Code No: 114AC

R13

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year II Semester Examinations, May - 2016
NETWORK THEORY
(Electrical and Electronics Engineering)

Time: 3 Hours   Max. Marks: 75

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART - A

(25 Marks)

1.a)	What is the significance of phase sequence?	[2]
b)	What is balanced supply and balanced load?	[3]
c)	Define time constant of R-L circuit excited d.c source.	[2]
d)	Explain the behavior of a capacitor for sudden changes in voltages.	[3]
e)	Define transform impedance.	[2]
f)	What are the functions of one port networks?	[3]
g)	Define short circuit reverse transfer admittance.	[2]
h)	What is meant by transformed variable? Give an example.	[3]
i)	What are the properties of line spectra?	[2]
j)	What are the properties of Fourier transforms?	[3]

PART - B

(50 Marks)

2.a) What is the relationship between phase and neutral line currents in a three phase unbalanced system.

b) Explain how to measure reactive power in a three phase balanced system.

c) A three phase three wire system has a balanced star connected load with a 60Ω resistance in each phase. The circuit is supplied with a balanced supply of 150V, 50 Hz. Determine the line current.   [3+3+4]

OR

3.a) Explain the measurement of power in a 3-phase circuit using two wattmeter method.

b) A delta connected load with phase impedances $(2j), (-6j)$ and (2) are fed by a three phase star connected supply 120 V. Determine the line current.   [5+5]

4.a) Draw the time response of inductor current in a series RL circuit excited by DC supply.

b) What is the condition for the response of a series RLC circuit excited by DC supply to have critically damped response?

c) Derive the expression for the current in a series RL circuit ($R = 10\Omega$, $L = 10$ mH) excited by a sinusoidal voltage of 100V, 50 Hz if the supply is connected at $t = 0$. Assume zero initial conditions.   [2+3+5]

OR

5.a) What is damping ratio?

b) Derive the time constant for a parallel RC circuit excited by DC supply.

c) Derive the expression for the voltage across the capacitor in a series RLC circuit ($R = 5\Omega$, $L = 5$ mH, $C = 5\mu F$) excited by a sinusoidal voltage of 100V, 50 Hz if the supply is connected at $t = 0$. Assume zero initial conditions.   [3+2+5]

6.a) What is a two port network?

b) Comment on the time domain response of a second order system if the poles are complex conjugate having positive real parts.

c) What are the necessary conditions for driving point functions? Explain.   [2+3+5]

OR

7.a) Define driving point impedance.

b) Comment on the time domain response of a second order system if the poles are equal negative real values.

c) What are the properties of transfer function? Explain.   [2+3+5]

8.a) Define open circuit reverse voltage gain.

b) Derive the condition for a two port network to be symmetrical in terms of ABCD parameters.

c) For the network shown in the figure 1, determine hybrid parameters and using these parameters calculate admittance parameters.   [2+3+5]
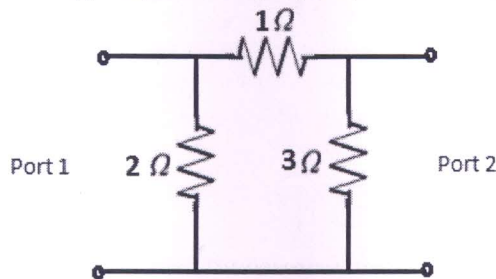

Figure: 1

OR

9.a) Define short circuit input impedance.

b) Derive the condition for a two port network to be reciprocal in terms of admittance parameters.

c) For the network shown in the figure 2, determine ABCD parameters and using these parameters calculate impedance parameters.   [2+3+5]
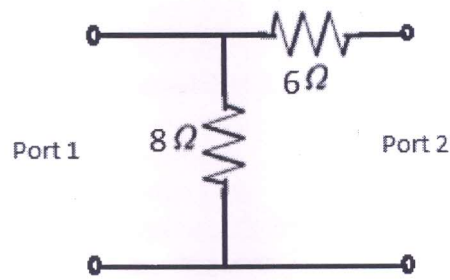
Figure: 2

10.a) What is the main property of low pass filter?

b) Find F(jω) for the following function $f(t) = e^{-9(t-4)}$.

c) Calculate the coefficients in the Fourier series expansion of the following function

$$f(t) = 10\cos(5t + 30^0) + 5\sin(10t + 60^0).$$

[2+3+5]

OR

11.a) What is the function of a band elimination filter?

b) Calculate the coefficients in the Fourier series expansion of the following function $f(t) = 10\cos(5t + 30^0)$.

c) Find f(t) at t = 10 if $F(j\omega) = 3u(\omega + 3) - 3u(\omega - 3)$.

[2+3+5]

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