Reg.No.:								

VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
[AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]
Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 7003

B.E. / B.Tech. DEGREE SUPPLEMENTARY EXAMINATIONS – FEB. / MAR. 2020
Third Semester
Electronics and Communication Engineering
U15EC303 – NETWORK ANALYSIS AND SYNTHESIS
(Regulation 2015)

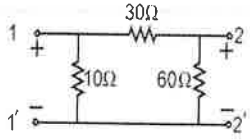
Time : Three Hours | Maximum : 100 Marks

Answer ALL the questions

PART – A

(10 x 2 = 20 Marks)

1. State superposition theorem.
2. An electrical appliance consumes 1.2 kWh in 30 minutes at 120V. Calculate the current drawn by the appliance.
3. Find the resonant frequency of a series RLC Circuit when R=5kΩ, L=3H, and C = (1/200)μF.
4. What is the transform impedance & transform admittance of the capacitor?
5. For the two port network shown in the figure, the impedance (Z) matrix (in Ω) is



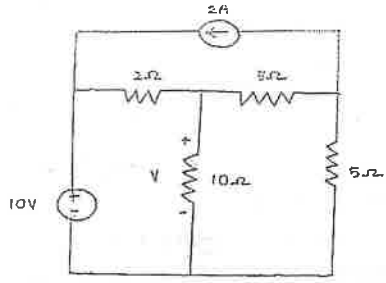
6. Define Voltage transfer ratio.
7. What will be the value of equivalent single source, if the two voltage sources connected in series combination possess equal or similar polarity?
8. The attenuation and characteristic impedance of a symmetrical lattice attenuator are 40dB and 500Ωrespectively.Design the network.
9. The driving point impedance of a network is given by $\frac{(s^2+4s+3)}{s(s+2)(s+5)}$. Calculate the minimum number of elements required to realize this network.
10. Define Hurwitz polynomial.

PART – B

(5 x 13 = 65 Marks)

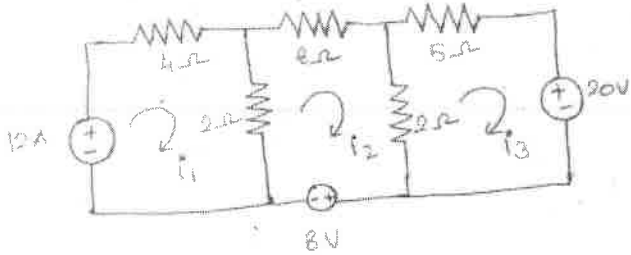
11. a) i. In a series circuit containing a pure resistance and a pure inductance, the voltage and current are $v(t) = 15 \sin (314 t + 5\pi/6)$ & $i(t) = 5 \sin(314t + 2\pi/3)$. Calculate Impedance of the circuit, resistance & inductance, average power drawn by the circuit & Power factor of the current. (8)

ii. Use Superposition theorem to find voltage V across 10Ω resistor. (5)

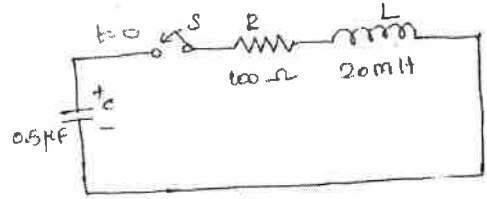


(OR)

b) Obtain the mesh current equations for the circuit below by inspection. Calculate the power absorbed by the 8Ω resistor.

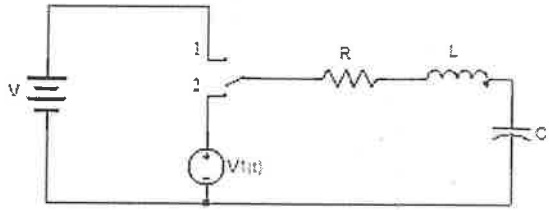


12. a) In a series RLC circuit shown, the initial voltage across the capacitor is 10V and the initial current through inductor is zero. Determine i(t).

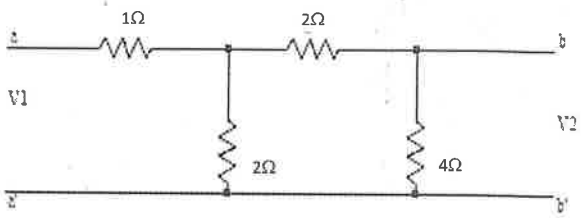


(OR)

b) In the circuit shown below, switch K is moved from position 1 to position 2 at time t = 0. At time t = 0-, the current in the inductor is I_0 and the voltage at the capacitor is V_0. Determine V_C & I_L.



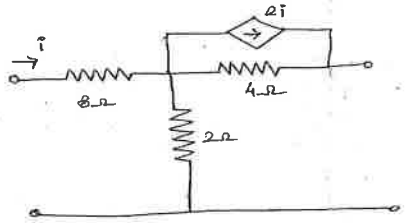
13. a) i. Determine the Y parameters for the two port network. (8)



ii. A two port network is described by the following equations:
$V_1=50I_1+20I_2$
$V_2=30I_1+10I_2$. Find Z_{12} & Y_{12}. (5)

(OR)

b) Determine the Y parameters for the two port network.



14. a) Explain Symmetrical T type attenuators with relevant derivations.

(OR)

b) Design a composite high pass filter to operate into load of 600Ω with 1.2 kHz cut-off frequency and infinite attenuation at 1.1kHz. The composite filter should have constant K type section, m-derived section and suitable terminating sections.

15. a) Synthesize the following function as driving point impedance and admittance.

$$F(s)=\frac{2(s^2+1)(s^2+9)}{s(s^2+4)}$$

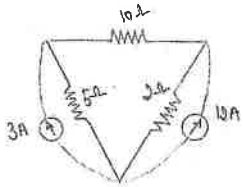
(OR)

b) Explain about R-C driving point impedance, its properties and synthesis with an example.

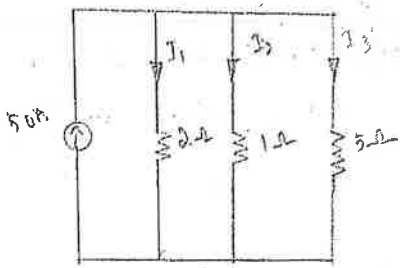
PART – C

(1 x 15 = 15Marks)

16 a) i. Find the current flow through 10Ω resistor using source transformation. (10)



ii. Find the current flow through all resistors for the circuit shown below. (5)



(OR)

b) Synthesize a third order Butterworth low pass filter terminated in 1 Ω resistance and having transfer impedance Z21 of third order Butterworth polynomial.