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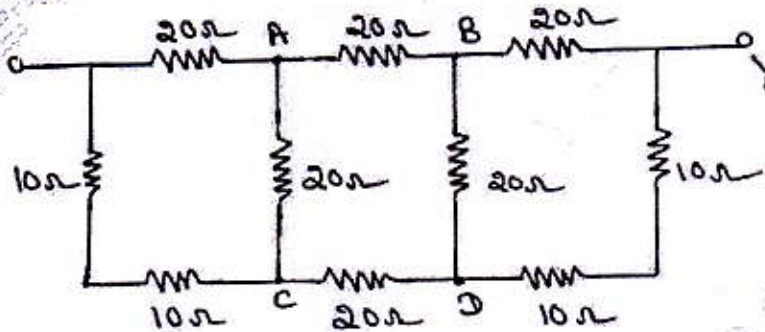## Third Semester B.E. Degree Examination, June/July 2018
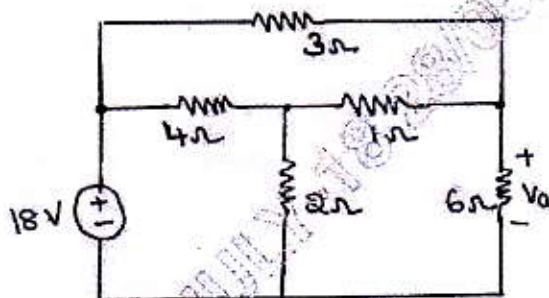## Network Analysis

Time: 3 hrs.

Max. Marks: 80

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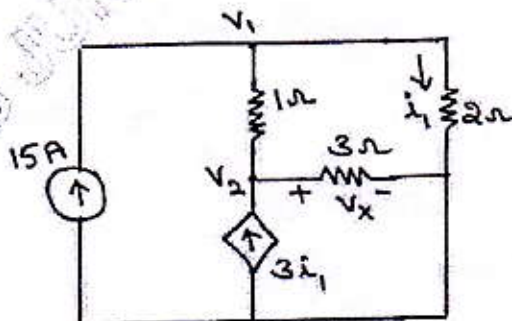ONE full question from each module.

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)
1 of 5

OR

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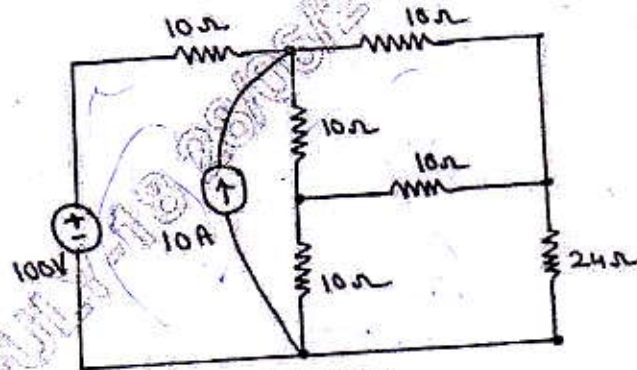(08 Marks)

Fig.Q2(a)

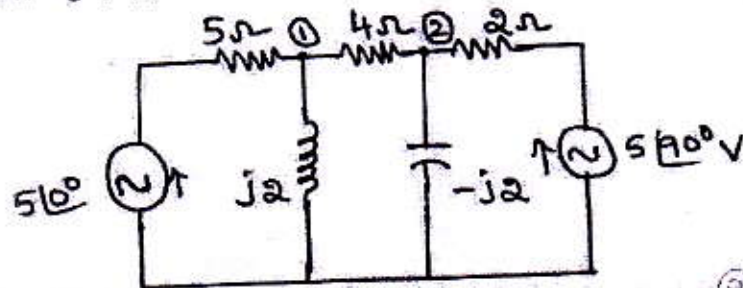 b. For the network of Fig.Q2(b) determine the node voltage by nodal analysis.   (08 Marks)

Fig.Q2(b)

Module-2

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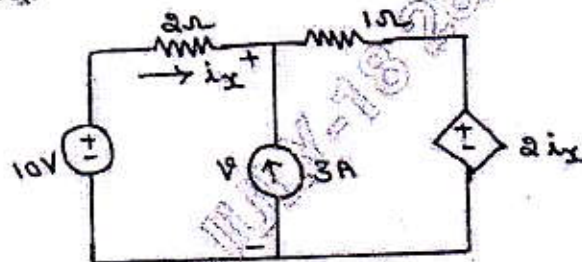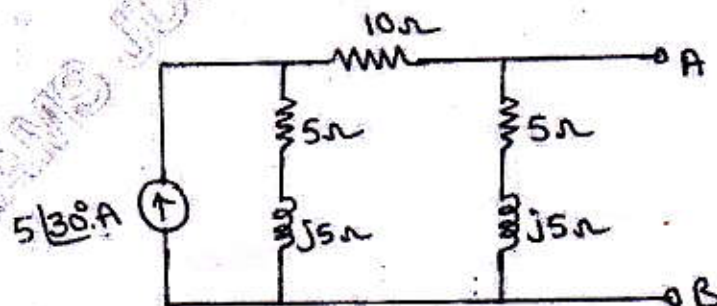determine the value of i_x.   (08 Marks)

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)
3 of 5

OR

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

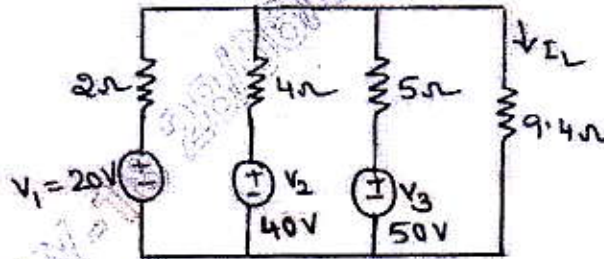

Fig.Q4(a)

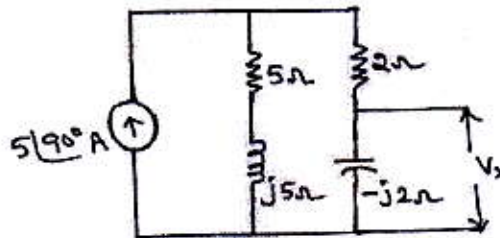b. Verify reciprocity theorem for the circuit shown in Fig.Q4(b). (06 Marks)

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, $\dfrac{di}{dt}$ and $\dfrac{di^2}{dt^2}$ at $t=0$. (08 Marks)
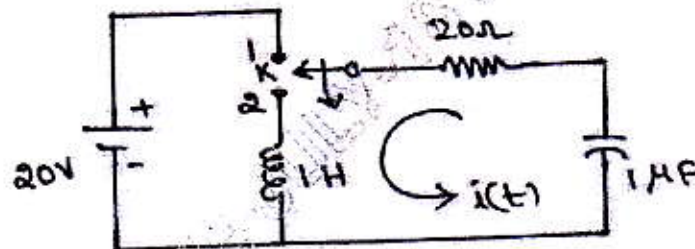

Fig.Q5(a)

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)
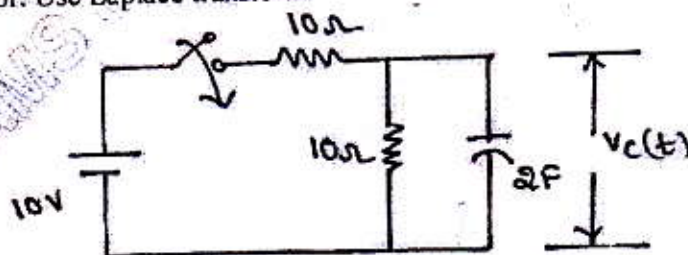

Fig.Q5(b)

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, $\dfrac{dv}{dt}$ and $\dfrac{d^2v}{dt^2}$ if $I = 2A$, $R = 200\Omega$ and $L = 1H$. **(08 Marks)**
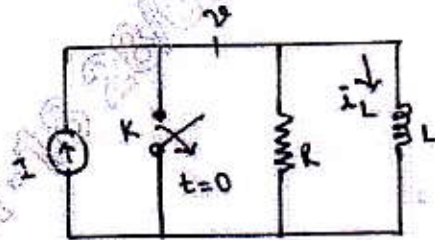

Fig.Q6(a)

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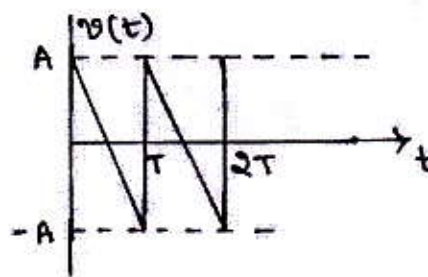

Fig.Q6(b)

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)**
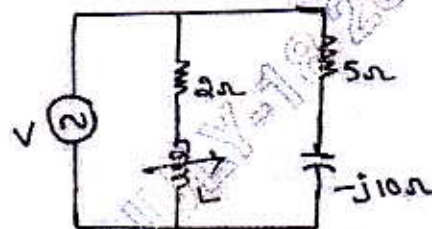

Fig.Q7(b)

c. A series RLC circuit has $R = 10\Omega$, $L = 0.01H$ and $c = 0.01\mu F$ 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 $100\mu F$. 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 $R_L = R_C = \sqrt{\dfrac{L}{C}}$ where R_L = Resistance in the inductor branch, R_C = resistance in the capacitor branch. **(08 Marks)**

Module-5

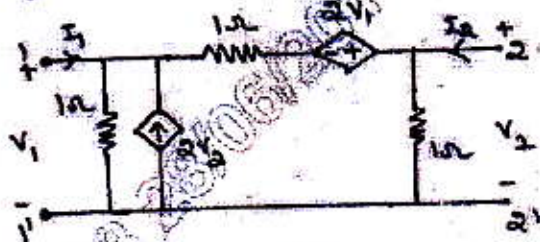9 a. Find Y parameters and Z parameters for the circuit show in Fig.Q9(a). **(08 Marks)**

Fig.Q9(a)

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

OR

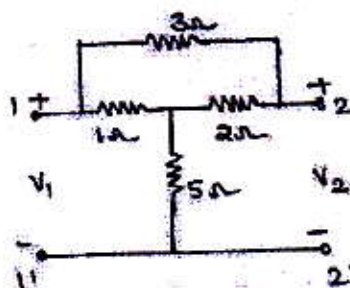10 a. Determine z parameters for the network shown in Fig.Q10(a). **(08 Marks)**

Fig.Q10(a)

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

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