CBCS SCHEME

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

15EE32

Third Semester B.E. Degree Examination, Dec.2018/Jan.2019
Electric Circuit Analysis

Time: 3 hrs. Max. Marks: 80

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

Module-1

1 a. Find 'I_a' shown in the circuit in Fig Q1(a) using mesh analysis. **(08 Marks)**

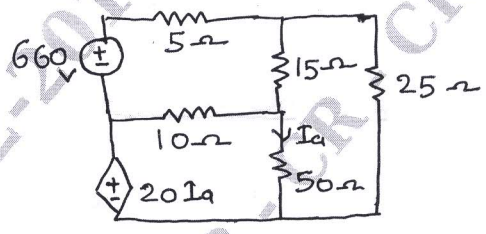

Fig Q1(a)

b. Find the I_x in the circuit show in Fig Q1(b) using source transformation.

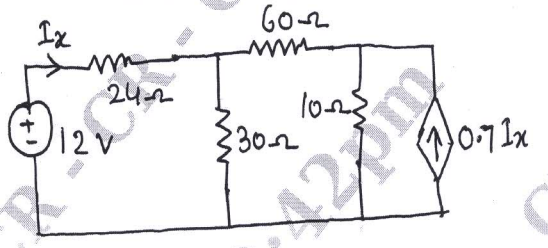

Fig Q1(b) **(08 Marks)**

OR

2 a. Find V_1 in the circuit shown in Fig Q2(a) using node analysis,. When V_2 = 20 volts.

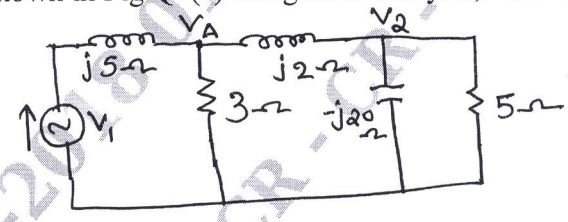

Fig Q2(a) **(06 Marks)**

b. A series RLC circuit consist of R = 50Ω, L = 0.2H, C = 10μF, with an applied voltage of 20V. Determine resonant frequency half power frequencies, Q – factor and B.W of the circuit. **(05 Marks)**

c. Find the current I in the circuit show in Fig Q2(c). Using star delta transformation. **(05 Marks)**

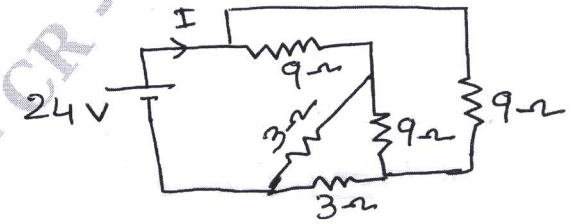

Fig Q2(c)

Module-2

3 a. State maximum power transfer theorem. **(03 Marks)**

b. For the circuit shown in Fig Q3(b). Find current 'I' using super position theorem. **(05 Marks)**

c. Find V_x in the circuit shown in Fig Q3(c) and hence verify reciprocity theorem.

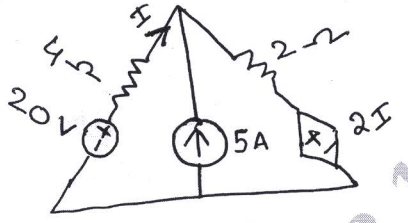

Fig Q3(b)

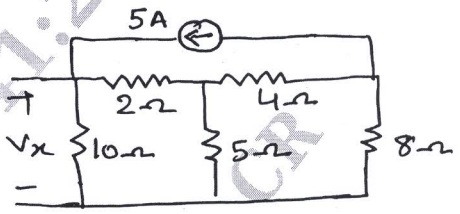

Fig Q3(c) **(08 Marks)**

OR

4 a. For the circuit shown in Fig Q4(a) obtain the Thevnin's equivalent across A – B.

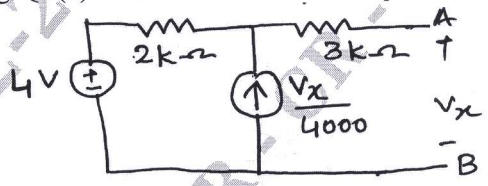

Fig Q4(a) **(06 Marks)**

b. Find I using Millman's theorem for the network shown in Fig Q4(b).

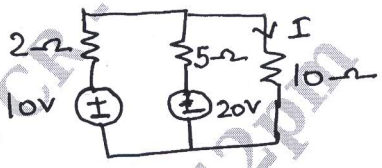

Fig Q4(b) **(04 Marks)**

c. Find the value of i_b in the Fig Q4(c) using Norton's theorem.

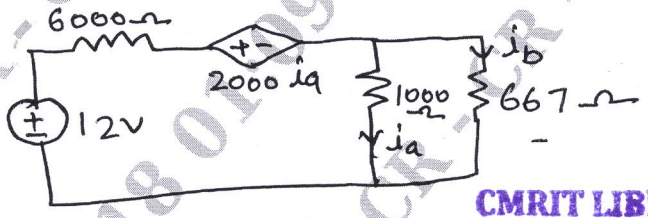

Fig Q4(c) **(06 Marks)**

Module-3

5 a. On the circuit shown in Fig Q5(a). the switch 'S' removed from a to b at t = 0. Find i, $\frac{di}{dt}$, $\frac{d^2i}{dt^2}$ at $t = 0^+$ steady state is achieved when switch is at a. **(08 Marks)**

b. In the circuit shown in Fig Q 5(b) switch K is opened at t = 0. Find the value of V_1 $\frac{dv}{dt}$, $\frac{d^2v}{dt^2}$ at $t = 0^+$. **(08 Marks)**

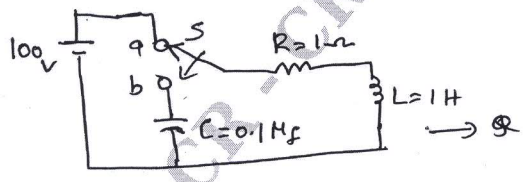

Fig Q5(a)

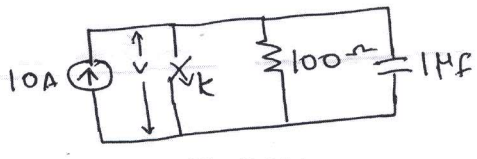

Fig Q5(b)

OR

6 a. In the circuit shown Fig Q6(a) determine the complete solution of current when switch is closed at t = 0. **(08 Marks)**

b. In the circuit sown in Fig Q6(b). Determine $V_a(0^-)$, $V_a(0^+)$ at t = 0. Steady state is reached with switch open. **(08 Marks)**

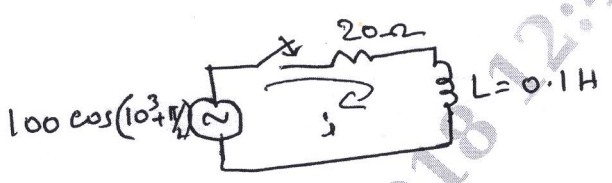

Fig Q6(a)

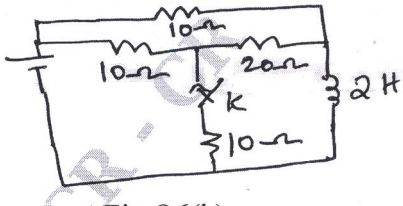

Fig Q6(b)

Module-4

7 a. Use initial and final value theorem to find F(0) and F(α)

$$F(s) = \frac{s^3 + 7s^2 + 5}{s(s^3 + 3s^2 + 4s + 2)}.$$ **(04 Marks)**

b. State and prove initial value theorem and final value theorem. **(06 Marks)**

c. Obtain the Laplace transform of the function shown in Fig Q7(c) **(06 Marks)**

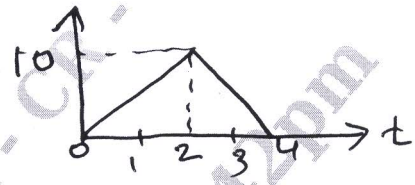

Fig Q7(c)

OR

8 a. Derive the Laplace transform of a periodic signal. **(08 Marks)**

b. Obtain the Laplace transform of the given wave form in Fig Q8(b). **(08 Marks)**

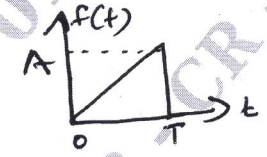

Fig Q8(b)

Module-5

9 a. A three phase, 400V, 4 wire system has a star connected load with $Z_A = (10 + j0)\Omega$, $Z_B = (15 + j10)\Omega$, $Z_c = (0 + j5)\Omega$. Find the line currents and current through neutral wire. **(06 Marks)**

b. Define Z and Y parameters. **(04 Marks)**

c. Find z parameters for the circuit in Fig Q9(c).

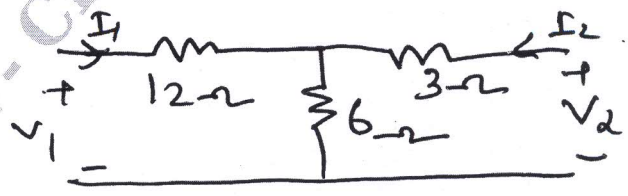

Fig Q9(c) **(06 Marks)**

OR

10 a. Find $V_c(t)$ in the circuit shown in Fig Q10(a) assuming zero initial condition. **(08 Marks)**

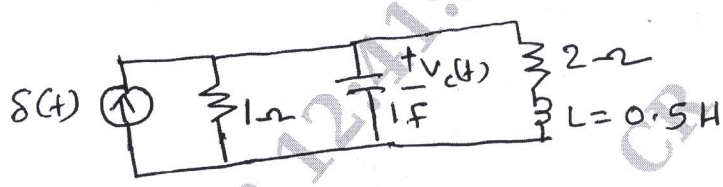

Fig Q10(a)

b. The pole – zero plot for an R-L-C circuit, driving point admittance, is as shown in Fig Q10(b). Find the values of R, L ,C. **(08 Marks)**

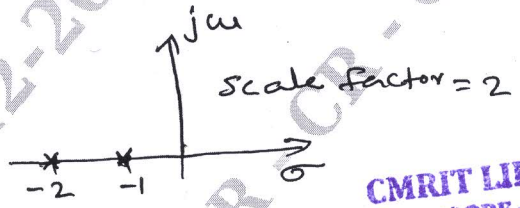

Fig Q10(b)

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