Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
A Constituent Institution of Manipal University

III SEMESTER B.Tech. (BME) DEGREE MAKE-UP EXAMINATIONS DEC/JAN 2016-17

SUBJECT: NETWORK ANALYSIS (BME 2101)
(REVISED CREDIT SYSTEM)
Friday, 30th December 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 currents in all the branches of the resistors. Use mesh current analysis. **(6)**

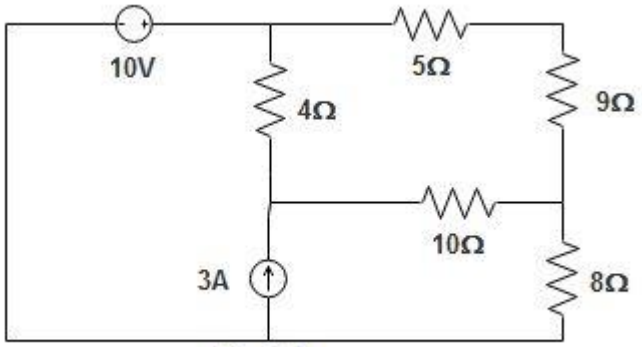

Fig.Q1a

1b) For the network shown in Fig. Q1b, determine the value of R_L so that maximum power is delivered to it. What is the maximum power? **(6)**

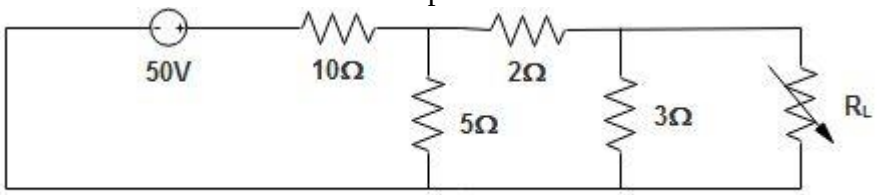

Fig.Q1b

1c) For the network shown in Fig.Q1c, find the voltage v across 3Ω resistor using superposition theorem. **(8)**

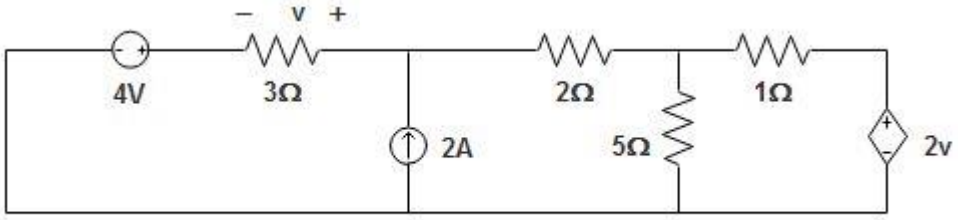

Fig.Q1c

2a) For the circuit shown in fig.Q2a, find the value of R_1 when the circuit resonates. **(6)**

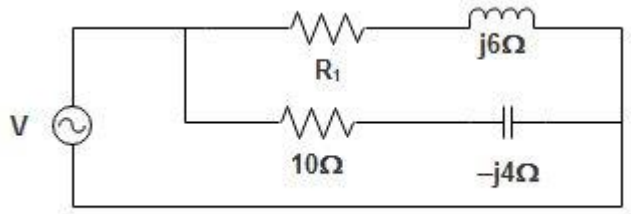

Fig.Q2a

2b) For the circuit shown in Fig.Q2b, Write the two mesh equations. **(6)**

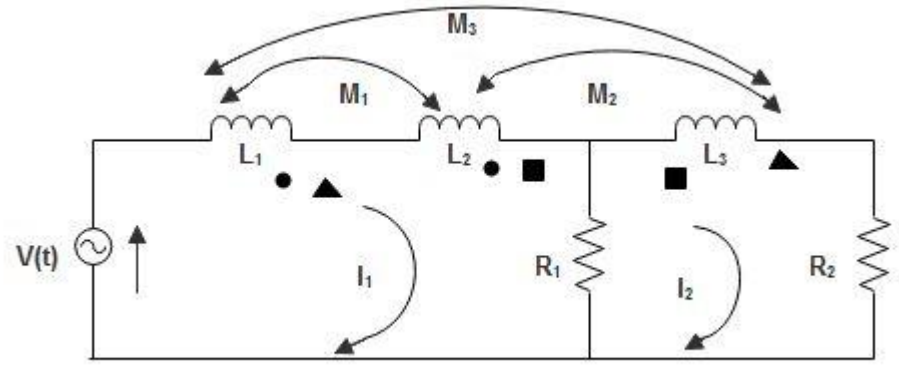

Fig.Q2b

2c) The network shown in the Fig.Q2c, find the current I in 10Ω resistor using Thevenin's theorem. **(8)**

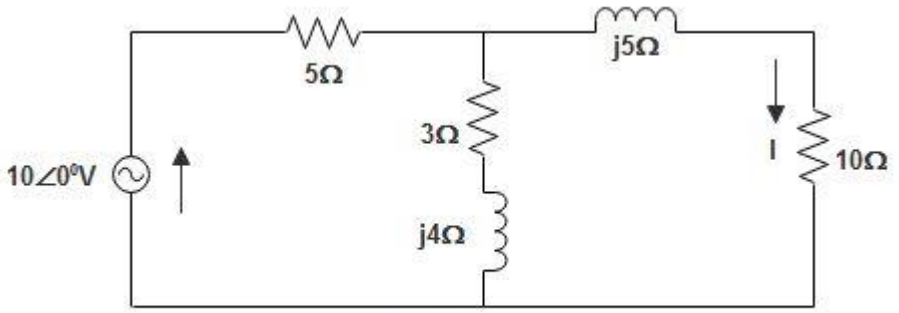

Fig.Q2c

3a) For the network shown in Fig.Q3a, obtain **STAR** equivalent circuit. **(6)**

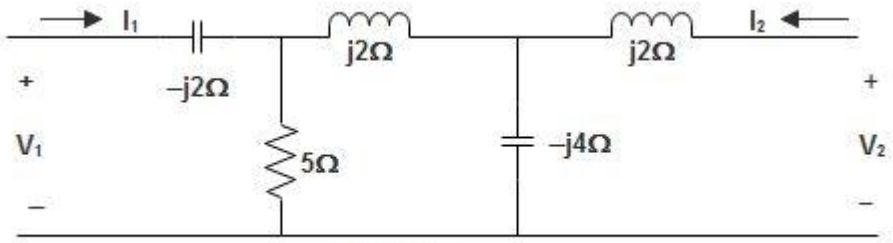

Fig.Q3a

3b) Find the Laplace transform of the following. **(6)**

(i) $f_1(t) = 1 + 2t^3 - 4e^{3t} + 5e^{-t}$

(ii) $f_2(t) = 3\cosh 4t + 4\sin 3t$

3c) State and prove initial value theorem and final value theorem. **(8)**

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

$(i)\,\mathrm{i}\ (0^+)$ (ii) $\frac{\mathrm{di}}{\mathrm{dt}}(0^+)$ (iii) $\frac{\mathrm{d}^2 i}{dt^2}(0^+)$

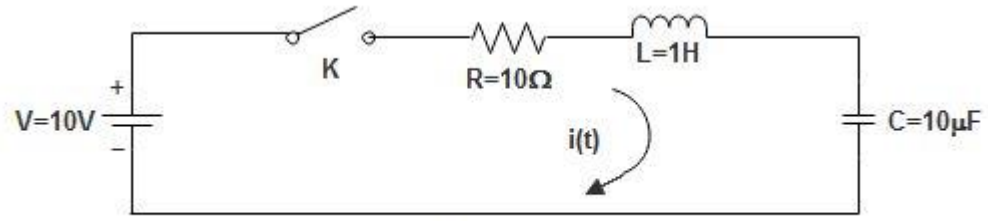

Fig.Q4a

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

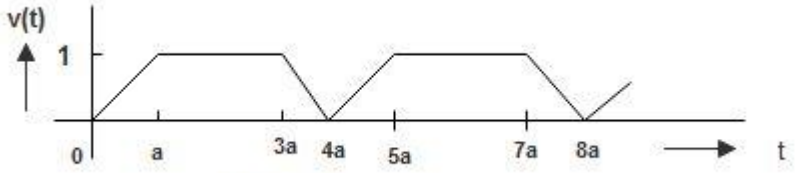

Fig.Q4b

4c) For the circuit shown in Fig.Q4c, the switch K is closed at t=0. With the network parameter values, solve for $i_2(t)$. **(8)**

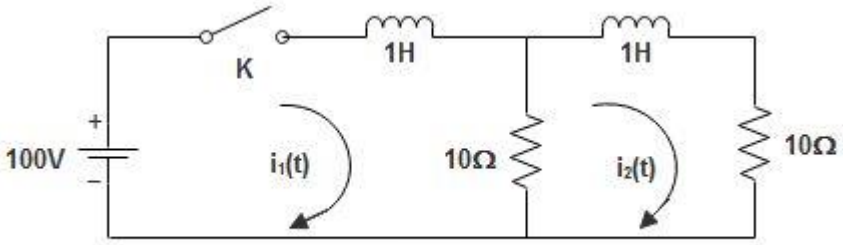

Fig.Q4c

5a) Convert Z parameters in terms of ABCD parameters. **(6)**

5b) For the Twin T network shown in Fig.Q5b, find Y parameters. **(8)**

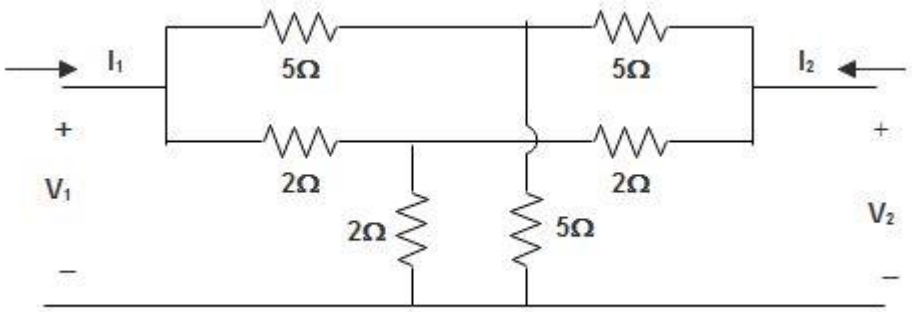

Fig.Q5b

5c) For the network shown in Fig. Q5c, find $G_{12}(s) = \dfrac{V_2(s)}{V_1(s)}$ **(6)**

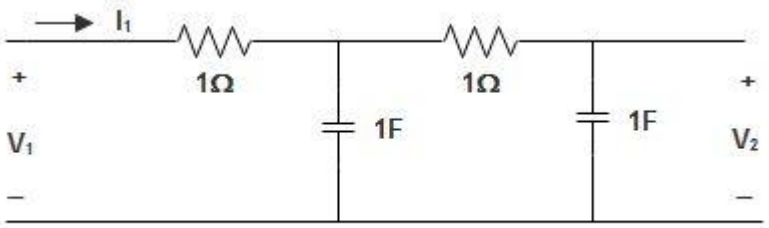

Fig.Q5c