GIET MAIN CAMPUS AUTONOMOUS GUNUPUR – 765022

RN19001843

Registration No: | | | | | | | | | | |

Total Number of Pages : 2 AR-18 B.TECH

B.TECH 3rd SEMESTER EXAMINATIONS, NOV/DEC 2019

BEIPC3030/BECPC3030/BELPC3030/BEEPC3030

Common to AEIE/ECE/EE/EEE

Network Theory

Time : 3 Hours Maximum : 100 Marks

Answer ALL Questions

The figures in the right hand margin indicate marks.

PART – A: (Multiple Choice Questions) 10 x 2=20 Mark

Q.1. Answer *All* Questions

a	Norton's equivalent Circuit Consists of a)Voltage source in parallel with resistance b) Voltage source in series with resistance c) Current source in series with resistance d) Current source in parallel with resistance	CO1PO1
b	The reciprocity theorem is applicable to a)Linear networks only b)Bilateral networks only c) Linear /bilateral networks d) Neither of the Two	CO1PO1
c	For Physically realizable circuit, input response is a) Zero for t < o b) Zero for t > o c) One for t < o d) Infinite for t > o	CO1PO1
d	Which parameters are widely used in transmission line theory a)Z parameters b) Y Parameters c) ABCD parameters d) H parameters	CO2PO1
e	A function x(t) is said to be even, pf x(t) is a) x(-t) b) –x(t) c) x (2t) d) x(t)	CO2PO1
f	Any periods function can be expressed by a Fourier series when the function having a) Infinite number of finite discontinuities in a period b)Final number of infinite discontinuities in a period c) Final number of finite discontinuities in a period d) Infinite number of finite discontinuities	CO2PO1
g	A high pass filter is one which a)passes all high frequencies b)Attenuates all low frequencies c)attenuates all frequencies below a designated cut-off frequency,and passes all frequencies above cut-off	CO3PO1
h	An ideal filter should have a) Zero attenuation in the pass band b) Infinite attenuation in the pass band c)Zero attenuation in the attenuation band d) None of the above	CO3PO1
i	Hurwitz polynomial possesses one of the conditions that a)all the quotients in the polynomial p(s) must be positive b) The roots of P (s) must lie on the right half of the S-plane c)The ratio of P (s) and p' (s) gives negative quotients d) P (s) may have missing terms	CO4PO1
j	In the first foster form, the presence of first element capacitor C_o indicates a)pole at w=o b) pole at w=∞ c) zero at w=o d) zero at w=∞	CO4PO1

PART – B: (Short Answer Questions) 10X2=20 Marks

Q.2. Answer *ALL* questions

a Determine Norton's equivalent circuit at terminals AB for the circuit shown below in figure 1 CO1PO1

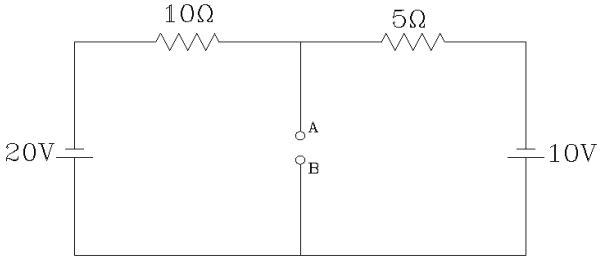

Figure-1

b Determine the value of load resistance when the load resistance draws maximum power. Also find the value of the maximum power for figure 2 CO1PO1

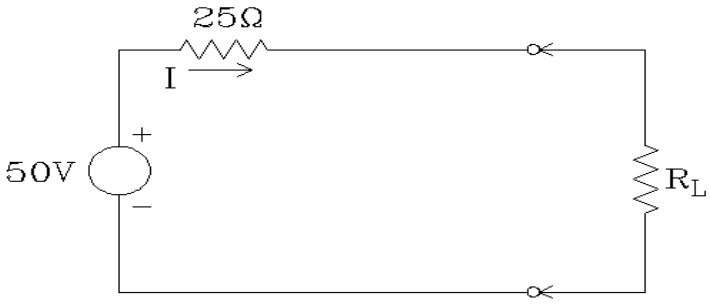

Figure-2

c What is the coupling coefficient when all the flux of coil 1 links with coil 2? CO1PO1

d Determine the inverse Laplace transform of the function. $\left\{\frac{4}{s^2+64}\right\}$ CO2PO2

e The Z parameters of a two-port network are CO2PO2
z_{11}=10Ω; z_{12}=15Ω ; z_{12}= z_{21}= 5Ω. find the equivalent T network.

f Draw the pole zero diagram for the given network function V(s)= $\frac{4(s+2)}{(s+1)(s+3)}$ CO2PO2

g Find the Fourier series for the waveform shown in figure 3 CO3PO2

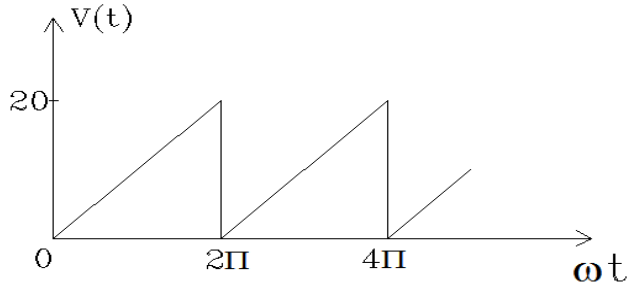

Figure-3

h Design a low pass filter having a cut-off frequency of 2KHZ to operate with a terminated load resistance of 500Ω CO3PO2

i For the given denominator polynomial of a network function, verify the stability of the network using the Hurwitz polynomial Q (s) = $S^3+S^{2+}3^s+8$ CO4PO2

j A periodic function f(t) having a time period T repeats itself after half-time period T/2. The Fourier series of f(t) would contain CO4PO2
(a) cosine terms only (b) sine terms only (c) odd harmonic terms only (d) even harmonic terms only

PART – C: (Long Answer Questions) 4X15=60 Marks

Answer *ALL* questions

Q.3.

a Determine the current I in the circuit shown below using the superposition theorem. for figure 4 — CO1PO2

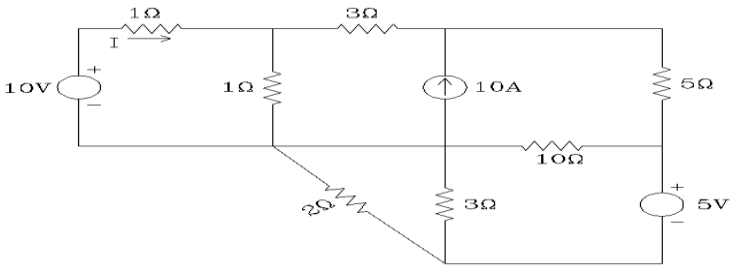

Figure-4

7

b Verify the reciprocity theorem for the given circuit shown below in figure -5 — 8 — CO1PO2

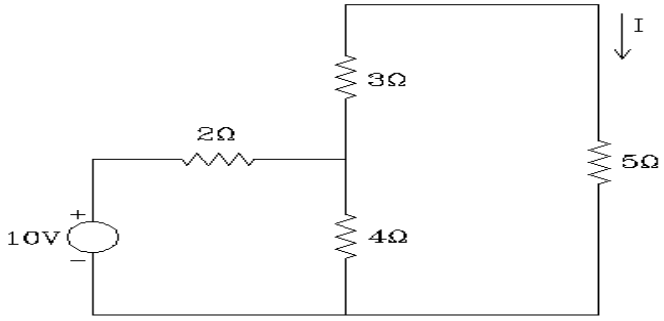

Figure-5

OR

c Use the venin's theorem to find the current through the 5 Ω resistor in figure 6 — CO1PO2

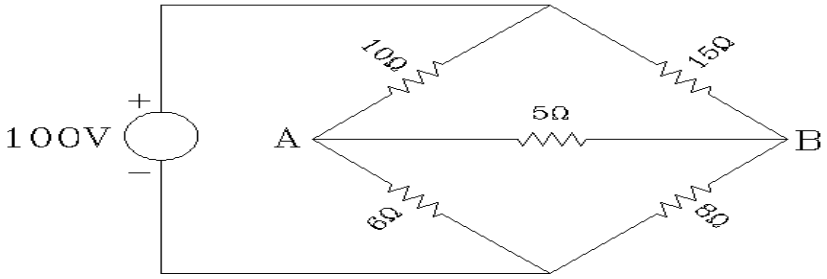

Figure-6

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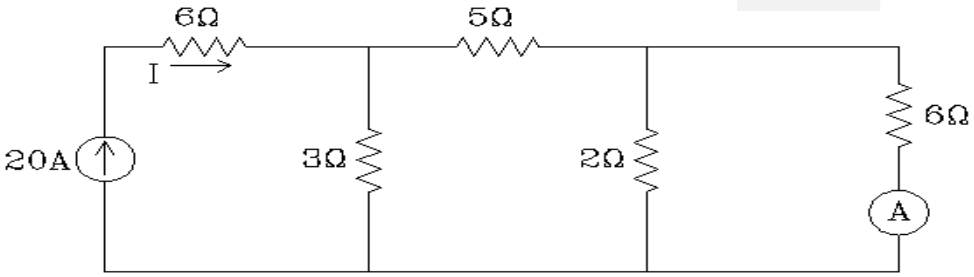
d Using the compensation theorem, determine the ammeter reading where it is connected to the 6 Ω resistor as shown in figure-7. The internal resistance of the ammeter is 2 Ω — 8 — CO1PO2

Figure-7



Q.4

a Determine the load resistance to receive maximum power from the source; also find the maximum power delivered to the load in the circuit shown in figure-8 — 7 — CO2PO2

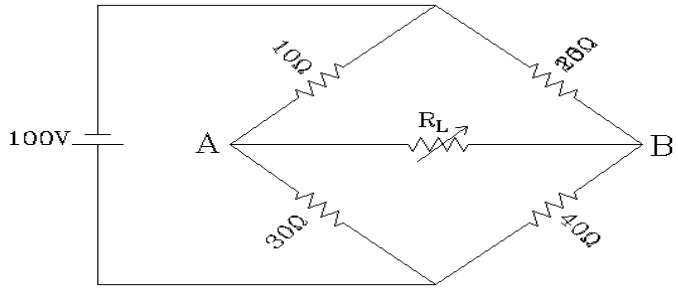


Figure-8

b A series RLC circuit consists of R=20KΩ, L=10mH and C= 1 μF. Calculate frequency of resonance. A variable frequency sinusoidal voltage of constant RMS value of 50V is applied to the circuit. Find the frequency at which the voltage across L and C is maximum. Calculate the voltage across L and C is maximum. Also calculate the voltage across L and C at frequency of Resonance. Find maximum current in the circuit. 8 CO2PO2

OR

c Calculate the current I Shown in figure-10 using Millman's Theorem. CO2PO2

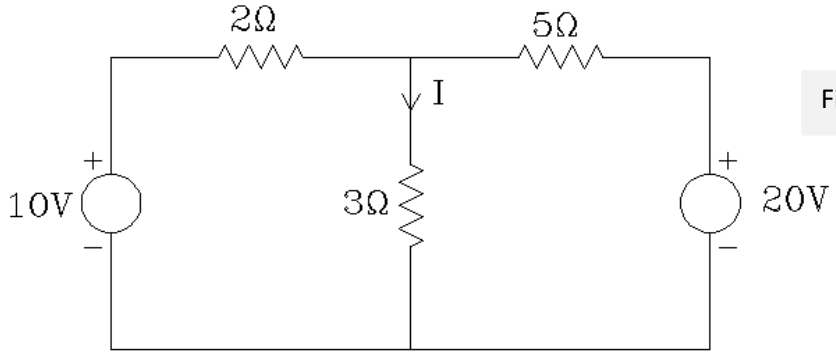


Figure-10

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d A series RLC circuit consists of 50 Ω resistance, 0.2 H inductance and 10MF 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 CO2PO2

Q.5

a Verify the final value theorem for the following functions. 5 CO3PO2

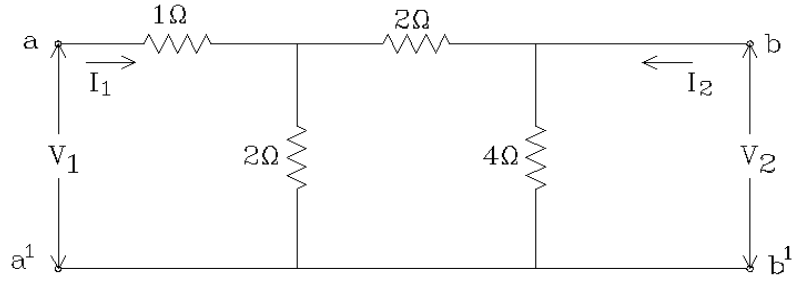
i) $2+e^{-3t}\cos 2t$ ii) $6\,(1-e^{-t})$

b Find the inverse Laplace transform of the following 10 CO3PO2

a) $\log\left(\frac{S+5}{S+6}\right)$ b) $\frac{1}{(s^2+5^2)^2}$

OR

Find the Z parameters for the circuit shown in figure 11



c CO3PO2

Figure-11

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d Find the transmission parameters for the circuit shown below the figure 12 8 CO3PO2

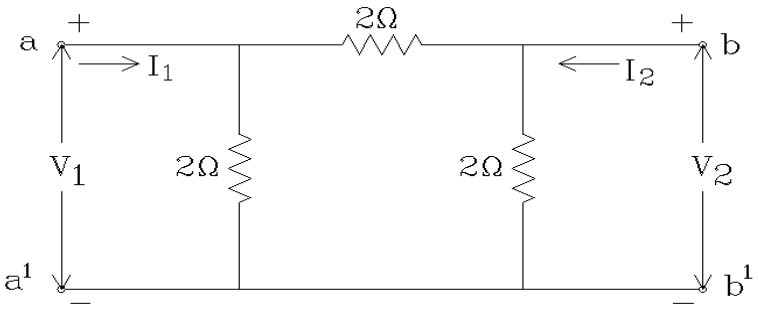

Figure-12

Q.6

a	For the given network function draw the pole zero diagram and hence obtain the time domain response verify this result analytically. I (s)= $\frac{3s}{(s+1)(s+3)}$	7	CO4PO2
b	For the network shown in figure-13, determine transfer impedance $z_{21}^{(s)}$ and $1/21^{(s)}$. Also find the transfer voltage ratio $G_{21}(S)$ and the transfer current ratio $\alpha_{21}(S)$.	8	CO4PO2

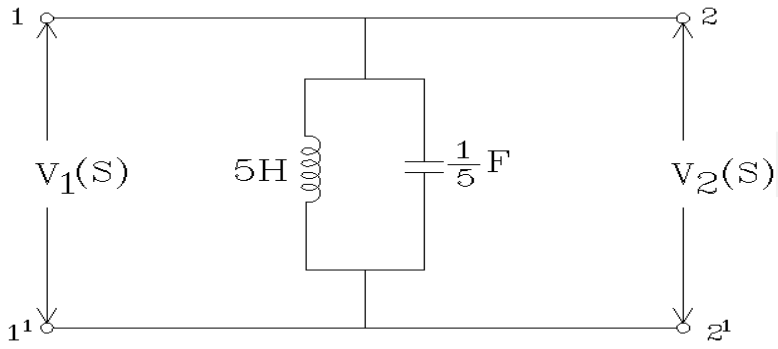

Figure-13

OR

c	The driving point impedance of a one-port reactive network is given by $Z(s) = \frac{(s^2+4)(s^2+25)}{s(s^2+16)}$ Obtain the first and second foster networks.	7	CO4PO2
d	For the given denominator polynomial of a network function, determine the value of K for which the network to stable $Q^{(s)}= s^3+2S^2+4^s+K$	8	CO4PO2

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