3E1493

Roll No. _____ [Total No. of Pages : 6

3E1493

B.Tech. IIIrd Semester (Main/Back) Examination, Feb. - 2011
Electronics & Communication (Common for Main & Back of 3EC3, 3AI3, 3EI3 and Back, Old Scheme of 3EC3)
Circuit Analysis and Synthesis

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

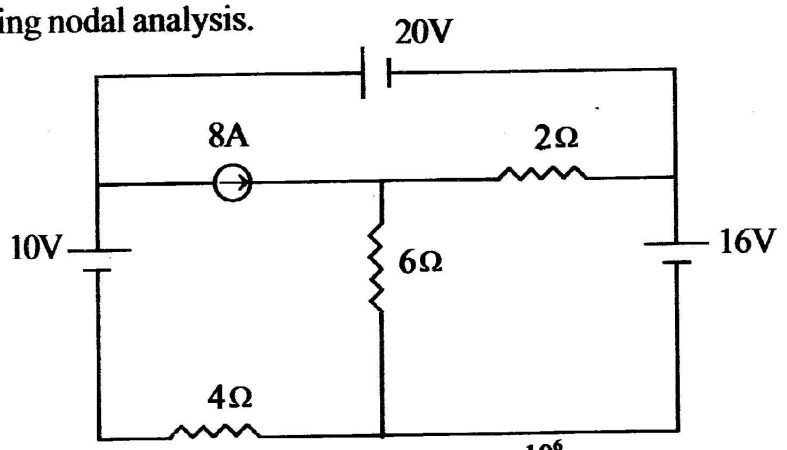
Min. Passing Marks : 24

Instructions to Candidates:

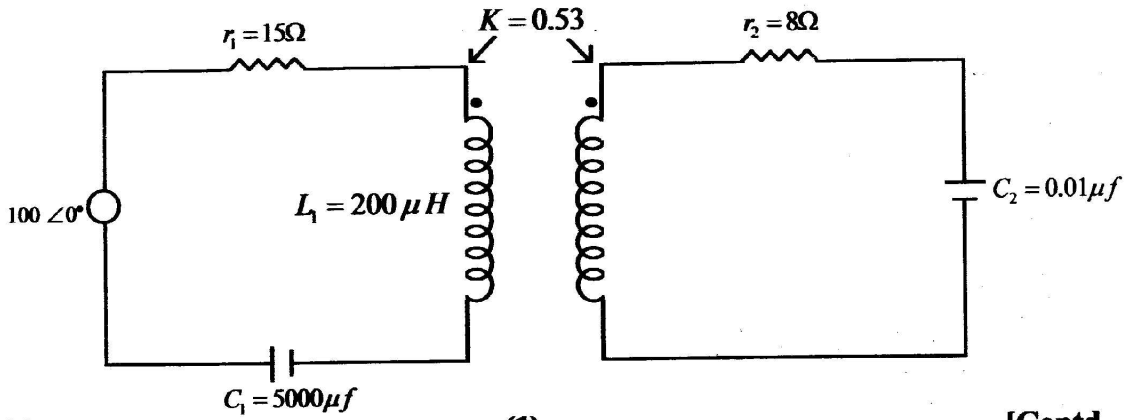
*Attempt any **five** questions, selecting **one** question from **each** unit. All questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.)*

Unit - I

1. a) Find current in 6Ω resistance in fig using mesh analysis and verify the result using nodal analysis. **(8)**

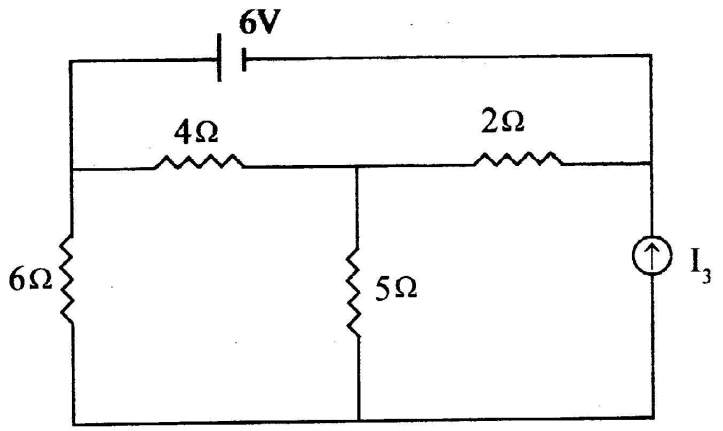


b) A voltage of 100V at a frequency of $\frac{10^6}{2\pi}$ Hz is applied to the primary of coupled circuit. Calculate primary and secondary current. **(8)**

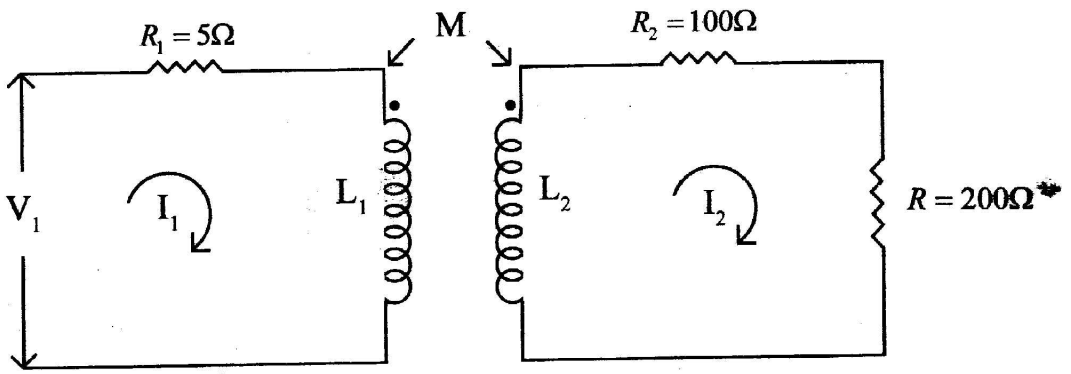


OR

a) Find out the current in 5Ω resistance using Node Voltage Analysis and verify the result using Mesh Analysis. **(8)**

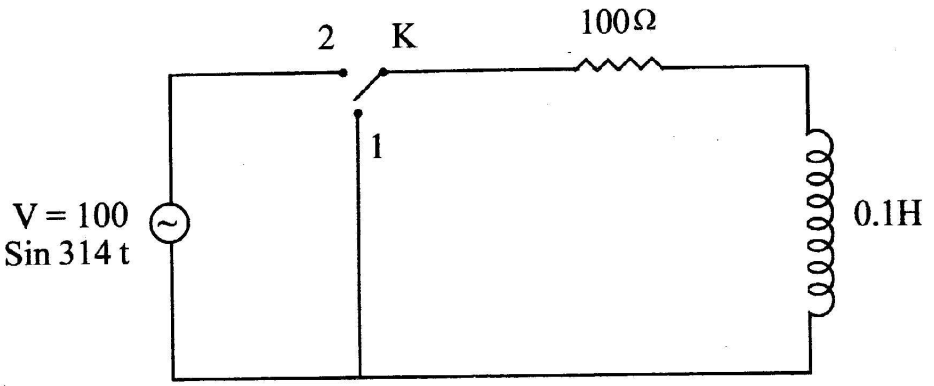


b) In figure two coils A ($R_1 = 5\Omega$, $L_1 = 0.01$ H) and B ($R_2 = 100\Omega$, $L_2 = 5$H) have coefficient of coupling 0.8. Calculating the percentage change in effective resistance of coil A at a frequency of 50 Hz when resistance connected across terminals of coil B becomes 0 ohms. **(8)**

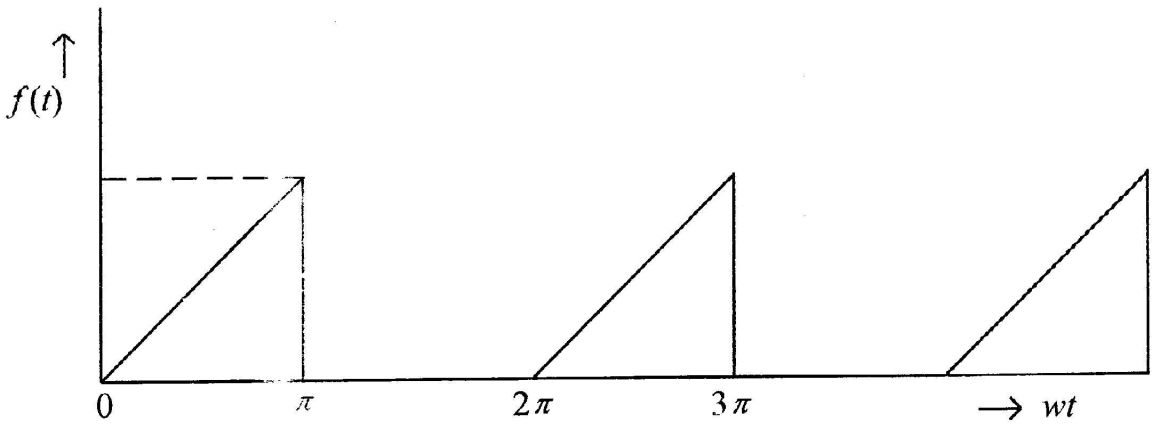


Unit - II

2. a) Obtain the current at $t > 0$, if ac voltage V is applied when the switch K is moved to 2 from 1 at $t = 0$. Assume a steady state current of 1 A in LR circuit when switch was at position 1. **(8)**

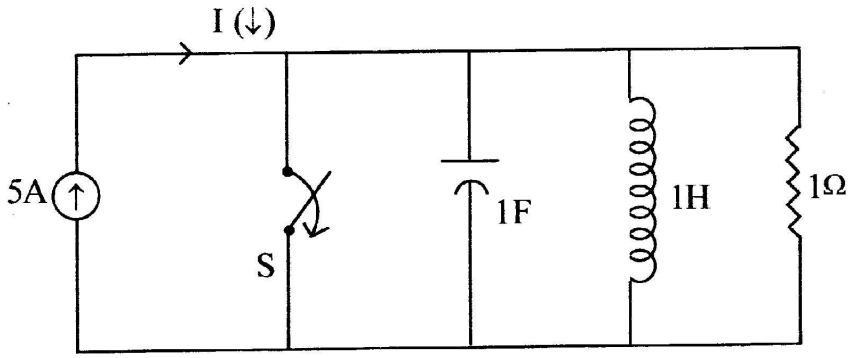


b) Find the fourier series of waveform shown in fig. and also find line spectrum. **(8)**

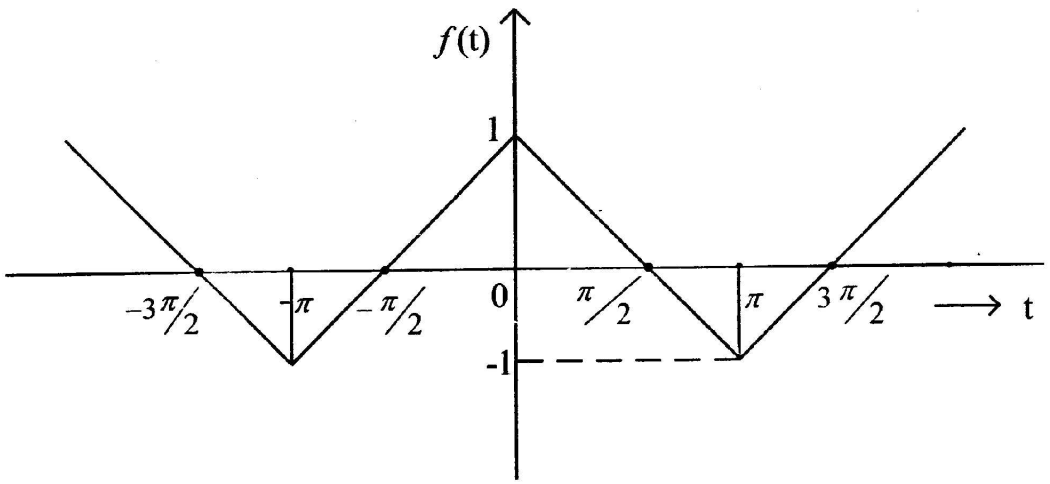


OR

a) Below figure shows a parallel RLC circuit. The switch is suddenly opened at t = 0. Assuming no charge on the capacitor and no current in the inductor before switching. Find the voltage across the switch. **(8)**



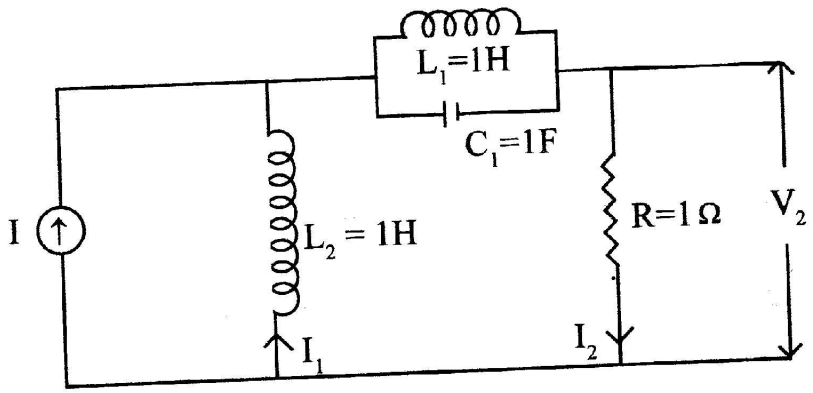
b) Obtain trigonometric fourier series of signal shown in fig. **(8)**



Unit - III

3. a) Denominator polynomial of a transfer function is $P(s)=s^4+11s^3+41s^2+61s+30$. Form Routh array and verify stability of the network. **(8)**

b) Calculate transfer impedance of given circuit shown in fig. **(8)**



OR

a) For the equation

$$P(s)=s^6+11s^5+42s^4+72s^3+71s^2+61s+30=0$$

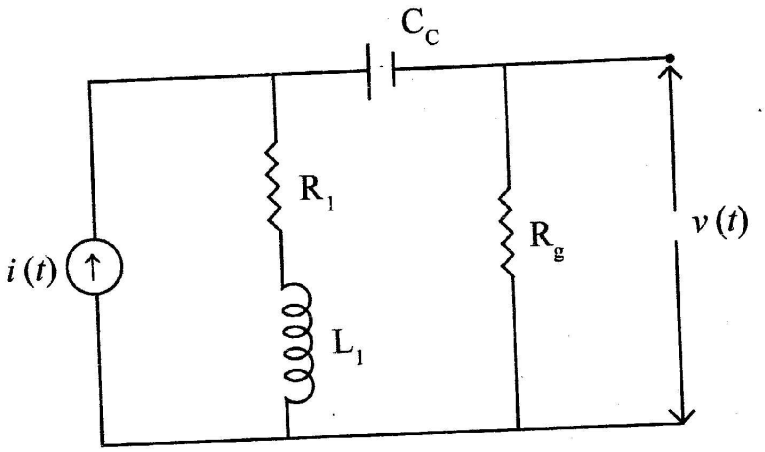
Determine the number of roots.

i) With positive real roots.

ii) With zero real parts.

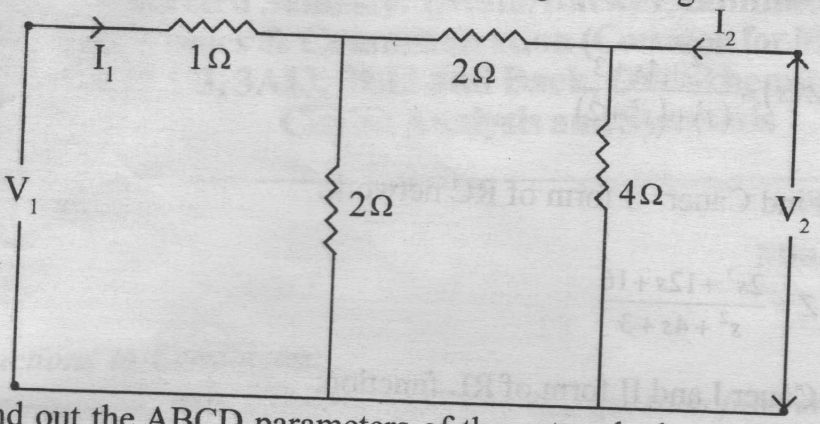
iii) With negative real parts. **(8)**

b) Determine the transfer function $\frac{V(s)}{I(s)}$ for the network shown in fig. **(8)**

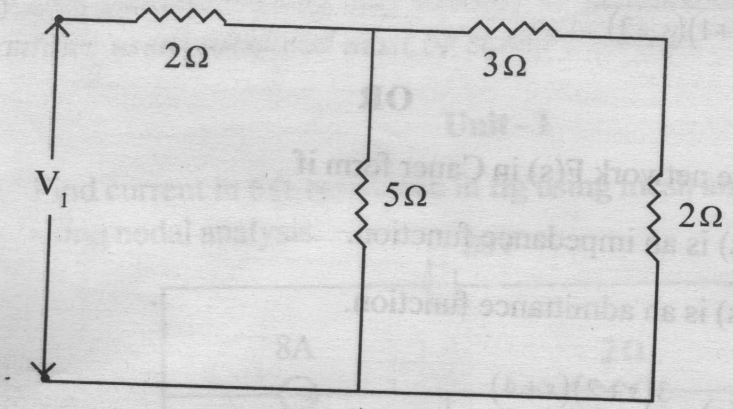


Unit - IV

4. a) Find the Z - parameters for the network given in fig. **(8)**

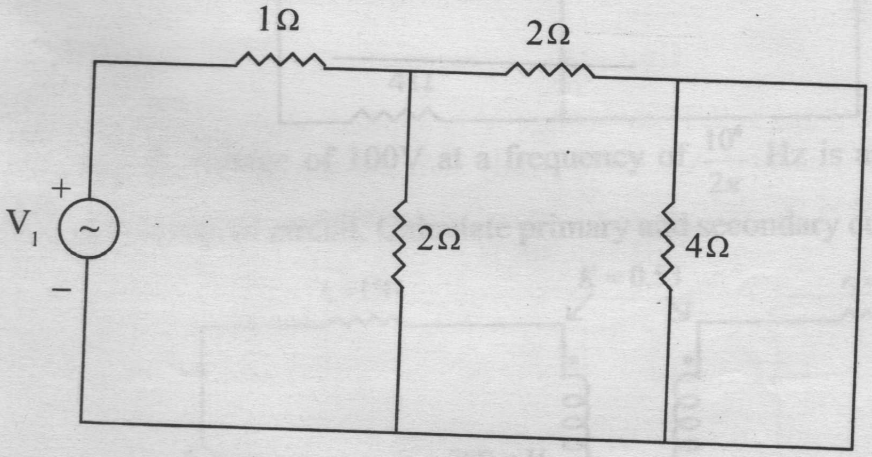


b) Find out the ABCD parameters of the network shown in fig. Also find the image parameters for the network. **(8)**



OR

a) Find the y - parameters for the network of fig. **(8)**



b) The z - parameters of a two port network are $Z_{11} = 10\Omega$, $Z_{22} = 20\Omega$, $Z_{12} = Z_{21} = 5\Omega$.

i) Find the ABCD parameters of this two port network.

ii) Also find its equivalent T - network. **(8)**

Unit - V

5. a) i) Find Cauer - II form of RC function.

$$Z(s)=\frac{s^2+4s+3}{(s)+(s^2+2)}$$

ii) Find Cauer - I form of RC network.

$$Z=\frac{2s^2+12s+16}{s^2+4s+3}$$ **(8)**

b) Find Cauer I and II form of RL function.

$$Z_{RL}=\frac{s(s+2)(s+4)}{(s+1)(s+3)}$$ **(8)**

OR

Synthesize the network F(s) in Cauer form if

a) F(s) is an impedance function. **(8)**

b) F(s) is an admittance function. **(8)**

$$F(s)=\frac{3(s+2)(s+4)}{s(s+3)}$$