Registration No : | | | | | | | | | | |

Total Number of Pages : 03

B.Tech

PEE3I101 / PEI3I104 / PEL3I101 / PET3I102

3rd Semester Back Examination: 2021-22

NETWORK THEORY

BRANCH(S): ELECTRICAL / AEIE, EIE / EEE, ECE / ETC

Time : 3 Hour

Max Marks : 100

Q.Code :OF608

Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.

The figures in the right hand margin indicate marks.

Part-I

Q1 **Answer the following questions :** (2×10)

a) State Tellegence theorem.

b) For a circuit with R=4 Ω, L=25mH, C=150μF in series. Calculate the band width.

c) The Z-parameters of a two-port network are given as Z_{11}=5Ω, Z_{22}=7Ω, Z_{12} =Z_{21}=3Ω. Find the A,B,C,D parameters.

d) State initial and final value theorem.

e) Prove that the efficiency of maximum power transfer theorem is 50%.

f) Determine h-parameters, in terms of given Y –parameters Y = $\begin{bmatrix} 0.1 & 0.1 \\ 0.4 & 0.5 \end{bmatrix}$

g) Write down the properties of series RC impedance function.

h) State Superposition theorem with an example.

i) Test the polynomial $2s^4 + 5s^3 + 6s^2 + 3s + 1$ for Hurwitz character.

j) Find the equivalent inductance across the input terminals of Fig.1 , having L_1 = 1 H, L_2 = 2 H and M = 0.5 H

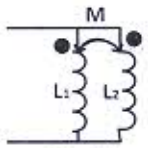

Fig.1

Part-II

Q2 **Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)** (6×8)

a) Apply Millman's theorem to find the current in the load resistor (R_L =5Ω) in the circuit shown in Fig.2 .

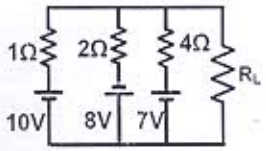

Fig.2

b) Draw the pole-zero diagram of the given function V(s) and determine

$$v(t).\mathbf{V(s)} = \frac{4S}{(S+2)(S^2+2S+2)}$$

c) Derive the condition for reciprocity and symmetry in terms of ABCD parameters for a 2-port network.

d) What is Initial value theorem and Final Value Theorem? Also find the initial and final value of the function f(t), whose Laplace Transform is given as .

s

e) Find the trigonometric Fourier series of the waveform shown in Fig. 3. Draw the magnitude and phase spectrum.

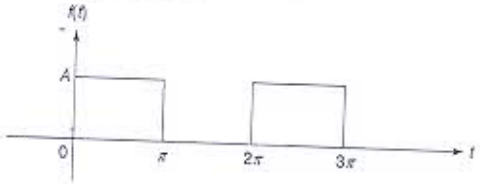

Fig.3

f) A resistor and a capacitor are in series with a variable inductor when the circuit is connected to a 200 V,50 Hz supply ,the maximum current obtained by varying the inductance is 0.314 A . The voltage across the capacitor is then 300 V. find the
circuit constants?

g) Check whether the following function is positive real or not.

$$F(S) = \frac{S^2+10S+4}{S+2}$$

h) Design a constant K band pass filter with cut off frequencies of 3KHZ and 7.5 KHZ and nominal characteristic impedance of 900 Ω.

i) A circuit consists of a non inductive resistor of 10 Ω ,an inductor of 0.1H and capacitor of 8μF in series. Calculate (a) the resonant frequency (b) current at resonant frequency (c) the voltage across each component when a voltage of 25V at resonant frequency is applied to the whole circuit.

j) In the network of Fig.4 shown, the switch is moved from the position 1 to 2 at t = 0, steady-state condition having been established in the position 1. Determine i (t) for t > 0.

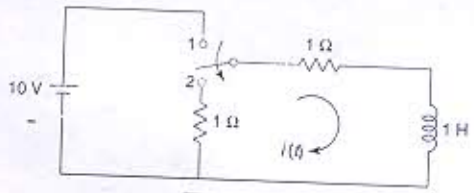

Fig.4

k) Using superposition theorem determine the voltage across the (2 + j5) ohm impedance for the network shown in Fig.5.

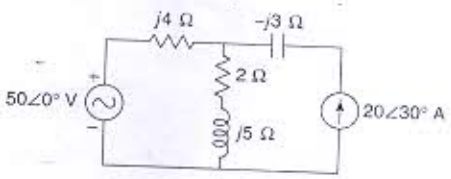

Fig.5

l) Two impedances Z_1=20 + j10 and Z_2=10-j30 are connected in parallel and this combination is connected in series with Z_3=30+jX. Find the value of X