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Network Analysis & Synthesis
(144115 / 184115 / 234115)

P. Pages : 3

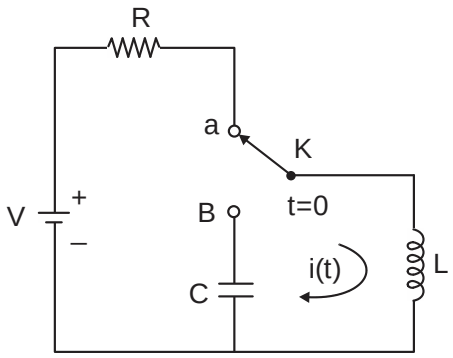
Time : Three Hours **Max. Marks : 80**

Instructions to Candidates :
1. Do not write anything on question paper except Seat No.
2. Answer sheet should be written with blue ink only. Graph or diagram should be drawn with the same pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. Attempt **any two** questions from each unit.
5. Figures to the right indicate full marks.
6. Assume suitable data if necessary.
7. Use of non-programmable calculator is allowed.

UNIT – I

1. a) Explain the concept of complex frequency and characteristics of standard signal. **8**

b) In the network shown in the figure given below, the switch 'k' is moved from position 'a' to position 'B' at t = 0 (A steady state existing in position 'a' before t = 0). Find expression for i(t) using Laplace transform method. **8**



c) Graphically determine residue at poles of the following function. **8**

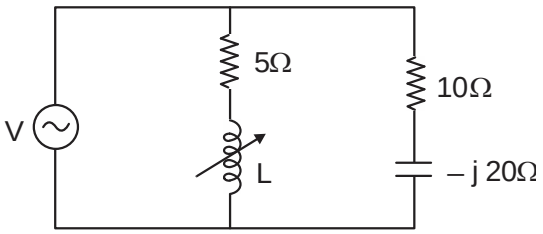
$$F(S) = \frac{S^2 + 4}{(S+2)(S^2+9)}$$

UNIT - II

2. a) Explain the concept of resonance. Derive the expression of resonating frequency for series resonance circuit. **8**

b) A series RLC circuits of a 50 Ω resistance, 0.2H inductance and 10 μF capacitor with an applied voltage of 20V. Determine the resonant frequency. Find the Q factor of the circuit. Compute the lower and upper frequency limits and also find the bandwidth of the circuit. **8**

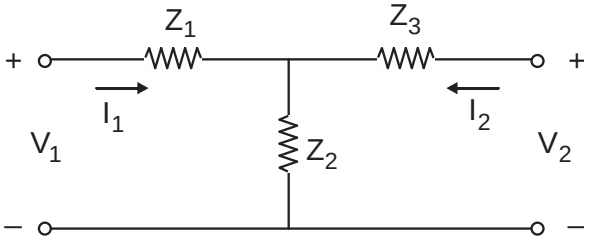
c) Find the value of 'L' for which the circuit shown below is resonant at frequency of $w_n = 1000\,\text{rad/sec}$. **8**



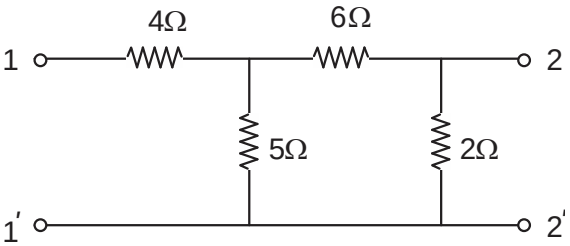
UNIT - III

3. a) Derive the condition of symmetry and reciprocity for y parameters. **8**

b) Find the transmission parameters for the network shown in below fig. **8**



c) For the network shown in below fig. Find y parameters and ABCD parameters. **8**



UNIT - IV

4. a) i) Derive the design equations of symmetrical T attenuator. **4**

ii) Design symmetrical T attenuator with attenuation of 20dB and design impedance of 600Ω. **4**

b) What is filter. Explain the different types of filters in detail. **8**

c) Design m-derived high pass filter π section to work into load of 600Ω with cut off frequency of $\left(\frac{1000}{\pi}\right)$ Hz and peak attenuation frequency at 300 Hz. **8**

UNIT - V

5. a) Test whether $F(S)=\frac{S^3+6S^2+7S+3}{S^2+2S+1}$ is a positive real function. **8**

b) Explain continued fraction expansion method with suitable example. Test whether the given polynomial is Hurwitz or not. **8**

$F(S)=S^3+2S^2+3S+6$.

c) Synthesis $Z(S)=\frac{(S+1)(S+4)}{S(S+2)}$ in cauer forms (i.e. cauer I and cauer II) **8**

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