| Reg. No. | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|

# MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
*A Constituent Institution of Manipal University*

**III SEMESTER B.Tech. (BME) DEGREE END SEM EXAMINATIONS NOV/DEC 2016**

**SUBJECT: NETWORK ANALYSIS (BME 2101)**
**(REVISED CREDIT SYSTEM)**
**Monday, 28th November, 2016, 9 AM to 12 NOON**

**TIME: 3 HOURS** **MAX. MARKS: 100**

**Instructions to Candidates:**

1. **Answer ALL questions.**
2. **Draw labeled diagram wherever necessary**

**1a)** For network shown in Fig. Q1a, Find the current I. Then apply the Reciprocity theorem for this network and verify it. **(6)**

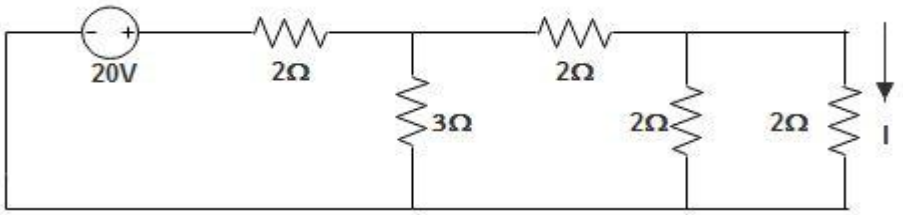


Fig.Q1a

**1b)** For the network shown in Fig. Q1b, use node voltage analysis to find the branch current I. **(6)**

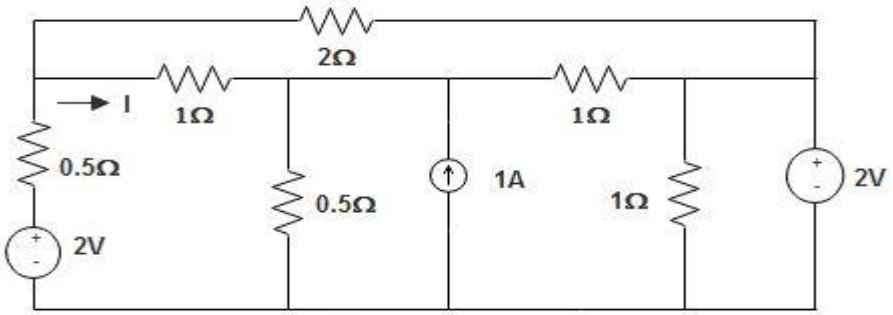


Fig.Q1b

**1c)** For the network shown in Fig.Q1c, find the currents and power dissipated in all branches of resistors. **(8)**

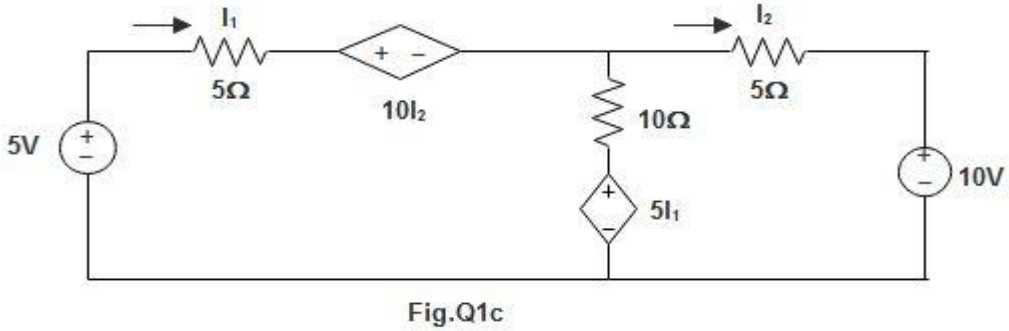


Fig.Q1c

**2a)** For the network shown in Fig.Q2a, determine the current I using Super position theorem. **(6)**

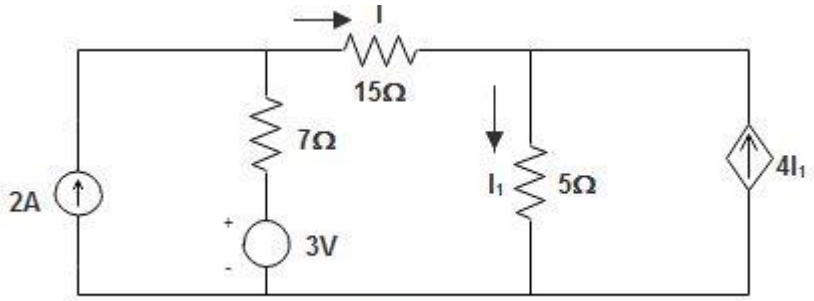


Fig.Q2a

**2b)** For the network shown in Fig.Q2b, the impedance $Z_L$ is variable in both resistance and reactance. Find the value of $Z_L$ to get the maximum power in the load. What is the maximum power? **(6)**

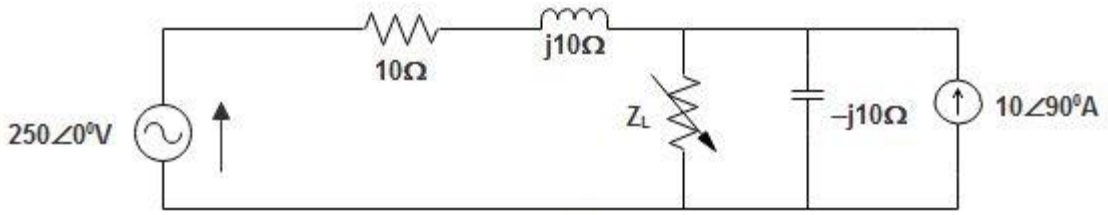


Fig.Q2b

**2c)** The network shown in the Fig.Q2c is a simple representation of a transistor. For the network determine Thevenin's equivalent network for the load $R_L$. **(8)**

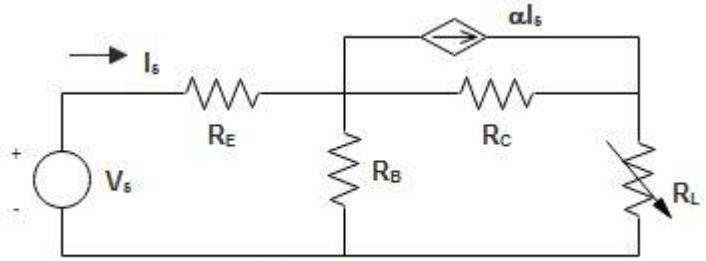


Fig.Q2c

**3a)** For a series RLC resonant circuit show that. **(6)**

$$Z = R(1 + j2Q_0\delta) \qquad \text{where } \delta = \frac{f - f_0}{f_0}$$

**3b)** For the network shown in Fig. Q3b, find $V_o$. **(6)**

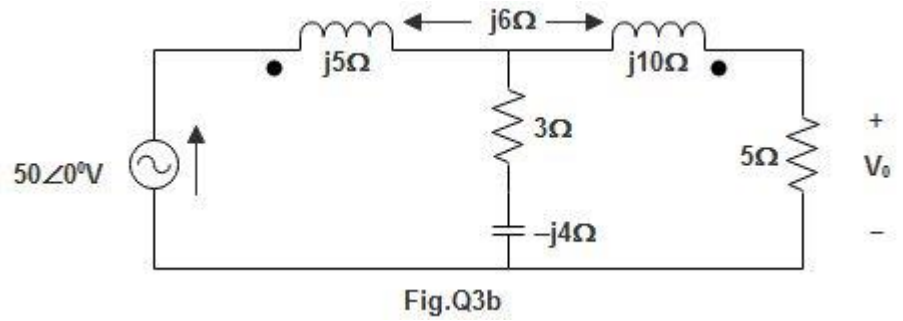


Fig.Q3b

**3c)** Find the inverse Laplace Transform of **(8)**

(i) $F_1(s)=\dfrac{2s}{(s^2+4s+13)}$ (ii) $F_2(s)=\dfrac{1}{(s+5)(s+2)}$ (ii) $F_3(s)=\dfrac{s+5}{s^2+4}$

**4a)** In the network shown in Fig.Q4a, the switch K is closed at t=0. Find, **(6)**

$(i)\, i_1(0^+)$, (ii) $i_2(0^+)$, (iii) $\dfrac{di_1(0^+)}{dt}$ (iv) $\dfrac{di_2(0^+)}{dt}$

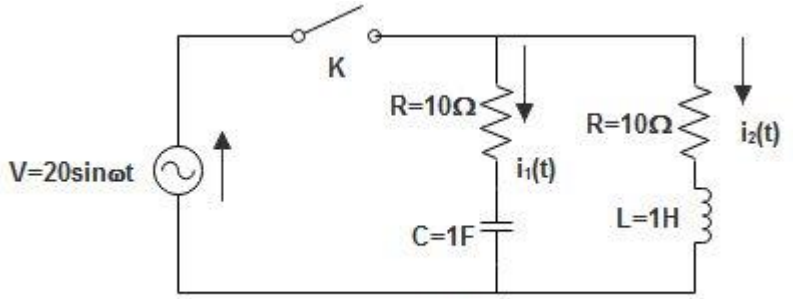


Fig.Q4a

**4b)** For the waveform shown in the Fig.Q4b, obtain its Laplace transform V(s). **(6)**

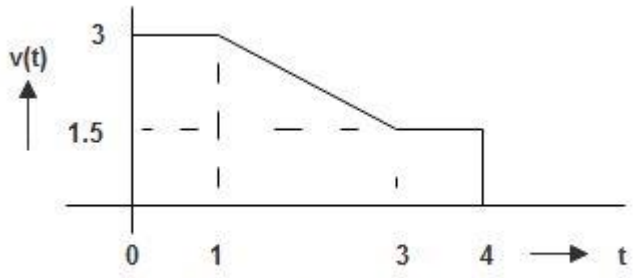


Fig.Q4b

**4c)** For the circuit shown in Fig.Q4c, the switch K was at position "a" to attain the steady state condition. At t=0, switch K is changed from position "a" to position "b". Solve for $V(t)$. **(8)**

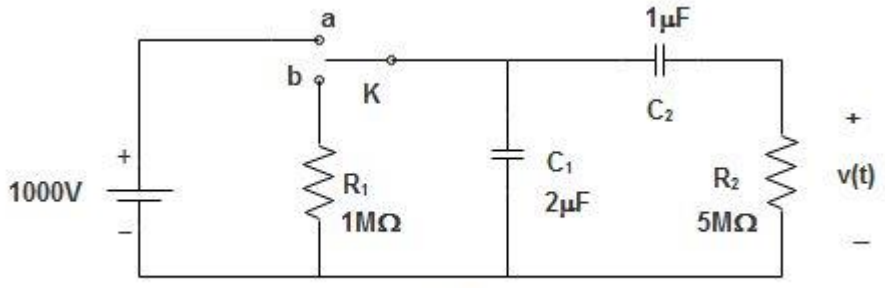


Fig.Q4c

**5a)** Convert h parameters in terms of Y parameters. **(6)**

**5b)** For the network shown in Fig.Q5b, find Z parameters. **(6)**

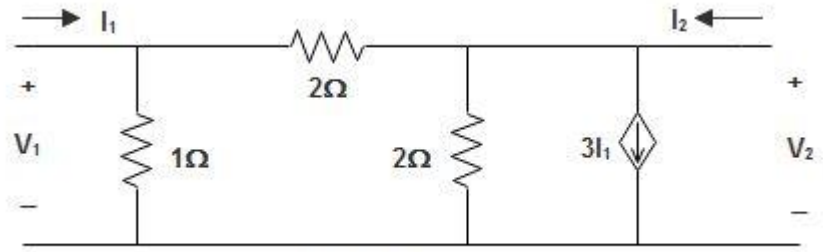


Fig.Q5b

**5c)** For the network shown in Fig. Q5c, find **(8)**

(*i*) $G_{12}(s) = \dfrac{V_2(s)}{V_1(s)}$ (ii) $Z_{12}(s) = \dfrac{V_2(s)}{I_1(s)}$

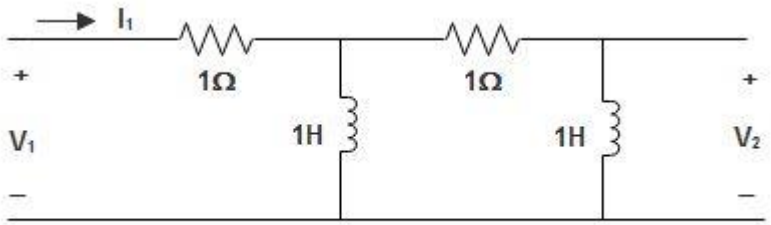


Fig.Q5c