G.R. No.

Paper Code - U218-136 (BE-FF)

MAY 2019/ENDSEM

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

COURSE NAME: NETWORK THEORY

COURSE CODE: ETUA21176
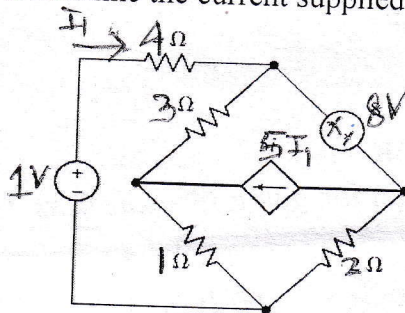
(PATTERN 2017)

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
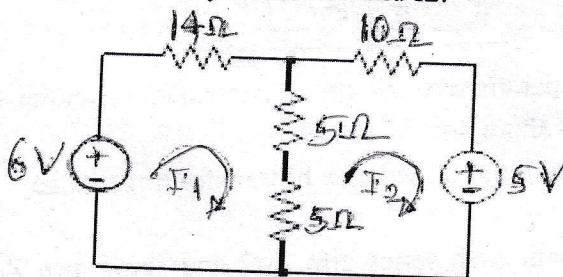
Q.1 a) Determine the current supplied by 1V source   [6]

OR

b) Using mesh analysis find I1 and I2.   [6]

Q.2 a) State and prove Thevenin's theorem with the help of suitable example.   [6]

OR

b) State and Describe Superposition theorem with help of suitable example.   [6]

Q.3 a) Compare series and parallel resonance (six points).   [6]

OR

b) A parallel resonant circuit has an inductor with Figure of merit, 5. Determine [6]
the inductance and capacitance if the circuit impedance is 100 ohms at
resonant frequency 1500 KHz. Also find its bandwidth.

Q.4 a) Determine Laplace transform for the following functions 1) $\sin(\omega t)$ 2) e^{-at} [4]

OR

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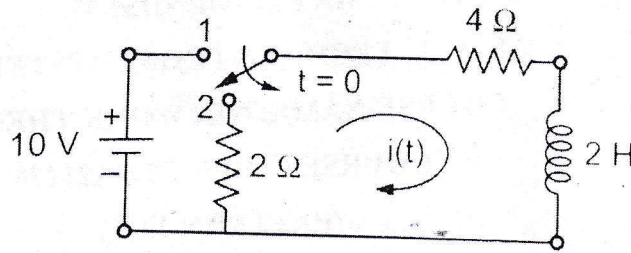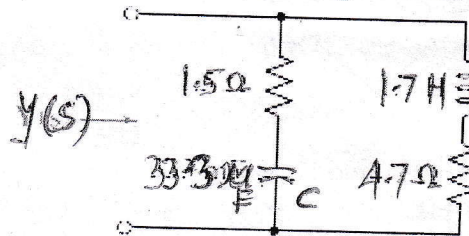

Q.5 a) Derive A, B and C parameters in terms of Z parameters [6]

b) Determine Z11 and Z22 parameters for the T network consisting of each [4] series arm of 100 ohms and shunt arm of 100 ohm.

c) Determine driving point impedance Zin for the following network [4]
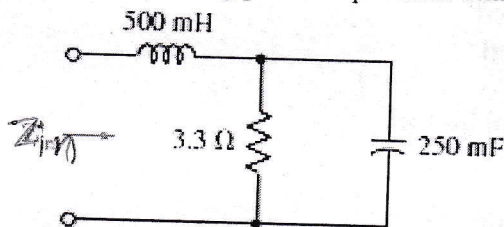
OR

Q.6 a) Specify the poles and zeros of Y(s) for given circuit. C is 333 μF [6]

b) Determine Y11 and Y22 parameters for the T network consisting of each [4] series arm of 100 ohms and shunt arm of 100 ohm.

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

Q.7 a) For prototype T network with each series arm $Z_1/2$ and shunt arm Z_2 Prove [6] that $Z_0 = \sqrt{Z_{oc}Z_{sc}}$

b) Derive the expression for cut off frequency of LPF [4]

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

OR

Q.8 a) Design a constant K low pass filter with cutoff frequency 1000 Hz with [6] design impedance Ro , 100 ohms

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

c) Define quality factor of the filter. How it affects the bandwidth of the filter? [4]