Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

(A constituent unit of MAHE, Manipal 576104)

III SEMESTER B.Tech. (BME) DEGREE END SEM EXAMINATIONS NOV/DEC 2018

SUBJECT: NETWORK ANALYSIS (BME 2101)
(REVISED CREDIT SYSTEM)
Saturday, 24th November, 2018, 9 AM to 12 NOON

TIME: 3 HOURS **MAX. MARKS: 50**

Instructions to Candidates:

1. **Answer ALL questions.**
2. **Draw labeled diagram wherever necessary. Any missing data may suitably be assumed.**

1A) For the circuit shown in **Fig. Q1A,** find the currents in all the branches. Use mesh current analysis. **(3)**

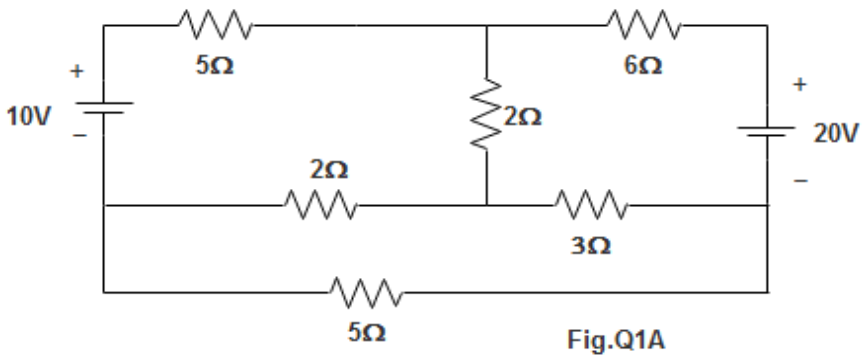

Fig.Q1A

1B) For the circuit shown in **Fig. Q1B**, apply Thevinin's theorem to find the current **I** in **10Ω** resister. Also calculate the power dissipated in it. **(4)**

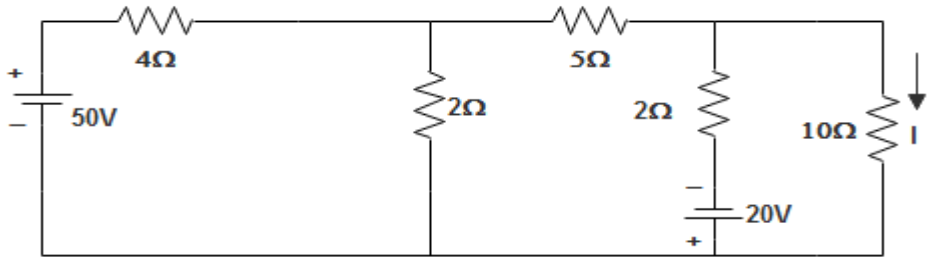

Fig.Q1B

1C) For the network shown in **Fig, Q1C**, obtain delta equivalent circuit. **(3)**

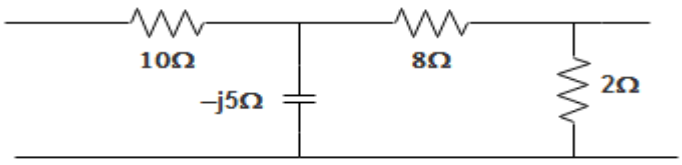

Fig.Q1C

2A) For the circuit shown in **Fig. Q2A**, find the voltage $\mathbf{V_{AB}}$ across **2Ω** resistor using superposition theorem. **(5)**

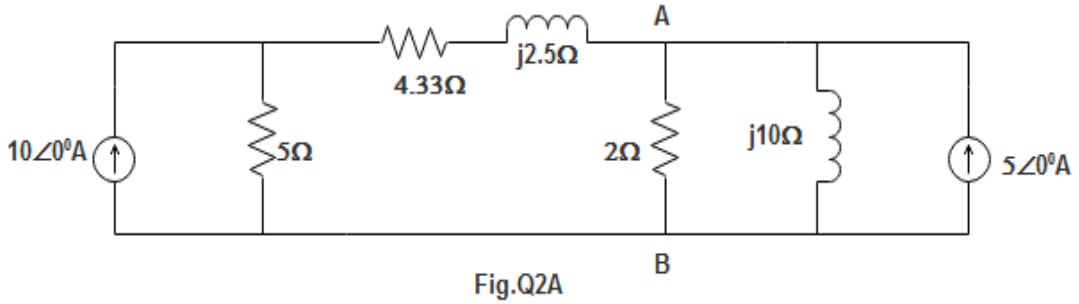

Fig.Q2A

2B) For the network shown in **Fig.Q2B**, the impedance $\mathbf{Z_L}$ is variable in terms of both resistance and reactance. Find the value of $\mathbf{Z_L}$ to get the maximum power in the load. What is the maximum power? **(5)**

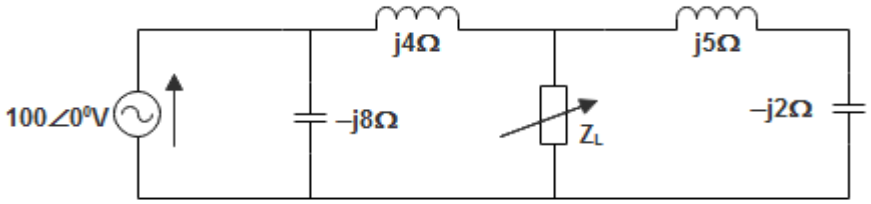

Fig. Q2B

3A) In the network shown in **Fig.Q3A**, the switch K is opened at **t=0**. Given **I=10A, R=50Ω** and **L=1H**, find, **(4)**

$$v(0^+),\ \frac{dv(0^+)}{dt}\ and\ \frac{d^2v(0^+)}{dt^2}$$

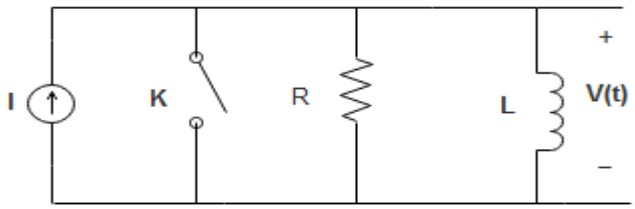

Fig.Q3A

3B) For the circuit shown in **Fig.Q3B**, the capacitor is initially charged to a voltage **Vo=1Volt** for **t<0**. At **t=0**, switch K is closed. Solve for the current ***i(t)*** using Laplace transform and sketch the waveform. **(3)**

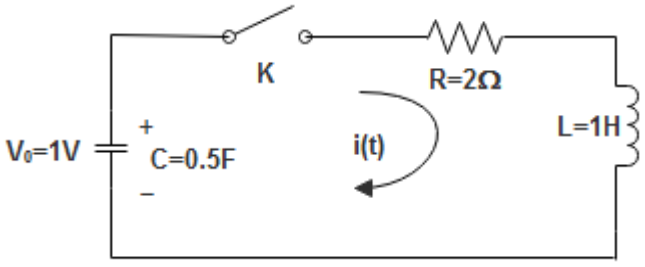

Fig.Q3B

3C) State and prove Initial value theorem and Final value theorem. **(3)**

4A) For the periodic waveform ***f(t)*** shown in **Fig.Q4A**, obtain its Laplace transform ***F(s)***. **(3)**

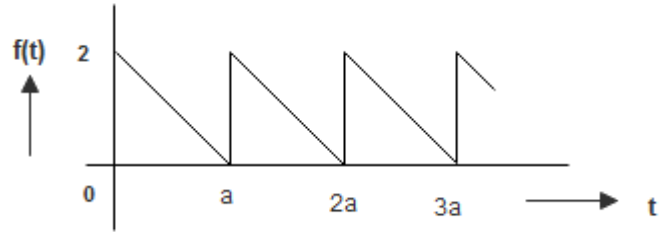

Fig.Q4A

4B) Convert **Z** parameters in terms of **h**-parameters. **(3)**

4C) The circuit shown in **Fig.Q4C**, a resistive T and resistive π networks connected in parallel. For the elements values given. Determine Y parameters. Then obtain the Z parameters by using conversion method. **(4)**

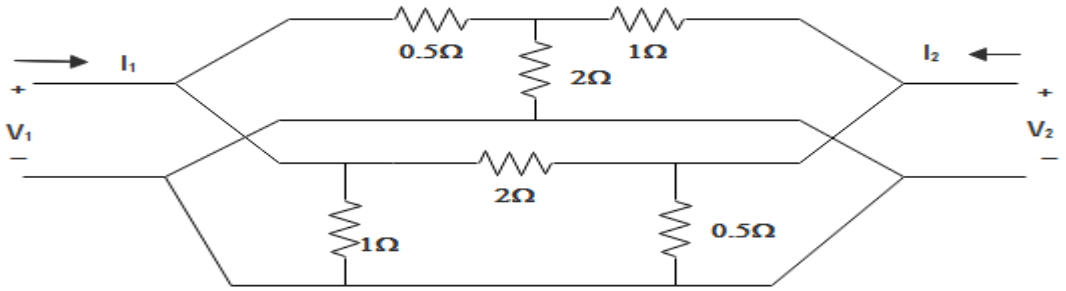

Fig.Q4C

5A) For the network shown in **Fig. Q5A**, find the expressions of, **(5)**

$(i)\ G_{12}(s)=\frac{V_2(s)}{V_1(s)}$ (ii) $Z_{12}(s)=\frac{V_2(s)}{I_1(s)}$ (iii) $\alpha_{12}(s)=\frac{I_2(s)}{I_1(s)}$

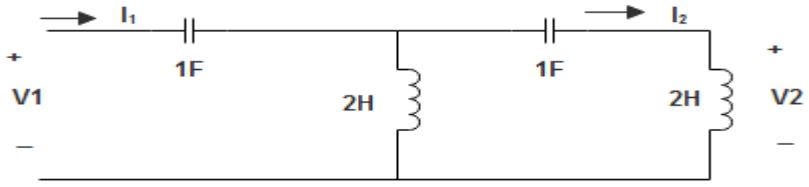

Fig.Q5A

5B) For the circuit shown in the **Fig.Q5B**, the pulse ***Vi*** is applied to the **RC** circuit. Derive the expression for output ***Vo*** and sketch the waveform indicating all the voltage levels. Also prove by direct integration that the sum of area of output ***Vo*** above and below the zero axis is zero. **(5)**

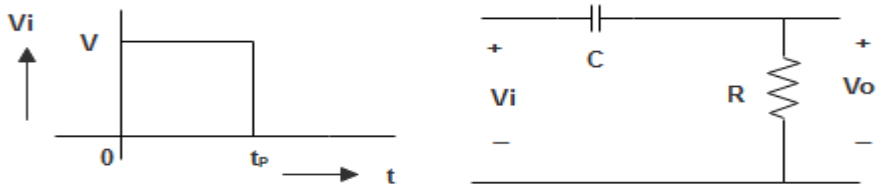

Fig.Q5B