4E4172

Roll No. _____ [Total No. of Pages : 4

4E4172

B.Tech. IV Semester (Main/Back) Examination, May - 2018

Electrical Engg.

4EE2A Circuit Analysis - II

Time : 3 Hours **Maximum Marks : 80**

Min. Passing Marks : 26

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitable be assumed and stated clearly.) Units of quantities used/calculated must be stated clearly.*

Unit - I

1. a) Explain the physical interpretation of complex frequency. **(8)**

b) In the series RLC circuit shown in figure (I), the switch k is being held in position 'a' until a current I_0 flow in the inductor and the capacitor is charged to voltage v_0. After steady conditions have been reached, the switch is thrown to position 'b' which connects the circuit to a voltage source v_1 (t).

i) Draw the transform network, showing the initial condition

ii) Find the expression for current I(s). **(8)**

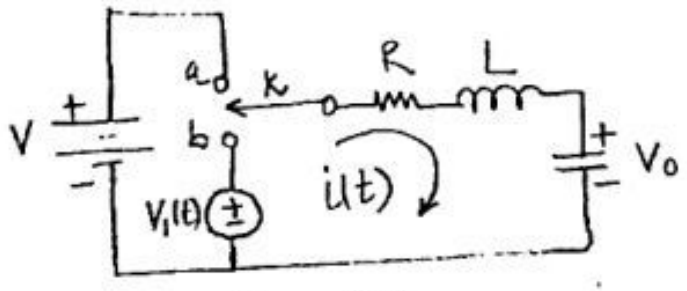

Figure (I)

OR

1. a) Find the transform admittance of the network shown in figure (II). **(8)**

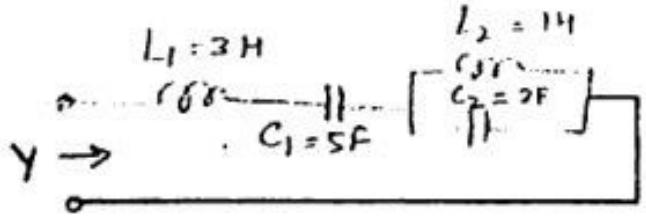

Figure II.

b) For the network shown in figure III, assuming all initial conditions to be zero, draw the transform network. Also the simplified transform network obtained by the combinations of various impedances and/or admittances and therefore obtain I(s). **(8)**

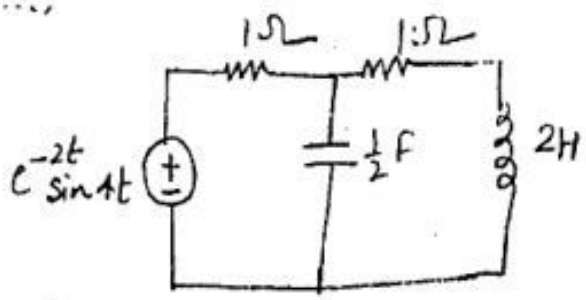

Figure III.

Unit - II

2. a) A current transfer function is given by $I(s) = \dfrac{5s}{(s+2)(s^2+2s+2)}$ obtain time response. **(8)**

b) Check the stability of the following polynomial by applying Routh Hurwitz criterian $P(s) = s^4 + 2s^3 + 4s^2 + 12s + 10$. **(8)**

OR

2. a) Determine the voltage transfer Ratio of the circuit shown in figure IV. **(8)**

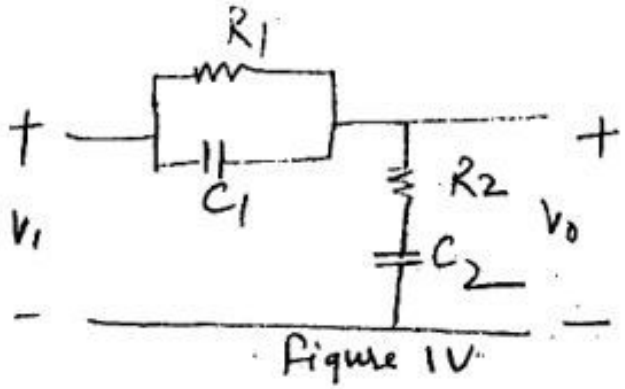

Figure IV

b) Calculate transfer impedance of the circuit shown in figure V. **(8)**

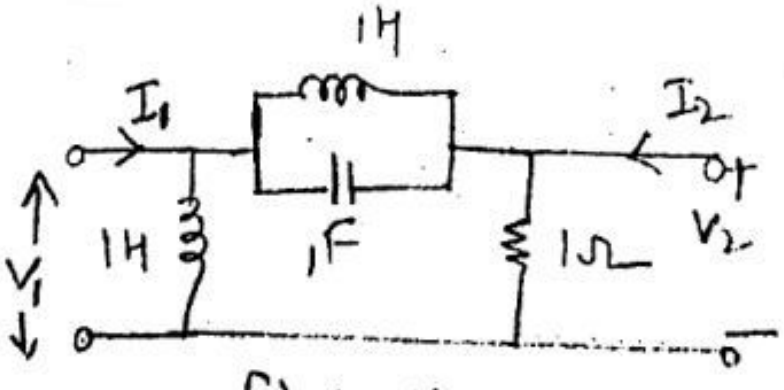

figure V.

Unit - III

3. a) Check whether the given function is PR function or not?

$$Z(s) = \frac{s^3 + 5s^2 + 9s + 3}{s^3 + 4s^2 + 7s + 9}$$ (8)

b) Find the foster-I form of the given function $Z(s) = \frac{2(s+2)(s+4)}{(s+1)(s+3)}$ (8)

OR

3. Obtain foster I and foster II form for $Z(s) = \frac{s(s^2+4)}{(s^2+1)(s^2+9)}$. (16)

Unit - IV

4. a) What do you mean by image impedances? Explain derive the expression for image parameter in terms of ABCD parameters. (8)

b) Convert the following:

i) ABCD parameter into h parameter.

ii) Z parameter into ABCD parameter. (8)

OR

4. a) Derive the condition of reciprocity and symmetry in two port parameter for ABCD parameter. (8)

b) For the Lattice Network shown in figure V_1. Find Z parameters. (8)

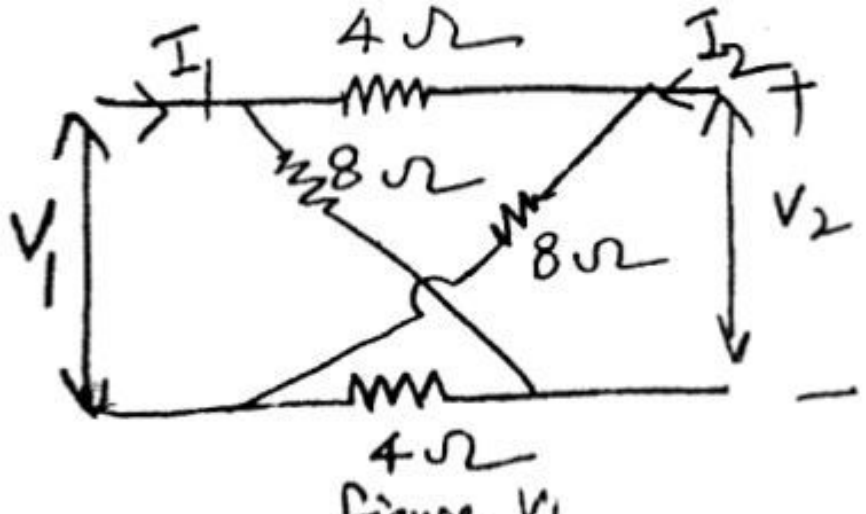

Figure V1

Unit - V

5. a) Derive all the characteristics for constant k filters.

   i) Low pass filter

   ii) High pass filter **(8)**

   b) Design a constant k, T section high pass filter having cut off frequency of 10KHz, design impedance $R_0 = 600\Omega$ find its charactestic impedance and phase constant at 25 KHz. **(8)**

OR

5. a) Derive all the characteristics for constant k filters

   i) Band pass filter

   ii) Band elimination filter **(8)**

   b) Derive m derived T and π section of low pass filter having a design impedance of 600Ω a cut off frequency of 2000HZ and a frequency of infinite attenuation $f\infty = 2100\,\text{HZ}$. **(8)**
