Seat No: _____ Enrollment No: _____

PARUL UNIVERSITY

FACULTY OF ENGINEERING & TECHNOLOGY

B.Tech. Winter 2022 - 23 Examination

Semester: 3 **Date: 8/10/2022**
Subject Code: 203107205 **Time: 2:00pm to 4:30pm**
Subject Name: Network Theory **Total Marks: 60**

Instructions:
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 **Objective Type Questions** - (Fill in the blanks, one word answer, MCQ-not more than Five in case of MCQ) (All are compulsory) (Each of one mark) **(15)**

1. What is the difference between a circuit and a network?
2. Write the statement of the Superposition theorem.
3. Define: Tree
4. What is the graph of the circuit?
5. What is the two-port network?
6. Write the time constant of the series RL circuit.
7. Define the underdamped response of a series RLC circuit.
8. Define Laplace Transform
9. What is the Laplace transform of function **f(t)= e^{-2t}**
10. If two current sources 5A and 3A are in parallel combination in the same direction then what is the equivalent current source?
11. If 3V is a series with a 3ohm register then what is the current source conversion?
12. What is the condition for the maximum power delivered by load resistance?
13. Define: Incidence Matrix
14. Write the relation between voltages and currents of the two-port network in terms of Z-parameters.
15. What is the filter circuit?

Q.2 Answer the following questions. (Attempt any three) **(15)**

A) Describe the characteristic of energy sources with the classification of sources.

B) An inductor shown in Fig. 1(a) is supplied with a current waveform given in Fig. 1(b). Draw the waveforms for the voltage and energy in the inductor.

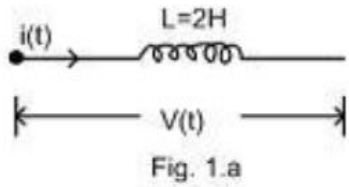


Fig. 1.a

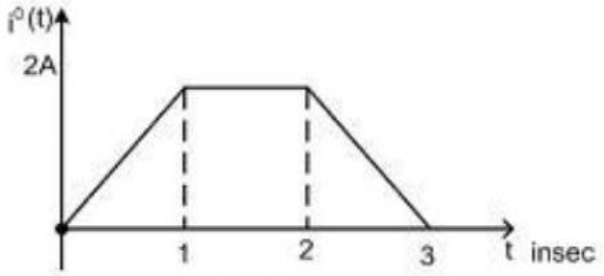
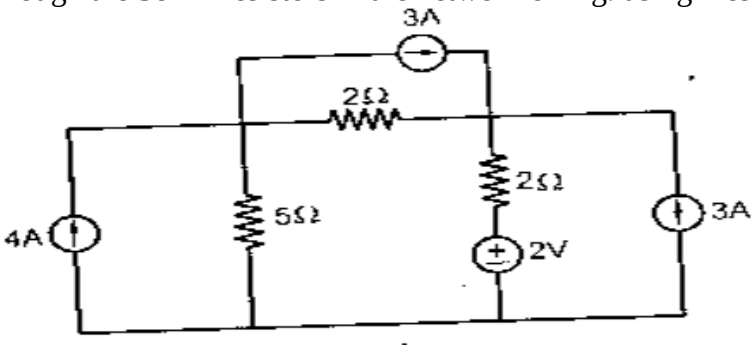


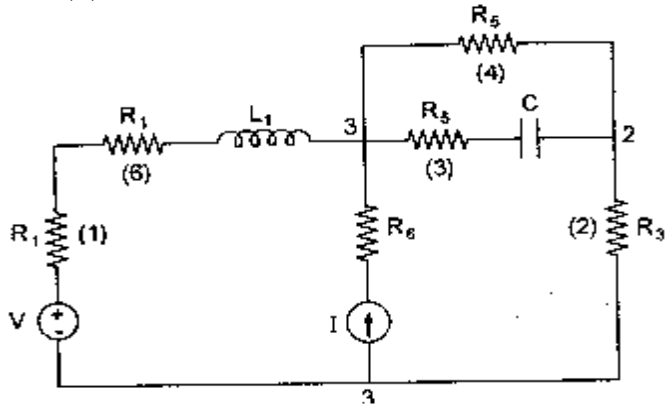
Fig.1.b

C) Find currents through the **5ohm** resistors in the network of Fig. using mesh analysis

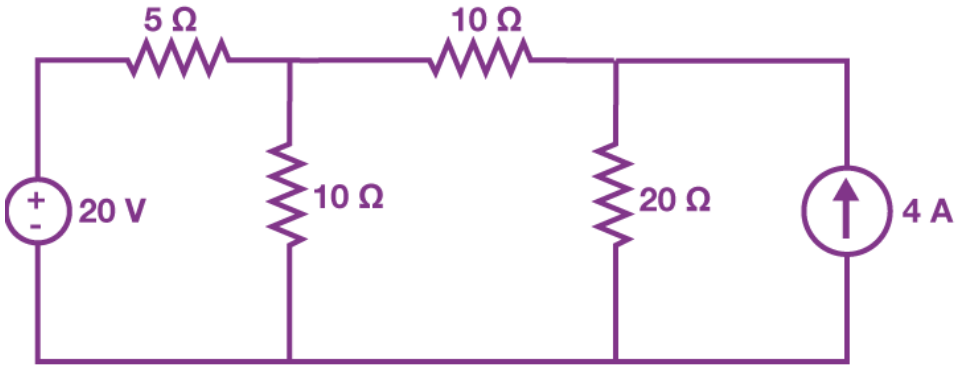


D) Obtained the step response of series RL circuit using Laplace transform.

Q.3 A) Define Sub-graph. For the circuit shown in Fig.- draw the graph and write the (i) Incidence matrix and (ii) Cut-set matrix. **(07)**

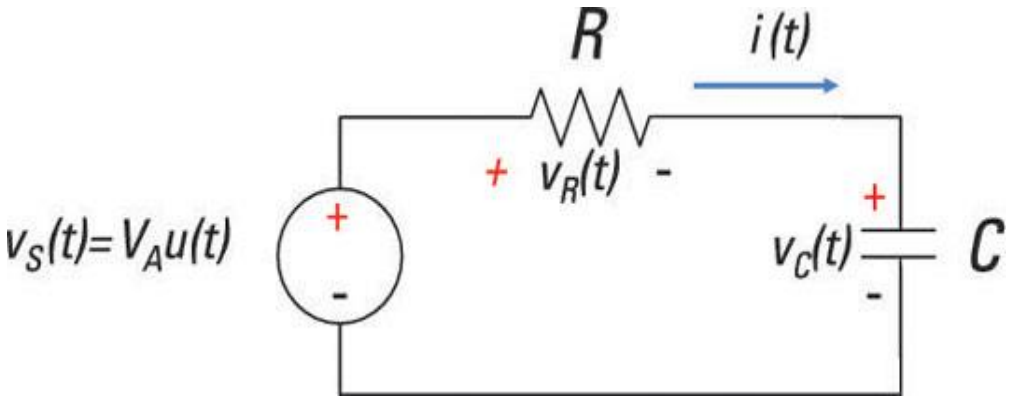


B) Find the current flowing through 20 Ω using the superposition theorem. **(08)**

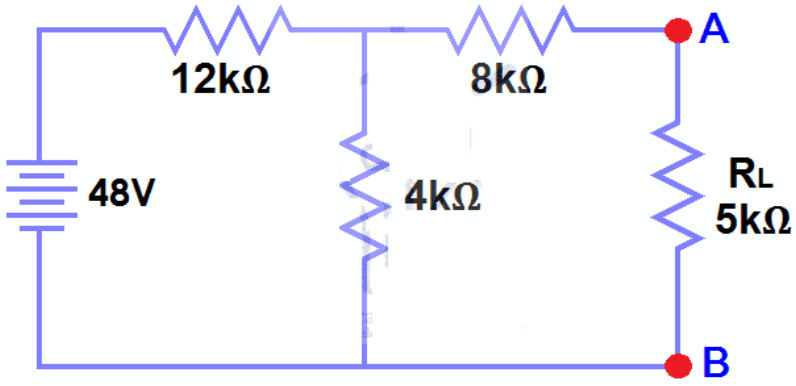


OR

B) Determine the response of voltage across of capacitor using the Laplace Transform in Fig. **(08)**



Q.4 A) V_{TH}, R_{TH} and the load current I_L flowing through and load voltage across the load resistor in Fig by using Thevenin's Theorem. **(07)**



OR

A) Explain the two-port network and Discuss the z-parameters. **(07)**

B) Use loop analysis to write matrix equations of the selected loop currents. Find the branch currents. **(08)**