D 30904 (Pages : 3) Name.....

Reg. No.....

THIRD SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION
OCTOBER 2012

Electronics and Communication Engineering

EC 09 303/PTEC 09 302—NETWORK ANALYSIS AND SYNTHESIS

(2009 Admissions)

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*

1. State superposition theorem.
2. Draw the circuit diagram of a passive integrator.
3. State necessary conditions for a driving point function.
4. What is a constant K-filter ?
5. Test whether the polynomial $P(s) = s^4 + s^3 + 4s^2 + 2s + 3$ is Hurwitz.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*

1. Find current through each resistor in the circuit using Nodal analysis for Figure (1).

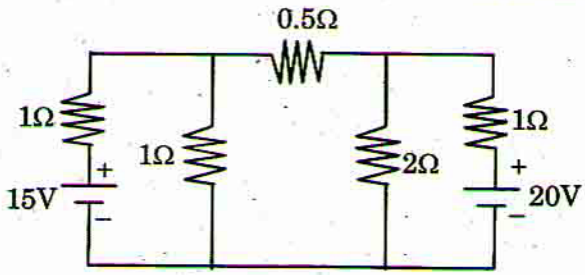

Fig. 1.

2. Find driving point admittance Y (S) for network shown in Figure (2).

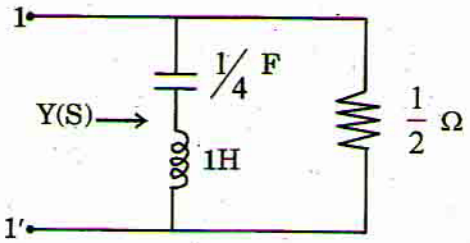

Fig. 2.

Turn over

3. List out the properties of positive real functions.

4. Find Z parameters for the network shown in Figure (3).

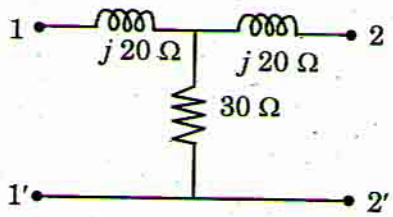

Fig. 3.

5. Explain various types of filters.

6. Obtain the pulse response of a series RC circuit.

(4 × 5 = 20 marks)

Part C

Answer **one** *question from each module.*

MODULE I

1. A ramp voltage V = 5 r (t – 2) is applied in a series RC circuit. Find the response if R = 1 Ω and C = 0.25 Farad.

(10 marks)

Or

2. Find the power loss in the 10 Ω resistor using Mesh analysis in Figure (4).

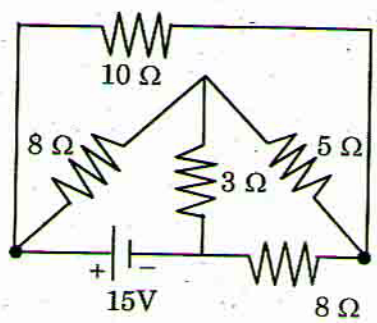

Fig. 4.

(10 marks)

MODULE II

3. Given transform current in a network as $I(s)=\frac{s}{(s+2)(s^2+2s+2)}$. Draw the pole-zero plot and obtain time domain response.

(10 marks)

Or

4. Obtain Y-parameters of network shown in Figure (5).

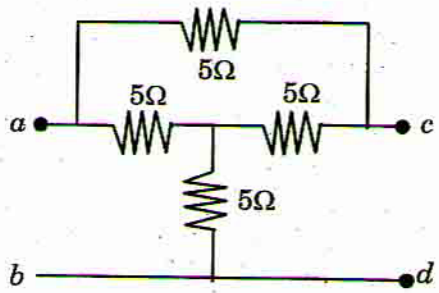

Fig. 5.

(10 marks)

MODULE III

5. Synthesize a Chebyshev low pass filter to meet the specifications : Load resistor $R_L = 600\ \Omega$, $\frac{1}{2}$ dB Ripple within pass band, cut off frequency 5×10^5 rad/sec. and at 1.5×10^6 rad/sec. Magnitude must be down to 30 dB.

Or

6. Transform a low pass filter into high pass filter.

MODULE IV

7. Given $Z(S)=\frac{s^4+7s^2+9}{s(s^2+4)}$. Realize LC network using Cauer forms I and II.

(10 marks)

Or

8. Synthesize the given impedance function $Z(s)=\frac{(s+2)(s+4)}{(s+1)(s+5)}$ using Foster Forms I and II.

(10 marks)

[4 × 10 = 40 marks]