Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

THIRD SEMESTER BTECH. (E & C) DEGREE END SEMESTER EXAMINATION
MARCH 2021
SUBJECT: NETWORK ANALYSIS (ECE - 2154)

TIME: 3 HOURS **MAX. MARKS: 50**

Instructions to candidates

- Answer **ALL** questions.
- Missing data may be suitably assumed.
- Do not use **Laplace Transforms** unless specified.

1A. For the circuit shown in Fig. Q1A, find the Thevenin's equivalent network to the left of terminals A and B.

1B. In the network shown in Fig. Q1B, the power loss in the load resistor R_L is 18W. Find the magnitude of V_0 and the current supplied by it.

1C. For the network shown in Fig. Q1C, find the voltage V_x using Superposition Theorem.

(4+3+3)

2A. In the circuit shown in Fig. Q2A, determine V_C at t = 0.2sec.

2B. In the circuit shown in Fig. Q2B, determine the expression for $i_1(t)$ for t > 0.

2C. For the circuit shown in Fig. Q2C, find the voltage V_0 at t =1.3msec.

(4+3+3)

3A. A square wave with T_1 = 0.1sec, T_2 = 0.2sec as shown in Fig.Q3A is applied to an RC low pass circuit. If the time constant of the circuit is 0.1 sec, calculate the output voltages and draw the output waveform.

3B. A limited ramp from a generator rises linearly to Vs volts in a time period Ts = 0.1μs and remains constant for 2 μs. This signal is applied to a differentiating circuit whose time constant is 0.01 μs. The resultant pulse at the output of the differentiator has a maximum value of 15 V. What is the peak amplitude of the ramp at the output of the generator?

3C. A positive step input of magnitude V is applied to high-pass RC circuit at t = 0. Derive the expression for the output voltage and calculate the fall time. Show that the fall time is $\frac{0.35}{f_1}$ where f_1 is the lower cut-off frequency.

(4+3+3)

4A. Determine the voltage v_x in the circuit shown in Fig. Q4A using Laplace Transform method.

4B. Find the current i_2 in the circuit shown in Fig. Q4B at t = 0.15sec.

4C. For the circuit shown in Fig. Q4C, determine the expression for i(t) using Laplace transform.

(4+3+3)

5A. Find ABCD parameters for the network shown in Fig. Q5A.

5B. Find Hybrid parameters for the network shown in Fig. Q5B.

5C. Derive the expressions for y parameters in terms of z parameters.

(4+3+3)

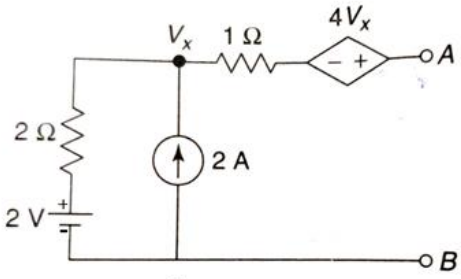

Fig.Q1A

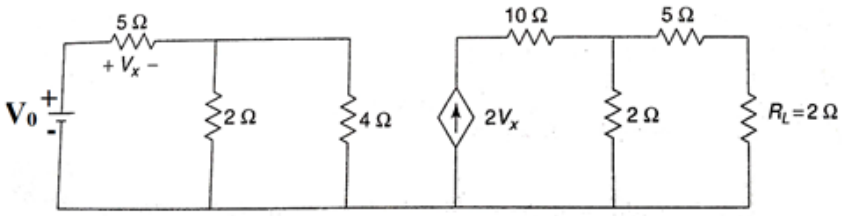

Fig.Q1B

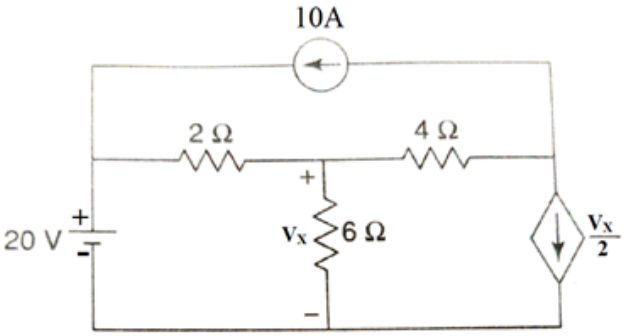

Fig.Q1C

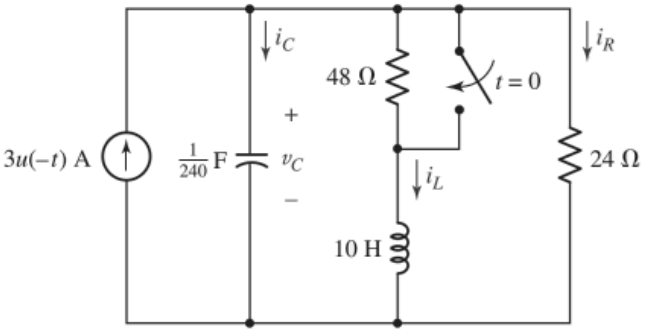

Fig.Q2A

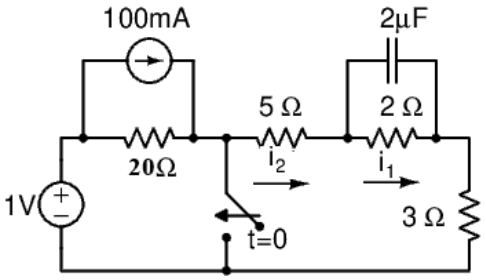

Fig.Q2B

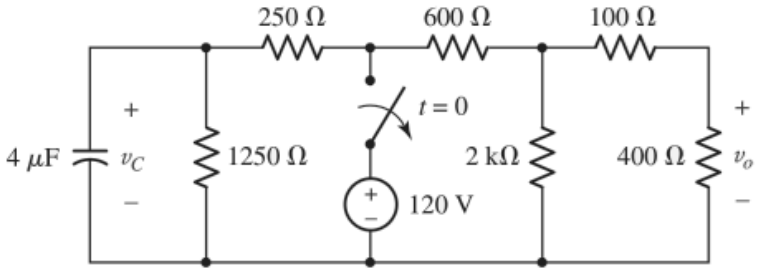

Fig.Q2C

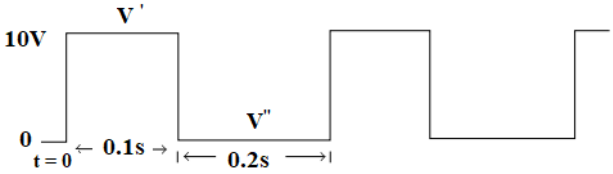

Fig.Q3A

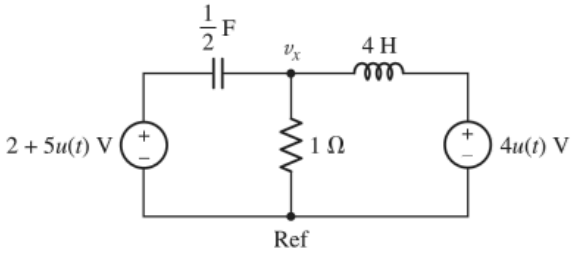

Fig.Q4A

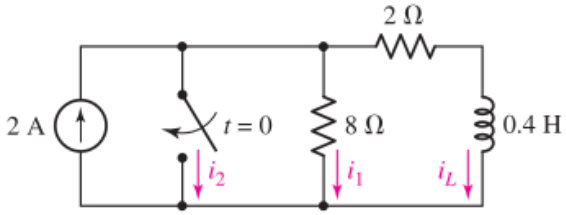

Fig.Q4B

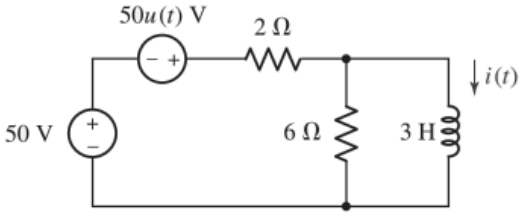

Fig.Q4C

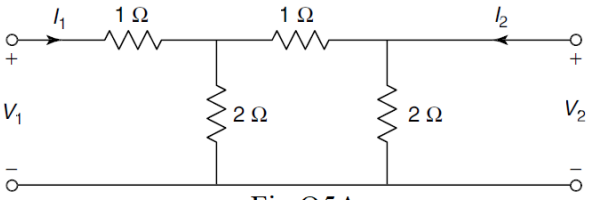

Fig.Q5A

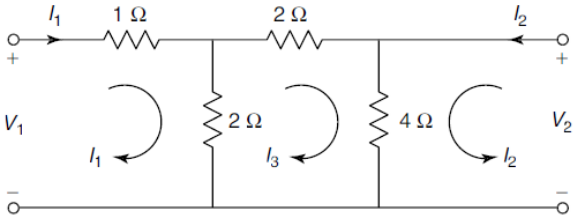

Fig.Q5B