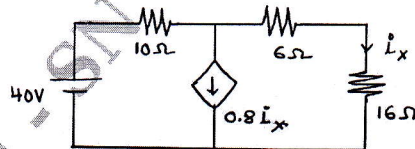


Fig.Q3(a)

(08 Marks)

- Using maximum power transfer theorem, find the maximum power transfer to the load for the circuit shown in Fig.Q3(b).

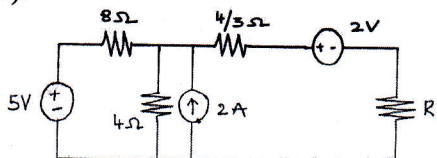


Fig.Q3(b)

(08 Marks)

OR

- 4 a. Using superposition theorem, find the current, I for the circuit shown in Fig.Q4(a).

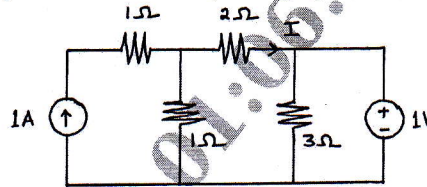


Fig.Q4(a)

(08 Marks)

- b. Using Millman's theorem, find the current in the impedance, Z_1 , for the circuit shown in Fig.Q4(b).

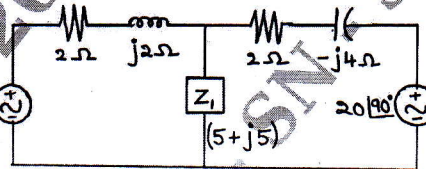


Fig.Q4(b)

(08 Marks)

Module-3

- 5 a. For the circuit shown in Fig.Q5(a), the switch, K , is changed from position 1 to 2 at $t = 0$ (Steady state condition having reached before switching). Find i , $\frac{di}{dt}$ and $\frac{d^2i}{dt^2}$ at $t = 0^+$.

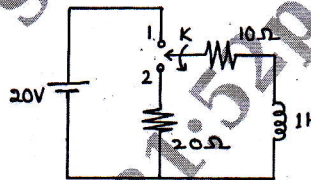


Fig.Q5(a)

(08 Marks)

- b. For the circuit shown in Fig.Q5(b), the switch, K , is opened at $t = 0$. Find the values of v , $\frac{dv}{dt}$ and $\frac{d^2v}{dt^2}$ at $t = 0^+$.

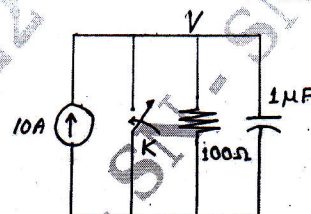


Fig.Q5(b)

(08 Marks)

OR

- 6 a. Find the Laplace transform of ;
 (i) $f(t) = u(t)$
 (ii) $f(t) = t$
 b. Obtain the Laplace transform of saw tooth waveform shown in Fig.Q6(b).

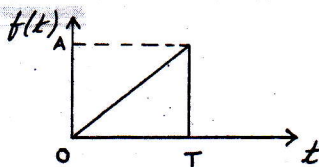


Fig.Q6(b)

(08 Marks)

Module-4

- 7 a. A 220 V, 100 Hz source supplies a series RLC circuit with a capacitor and a coil. If the coil has $50\ \text{m}\Omega$ and $5\ \text{mH}$, find at a resonance frequency of 100 Hz, the value of C. Also find Q, f_1 and f_2 . (08 Marks)
- b. Find the value of R_1 for the circuit shown in Fig.Q7(b) such that the given circuit is resonant.

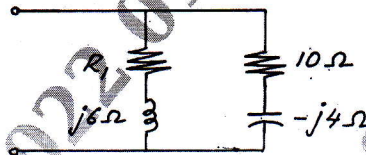


Fig.Q7(b)

(08 Marks)

OR

- 8 a. A series RLC circuit is shown in Fig.Q8(a). Determine (i) quality factor (ii) bandwidth (iii) resonance frequency and (iv) half power frequencies.

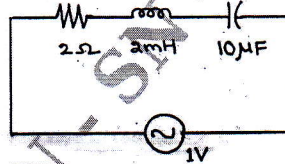


Fig.Q8(a)

(08 Marks)

- b. Derive the expressions of a resonance frequency and dynamic impedance of a parallel resonance circuit. (08 Marks)

Module-5

- 9 a. Derive the expression of Z-parameters in terms of h-parameters. (08 Marks)
- b. Find the Y-parameters for the network shown in Fig.Q9(b).

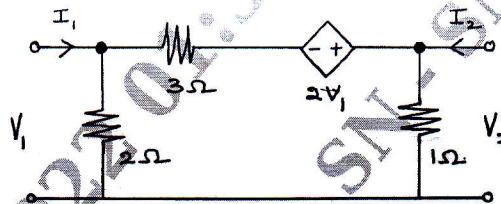


Fig.Q9(b)

(08 Marks)

OR

- 10 a. Derive the expression of ABCD-parameters in terms of Y-parameters. (08 Marks)
- b. Find the h-parameters for the network shown in Fig.Q10(b).

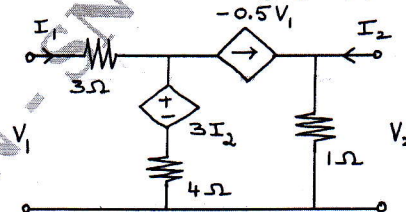


Fig.Q10(b)

(08 Marks)
