CBCS Scheme

USN | | | | | | | | | | **15EC34**

Third Semester B.E. Degree Examination, Dec.2016/Jan.2017
Network Analysis

Time: 3 hrs.   Max. Marks: 80

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

Module-1

1   a.   Derive the expression for i) Δ to Y transformation   ii) Y to Δ transformation.   **(10 Marks)**
    b.   Using source Transformation, find power delivered by 50V source. Shown in Fig Q1(b).
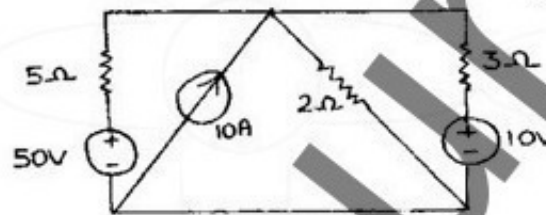   **(06 Marks)**

Fig Q1(b)

OR

2   a.   Find the voltage across 20Ω resistor in the Network. Shown in Fig Q2(a) by Mesh analysis.
                                                                                        (08 Marks)
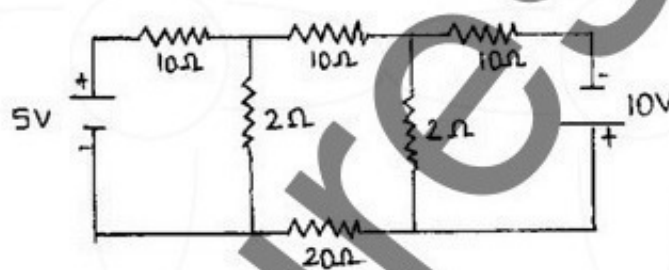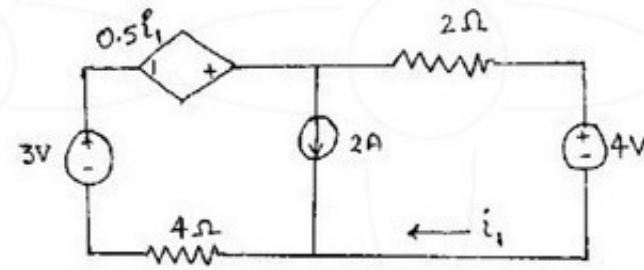   b.   Find i, using nodal analysis for the circuit shown in Fig Q2(b).   **(08 Marks)**

Fig Q2(a)

Fig Q2(b)

Module-2

3   a.   State and prove maximum power transfer Theorem for AC circuits.   **(08 Marks)**
    b.   For the network shown in Fig Q3(b), obtain the Thevenin's equivalent as seen from
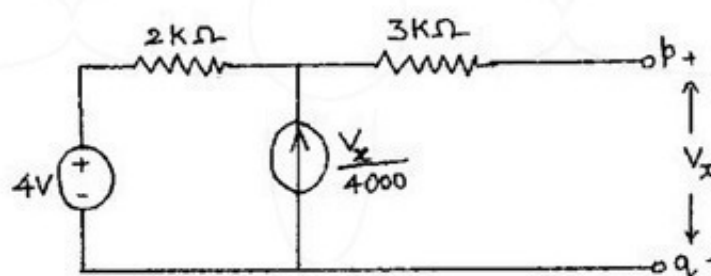   terminals p and q.   **(08 Marks)**

Fig Q3(b)

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OR

4 a. State and explain Millman's theorem. **(08 Marks)**
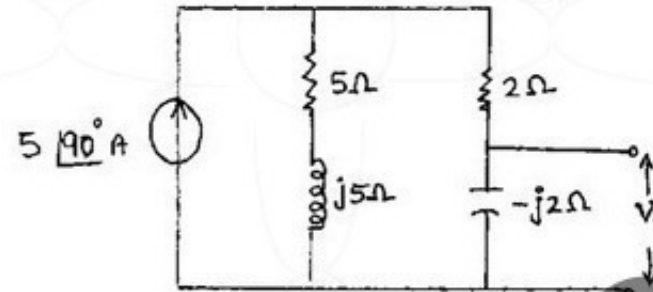   b. Verify reciprocity theorem for the circuit shown in Fig Q4(b). **(08 Marks)**

Fig Q4(b)

Module-3

5 a. Stat and prove initial value Theorem and final value theorem. **(08 Marks)**
   b. In the circuit shown in Fig Q5(b) $V = 10V$, $R = 10\Omega$, $L = 1H$, $C = 10\mu F$ and $V_c = 0$.
   Find $i(0^+)$, $\frac{di}{dt}(0^+)$ and $\frac{d^2 i}{dt^2}(0^+)$, it switch K is closed at $t = 0$. **(08 Marks)**
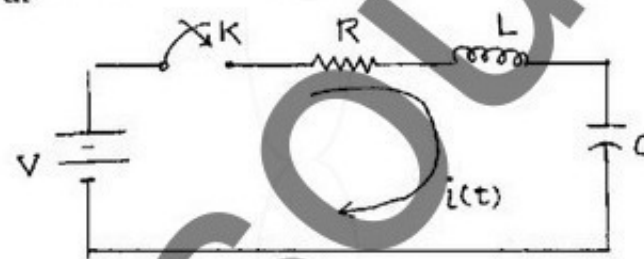

Fig Q5(b)

OR

6 a. In the network shown in Fig Q6(a), a steady state is reached with the switch K open.
   At $t = 0$, the switch is closed. For the element values given, determine the values of
   $V_a(0^-)$ and $V_a(0^+)$. **(08 Marks)**
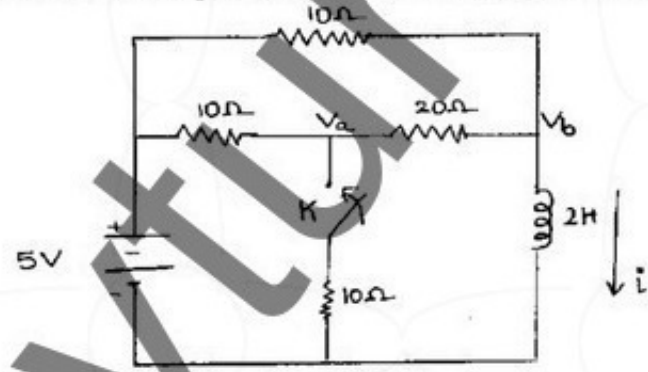   b. Obtain the Laplace Transform of saw tooth waveform shown in Fig Q6(b). **(08 Marks)**
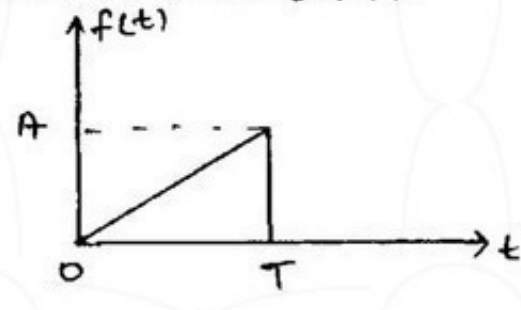

Fig Q6(a)

Fig Q6(b)

Module-4

7 a. Prove that $f_0 = \sqrt{f_1 f_2}$ where f_1 and f_2 are the two half power frequencies of a resonant circuits. **(08 Marks)**
   b. A series RLC circuit consists of $R = 10\Omega$, $L = 0.01H$ and $C = 0.01\mu F$ is connected across a supply of 10mV. Determine, i) f_0 ii) Q-factor iii) BW iv) f_1 and f_2 and v) I_0. **(08 Marks)**

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OR

8   a.   Obtain the expression for the resonant frequency for the circuit shown in Fig Q8(a)
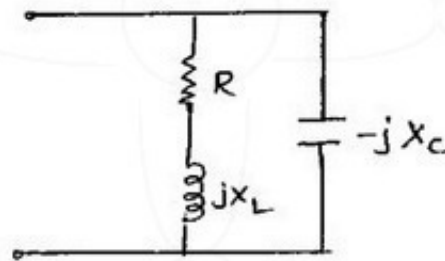   **(08 Marks)**

Fig Q8(a)

   b.   An RLC series circuit has an inductive coil of 'R' Ω resistance and inductance of 'L' H is in
        series with a capacitor 'C' F. The circuit draws a maximum current of 15A when connected
        to 230V, 50Hz supply. If the Q-factor is 5, find the parameter of the circuit.   **(08 Marks)**

Module-5

9   a.   Derive the z-parameters in terms of Y parameters.   **(08 Marks)**
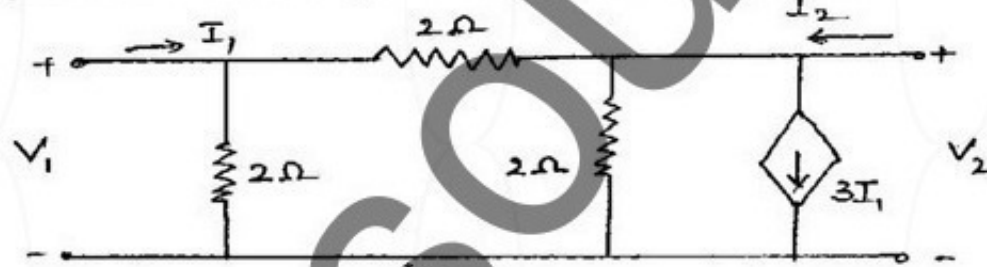   b.   Determine Y parameter of the two – port network shown in Fig Q9(b).   **(08 Marks)**

Fig Q9(b)

OR

10   a.   Obtain hybrid parameters (h) in terms of impedance parameters (z).   **(08 Marks)**
     b.   Find the Y parameters for the circuit shown in Fig Q10 (b). Then use the parameter
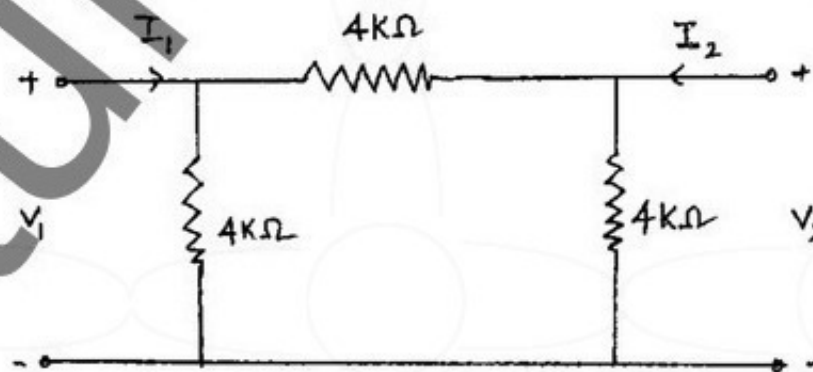   relationship to find ABCD parameters.   **(08 Marks)**

Fig Q10(b)

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