Total No. of Questions – [8]

Total No. of Printed Pages- 3

G.R. No.	

Paper code- U218-136 (BE-FS)

MAY 2019/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]

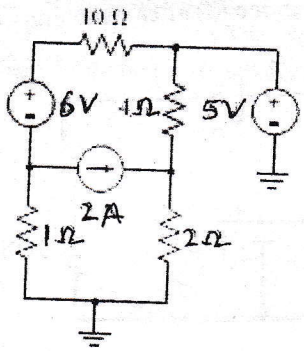


FIG. 1

OR

b) Determine all mesh currents. (Refer figure 2) [6]

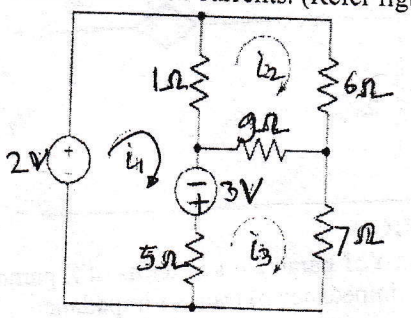


FIG. 2

Q2 a) Obtain thevenin's equivalent network for the following network (**FIG. 3**) [6]

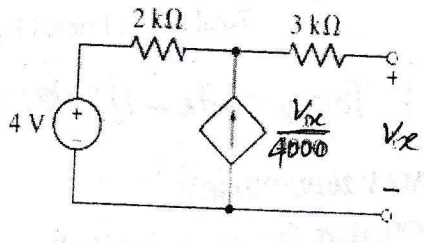


FIG. 3

OR

b) State and prove maximum power transfer theorem for reactive load. State its applications (any two). [6]

Q3 a) A parallel resonant circuit has an inductor 0.1 H with quality factor 5. Determine the capacitance and the coil resistance at resonant frequency 100 Hz. Also find the impedance at resonance. [6]

OR

b) Define Quality factor. Draw the frequency response for series resonant circuit and Prove that under resonance, the series-resonant circuit amplifies the voltage. [6]

Q4 a) Describe the concept and physical significance of complex frequency. [4]

OR

b) In the following circuit the switch is moved from position 1 to 2 at t=0. Prior to this the steady state was reached. Determine i(t) after switching . **(FIG. 4)** [4]

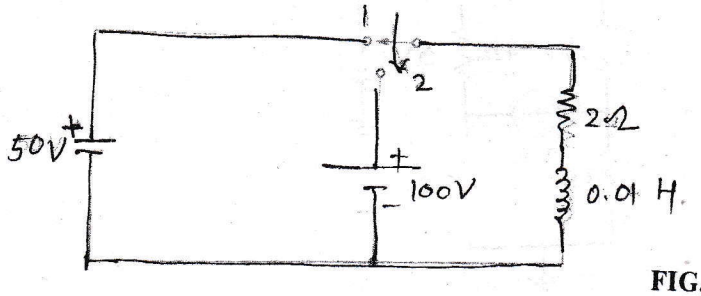


FIG.4

Q5 a) Determine Z parameters Z11 and Z22 for the following network (Fig5) [6]

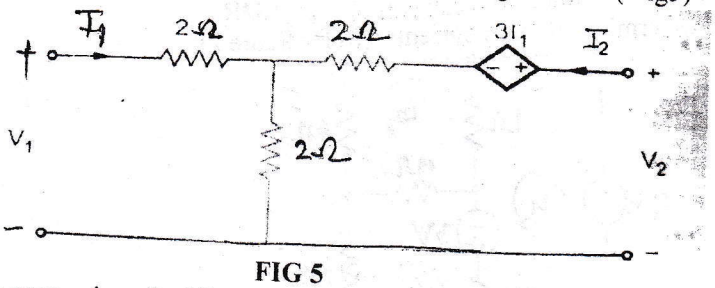


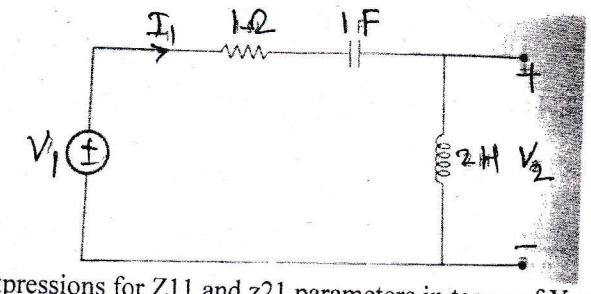
FIG 5

b) Derive the expressions for Y11 and Y21 parameters in terms of Z parameters [4]

c) Describe in details a) driving point impedance b) transfer impedance [4]

OR

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



b) Derive the expressions for Z11 and z21 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) Design a constant K Band pass filter with cutoff frequencies 4000 Hz and 10,000 Hz with design impedance , 0.5 k 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) Derive the expression for Characteristics impedance of Symmetrical T network [4]

OR

Q8 a) In constant K LPF, Each series arm consists of inductor of 0.06 H and shunt arm consists of capacitor of 200 nano farad. Determine design impedance, cut off frequency, Characteristics impedance Z_{oT} at 1 KHz. [6]

b) What are constant K filters? Draw the curve for attenuation and phase constant of constant k LPF. [4]

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