(Pages : 4) **A – 6586**

Reg. No. : .....

Name : .....

Third Semester B.Tech. Degree Examination, October 2016
(2013 Scheme)
13.303 : NETWORK ANALYSIS (AT)

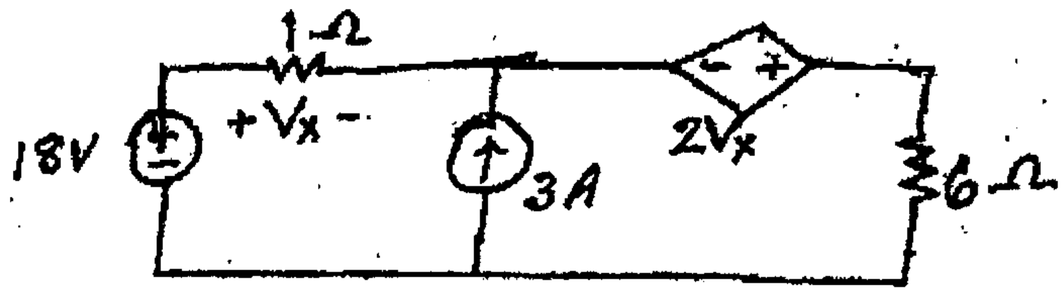
Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **2** marks.

1. Explain the fundamental cut-set matrix taking a suitable example.

2. Calculate the current through 6 Ω resistance in the following circuit.

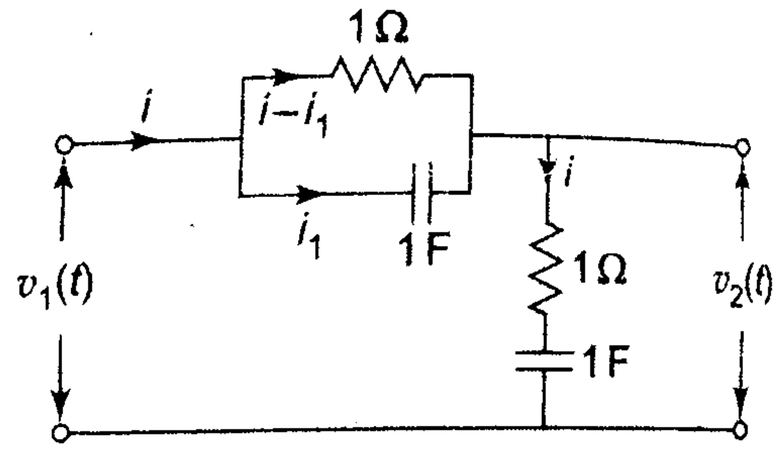


3. Plot the following functions :
   a) u (t – 6) + u (t – 4)
   b) (t – 4) [(t – 1) – u (t – 4)].

4. State the final-value theorem of Laplace Transform and find the final value of the function $f(t) = 5u(t) + 10e^{-t}$ using final-value theorem.

5. For the following network function, draw the pole zero diagram and hence, obtain the time domain response. $I(S) = \frac{5s}{(s+3)(s^2+2s+2)}$.

6. Obtain the Transfer function of the following network.



P.T.O.

7. Define and explain propagation constant and characteristic impedance.

8. A coil is represented by series combination of inductance L = 50 mH and resistance R = 15Ω . Calculate the quality factor of the circuit at 10 KHz.

9. Check the positive realness of the following functions

   a) $\frac{2s+4}{s+5}$ b) $\frac{s^2+2s+4}{(s+3)(s+1)}$

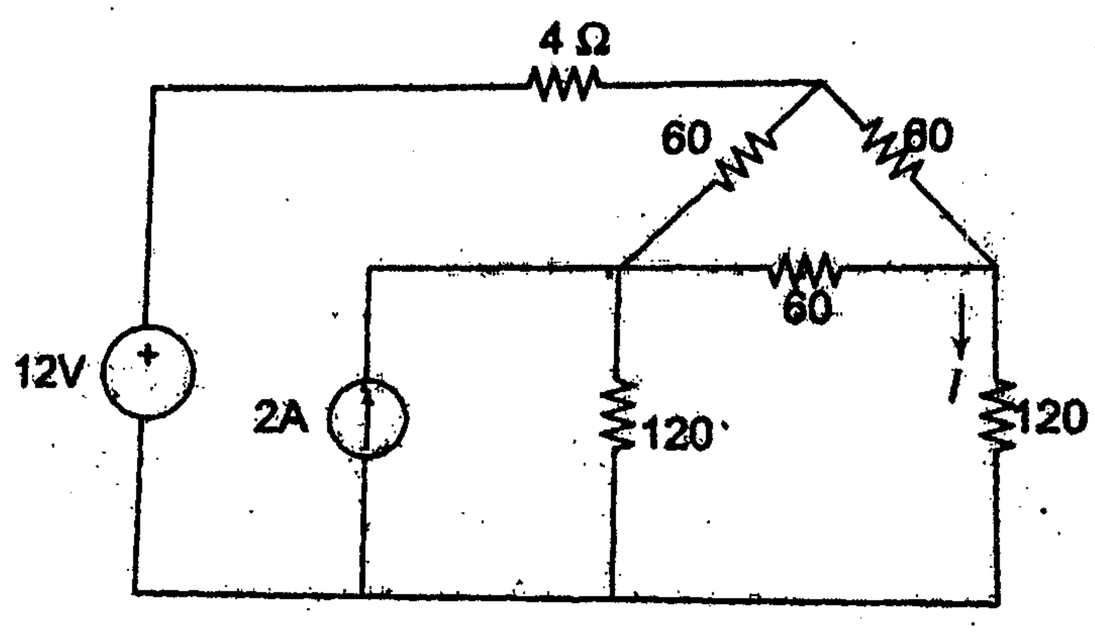
10. Analyse the frequency response of reactive one-port network with two external zeros.

PART – B

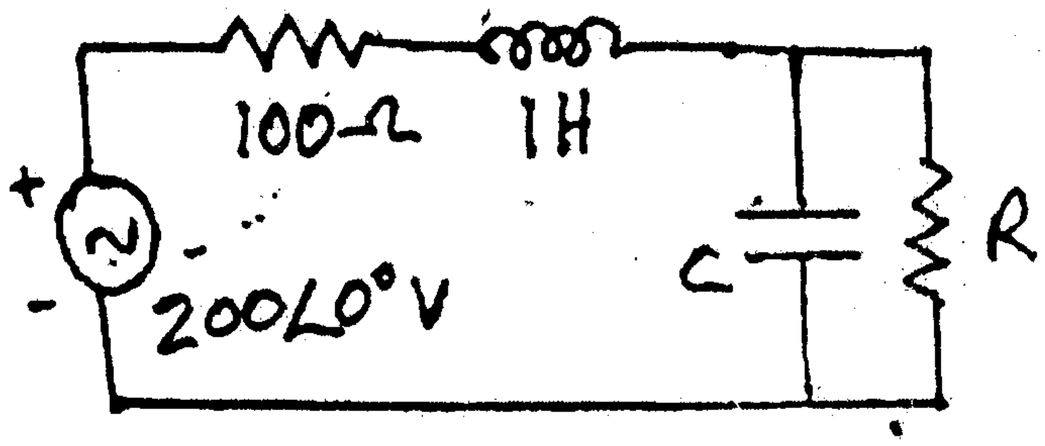
Answer **any one** question from **each** Module. **Each** question carries **20** marks.

Module – I

11. a) Using nodal analysis, find the current 'I' in the following network.

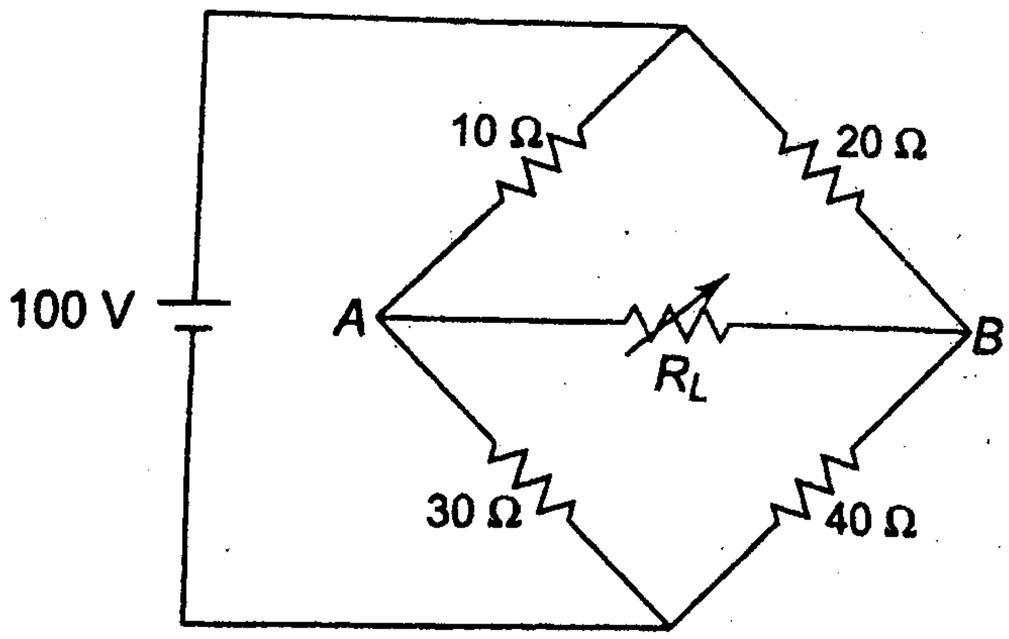


b) Determine the value of R and C so that maximum power is absorbed by R at angular frequency 200 rad/sec. in the following network.



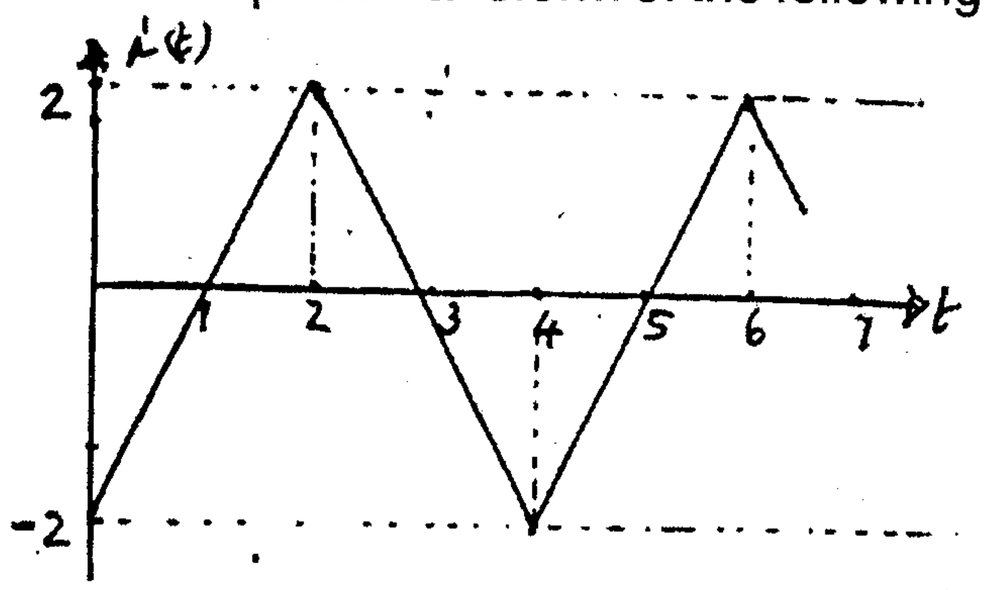
12. a) State and prove maximum power transfer theorem.

b) Determine the load resistance to receive maximum power from the source in the following circuit ; also find out the maximum power delivered to the load.

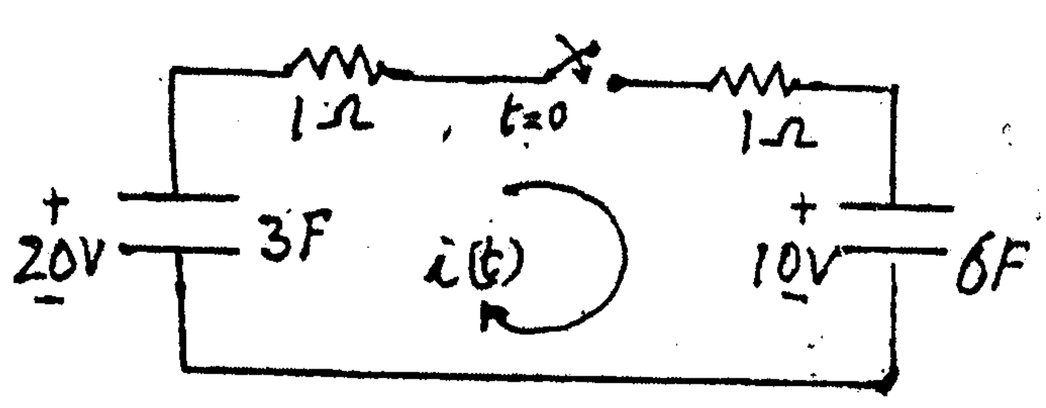


Module – II

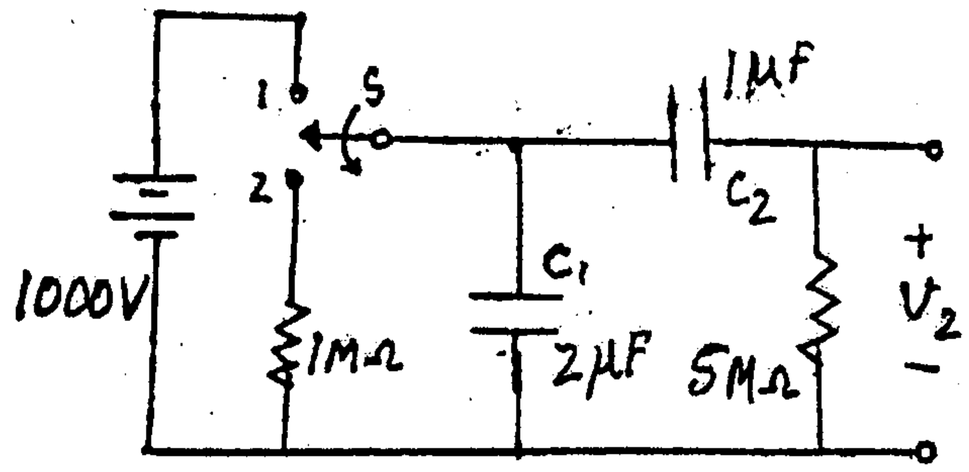
13. a) Find the Laplace transform of the following periodic triangular wave.



b) In the following network, the switch is closed at t = 0 with capacitance initially energised to the voltages shown in the figure. For the numerical values given, find the expression for the loop current i(t).

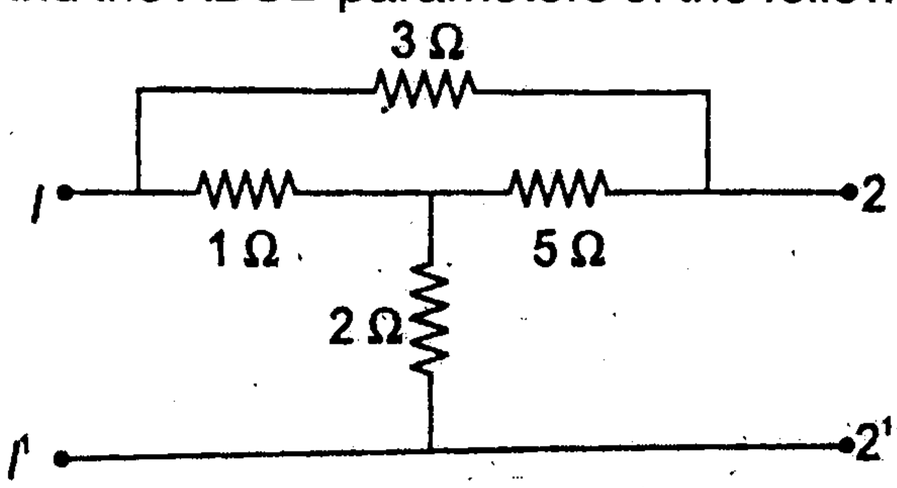


14. In the following network, the switch is in position – 1 for long enough to establish steady state condition and at t = 0, it is switched to position – 2. Find the resulting voltage v_2 across 5 MΩ resistor.

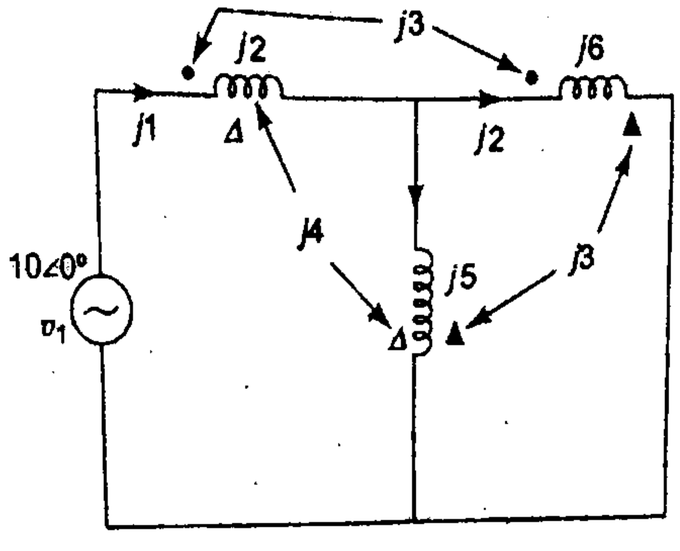


Module – III

15. Find the ABCD parameters of the following network.



16. Write the Mesh equation of the following network.



Module – IV

17. A function is given by $Z(s) = \frac{(s^2+1)(s^2+16)}{s(s^2+4)}$. Realise it in the first order and second order form of foster LC forms.

18. Find the two Cauer realization of driving-point function given by

$$Z(s) = \frac{10s^4 + 12s^2 + 1}{2s^3 + 2s}$$