CBCS SCHEME

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

15EC34

Third Semester B.E. Degree Examination, June/July 2018
Network Analysis

Time: 3 hrs. Max. Marks: 80

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

Module-1

1 a. Determine the equivalent resistance across XY shown in Fig.Q1(a) **(05 Marks)**

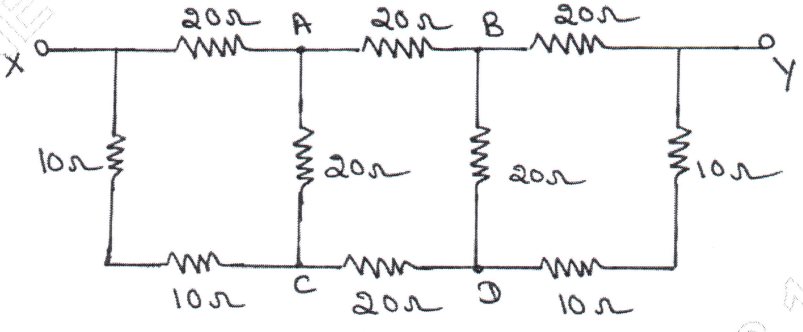

Fig.Q1(a)

b. Calculate the voltage across the 6Ω resistor using source shifting and transformation technique shown in Fig.Q1(b). **(05 Marks)**

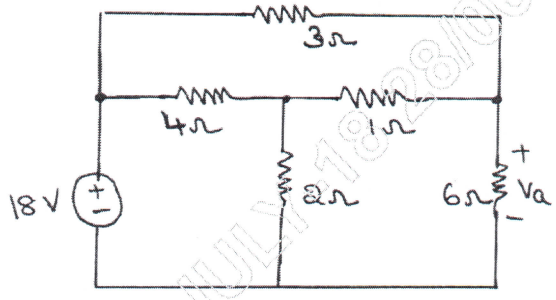

Fig.Q1(b)

c. Determine the power supplied by the dependent source of Fig.Q1(c) shown. **(06 Marks)**

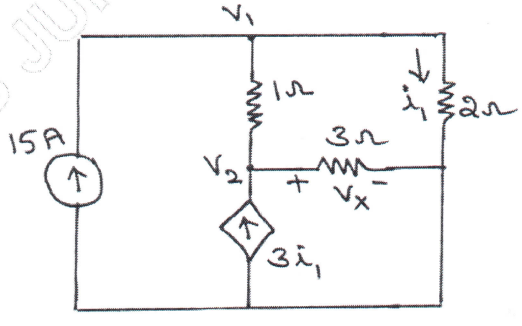

Fig.Q1(c)

OR

2 a. Using Mesh current analysis, find the current through 24Ω in the circuit shown in Fig.Q2(a). **(08 Marks)**

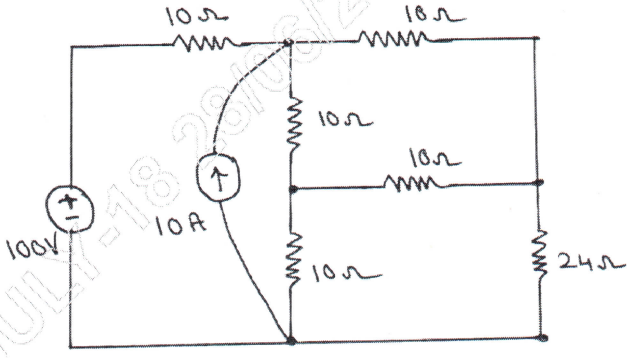

Fig.Q2(a)

b. For the network of Fig.Q2(b) determine the node voltage by nodal analysis. **(08 Marks)**

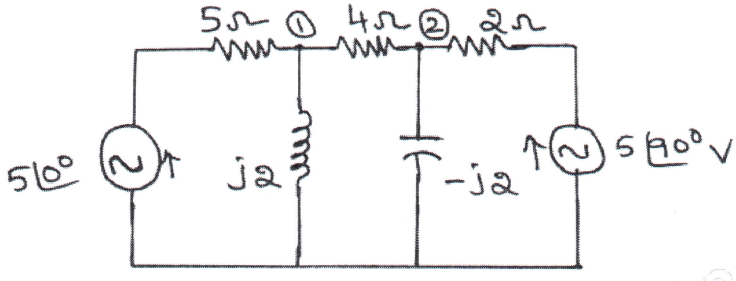

Fig.Q2(b)

Module-2

3 a. State superposition theorem. In the circuit of Fig.Q3(a), use the superposition principle to determine the value of i_x. **(08 Marks)**

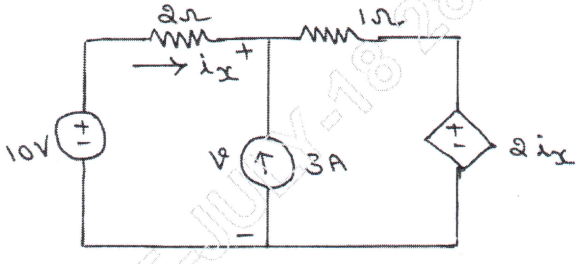

Fig.Q3(a)

b. Obtain the Thevenin and Norton equivalent circuits at terminals AB for the network shown in Fig.Q3(b). **(08 Marks)**

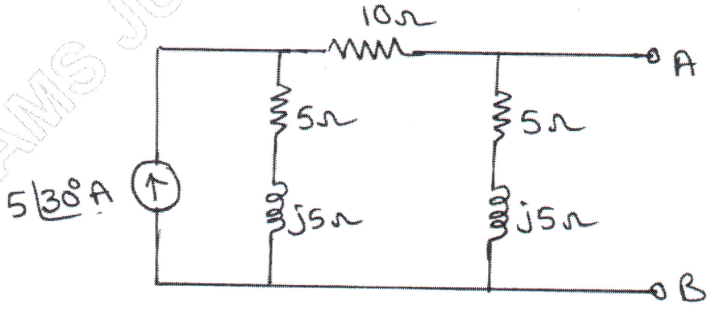

Fig.Q3(b)

OR

4 a. Using Millman's theorem, find I_L through R_L for the network shown in Fig.Q4(a). **(06 Marks)**

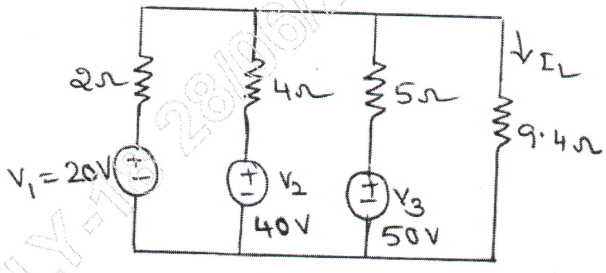

Fig.Q4(a)

b. Verify reciprocity theorem for the circuit shown in Fig.Q4(b). **(06 Marks)**

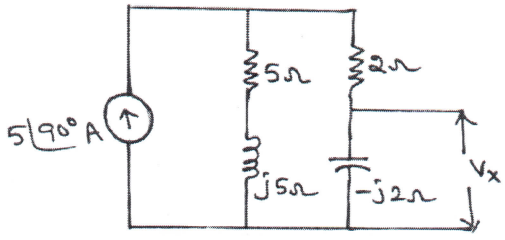

Fig.Q4(b)

c. State and explain maximum power transfer theorem. **(04 Marks)**

Module-3

5 a. In the circuit shown in Fig.Q5(a), the switch K is changed from position 1 to position 2 at t = 0, the steady state has been reached before switching. Find the values of i, $\frac{di}{dt}$ and $\frac{di^2}{dt^2}$ at $t = 0$. **(08 Marks)**

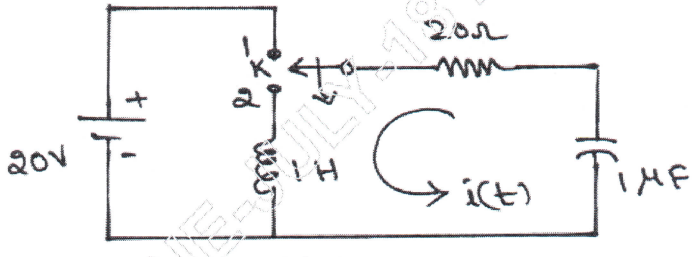

Fig.Q5(a)

b. The switch in the network shown in Fig.Q5(b) is closed at t = 0. Determine the voltage across the capacitor. Use Laplace transform. **(08 Marks)**

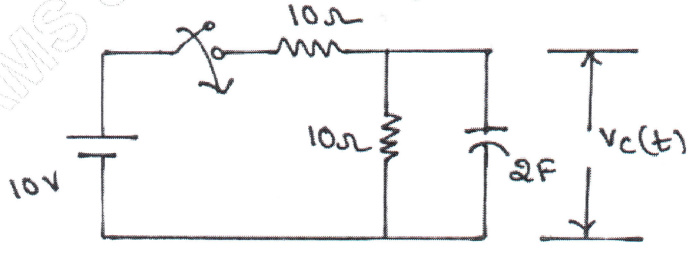

Fig.Q5(b)

OR

6 a. In the network shown in Fig.6(a), the switch K is opened at t = 0. At $t = 0^+$, solve for the values of v, $\frac{dv}{dt}$ and $\frac{d^2v}{dt^2}$ if I = 2A, R = 200Ω and L = 1H. **(08 Marks)**

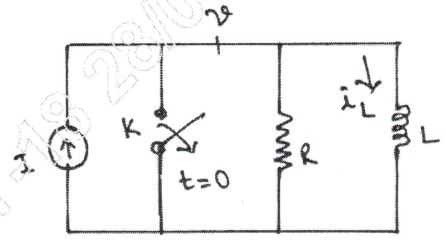

Fig.Q6(a)

b. Determine the Laplace transform of the periodic saw tooth waveform of Fig.Q6(b). Use gate function. **(08 Marks)**

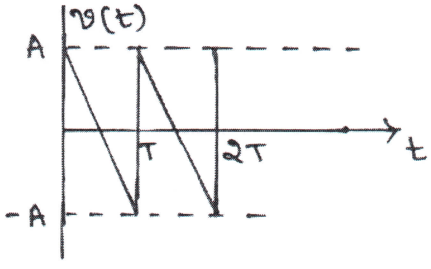

Fig.Q6(b)

Module-4

7 a. Derive for a resonant circuit, the resonant frequency $f_0 = \sqrt{f_1 f_2}$, where f_1 and f_2 are the two half power frequencies. **(07 Marks)**

b. Find the value of L for which the circuit shown in Fig.Q7(b) is resonant at a frequency of w = 5000 rad/sec. **(06 Marks)**

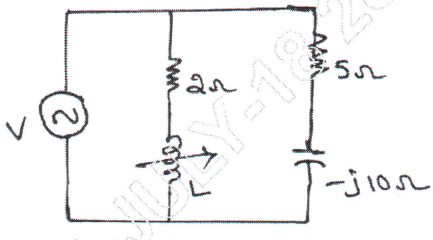

Fig.Q7(b)

c. A series RLC circuit has R = 10Ω, L = 0.01H and c = 0.01μF and it is connected across 10mV supply. Calculate : i) f_0 ii) Q_0 iii) B.w. **(03 Marks)**

OR

8 a. A series RLC circuit has a resistance of 10Ω, an inductance of 0.3H and a capacitance of 100μF. The applied voltage is 230V. Find : i) Resonant frequency ii) Quality factor iii) Lower and upper cut off frequencies iv) Bandwidth v) Current at resonance vi) currents at f_1 and f_2 vii) voltage across inductance at resonance. **(08 Marks)**

b. Derive an expression for the resonant frequency of a parallel resonant circuit. Also show that the circuit is resonant at all frequencies if $R_L = R_C = \sqrt{\frac{L}{C}}$ where R_L = Resistance in the inductor branch, R_C = resistance in the capacitor branch. **(08 Marks)**

Module-5

9 a. Find Y parameters and Z parameters for the circuit show in Fig.Q9(a). **(08 Marks)**

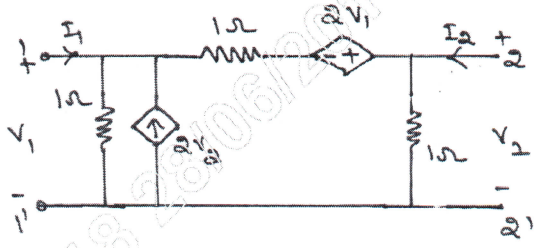

Fig.Q9(a)

b. Express ABCD parameters interms of Y-parameters and h-parameters. **(08 Marks)**

OR

10 a. Determine z parameters for the network shown in Fig.Q10(a). **(08 Marks)**

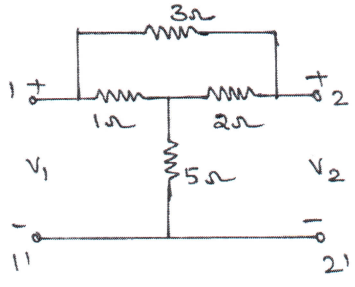

Fig.Q10(a)

b. Express h–parameters interms of Y–parameters. **(08 Marks)**

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