Total No. of Questions – [8] Total No. of Printed Pages-3

G.R. No.	

U218-136(ESE)

DECEMBER 2018/ENDSEM

S. Y. B. TECH. (E & TC) (SEMESTER - I)

COURSE NAME: NETWORK THEORY

COURSE CODE: ETUA21176

(PATTERN 2017)

Time: [**2 Hours**] [Max. Marks: **50**]

(*) Instructions to candidates:

1) **Answer Q.1, Q.2, Q.3, Q.4, Q.5 OR Q.6, Q.7 OR Q.8**
2) **Figures to the right indicate full marks.**
3) **Use of scientific calculator is allowed**
4) **Use suitable data wherever required**

Q1 a) For the circuit of Fig 1. below, determine all four nodal voltages. [6]

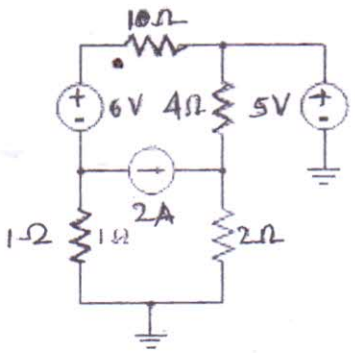


FIG. 1

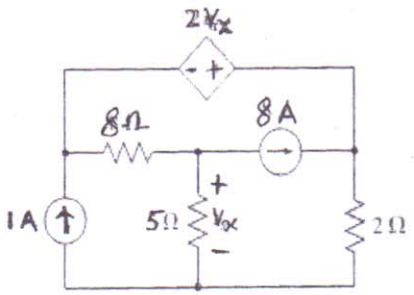


FIG. 2

OR

Q1 b) Determine the voltage Vx in the circuit of Fig 2, and the power supplied by the 1 A source. [6]

Q2 a) Find the current through branch ab of the netwrok in figure 3 using thevenin's theorem. Let V=10 V [6]

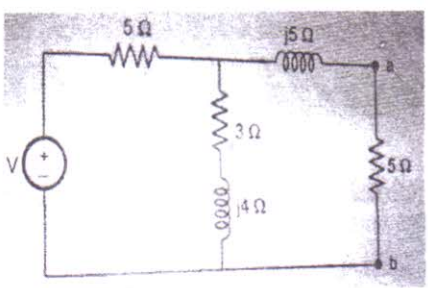


FIG. 3

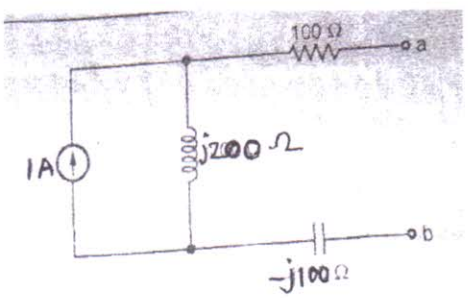


FIG. 4

OR

Q2 b) Determine the impedance to be connected at ab for maximum power transfer. Also determine power delivered to the load impedance at ab. Refer figure 4 [6]

Q3 a) An inductor coil having resistance 20 ohm and an inductance 0.02 H is connected in series with a capacitor of 0.02 micro farad. Determine Quality factor of the coil, Resonant Frequency and two half power frequencies. [6]

OR

Q3 b) Refer following Fig 5. Determine resonant frequency , Impedance of the antiresonant circuit Zar and resistance Rg for maximum power transfer. What is the relation between BW of the circuit at Max.Power transfer and BW with Rg=0? (L=1.284 mH, R=2.23Kohms, C=10pF) [6]

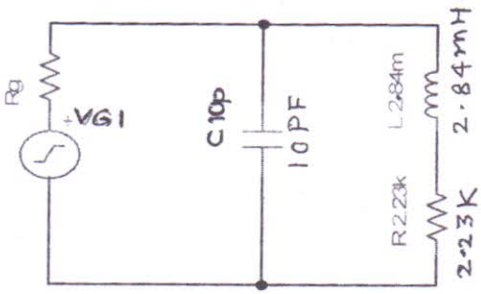


FIG. 5

Q4 a) The network shown in fig. 6 has acquired the steady state with switch closed for t <0. The switch is opened at t=0. Obtain the equation for i(t) [4]

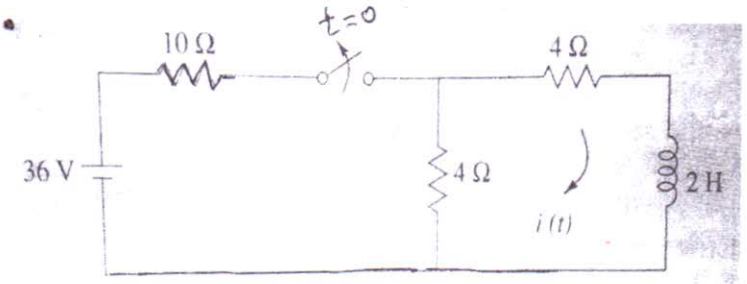


FIG. 6

OR

Q4 b) In network the switch is moved from a to b at t=0 find v(t). Refer fig 7 [4]

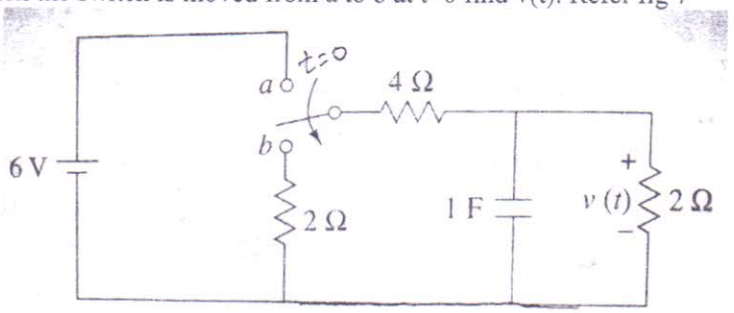


FIG 7

Q5 a) Determine Z parameters for the following network (Fig 8) [6]

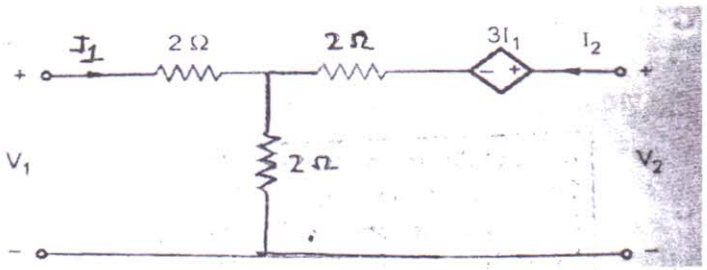


FIG 8

b) Plot pole zero plot for driving point impedance for the network shown in fig 9 [4]

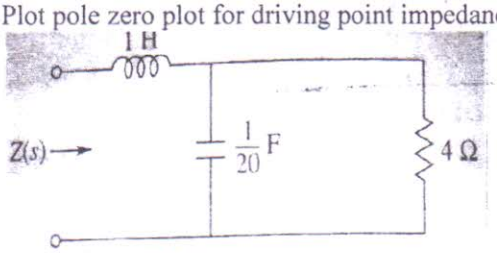


FIG 9

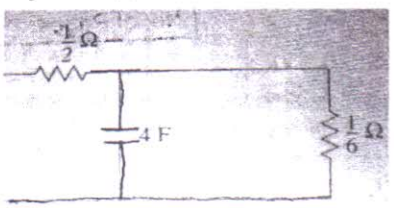
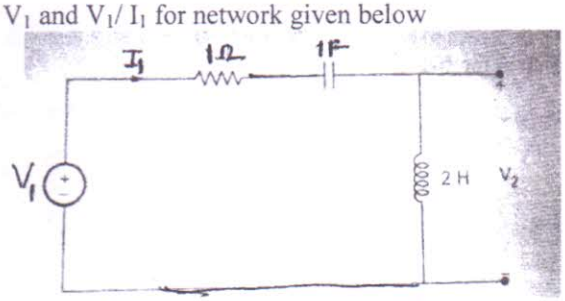


FIG 10

c) Determine Y(s) i.e. driving point admittance for the network shown in fig 10. [4]

OR

Q6 a) Determine V_2/ V_1 and V_1/ I_1 for network given below [6]



b) Derive the expressions for Z parameters in terms of Y parameters [4]

c) Determine transmission parameters for T network consisting of each series arm 100 ohm and shunt arm 200 ohm [4]

Q7 a) In constant K LPF, Each series arm consists of inductor of 60mH and shunt arm consists of capacitor of 0.2 micro farad. Determine design impedance, cut off frequency, Characteristics impedance Z_{0T} at 1 KHz and ratio of phase constant at 1KHz and phase constant at 5KHz [6]

b) Draw the characteristics curves for attenuation constant, phase constant and characteristics impedance Z_{0T} for LPF and BPF [4]

c) Derive the expression for Characteristics impedance of Symmetrical T network [4]

OR

Q8 a) Design a constant K Band pass filter with cutoff frequencies 4KHz and 10 KHz with design impedance , 500 ohms. [6]

b) For prototype T network with each series arm $Z_1/2$ and shunt arm Z_2 Prove that $Z_0 = \sqrt{Z_{OC}Z_{SC}}$ [4]

c) Design T attenuator for 20dB attenuation and design impedance 600 ohms [4]