

## **ADAMAS UNIVERSITY**

## **END-SEMESTER EXAMINATION: JANUARY 2021**

(Academic Session: 2020 – 21)

PURSUE EXCELLENCE	(Academic Session, 2020 – 21)		
Name of the Program:	B.TECH	Semester:	III
Paper Title :	SIGNALS AND NETWORKS	Paper Code:	EEC42105
Maximum Marks :	40	Time duration:	3 hours
Total No of questions:	08	Total No of Pages:	03
Note:	<ol> <li>All parts of a Question should be answered consecutively.</li> <li>Each Answer should start from a fresh page.</li> <li>Assumptions made if any, should be stated clearly at the beginning of your answer.</li> <li>Submit scan copy of the answers on A4 sheet.</li> </ol>		

## Answer all the Groups Group A

Answer all the questions of the following

 $5 \times 1 = 5$ 

- **1. a)** What do you understand by cross correlation?
  - **b**) Explain with suitable example Impulse Response and Step Response of a system.
  - c) How to calculate the self and mutual inductance of a simple network?
  - d) Explain with suitable diagram concept of tree of a network topology.
  - e) Find the required capacitor value for an R-C low pass filter rejecting all frequency component beyond 8 KHz and having a resistance value  $1K\Omega$ .

## **GROUP-B**

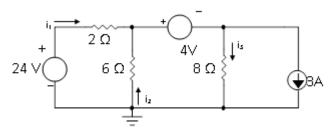
Answer any three of the following

 $3 \times 5 = 15$ 

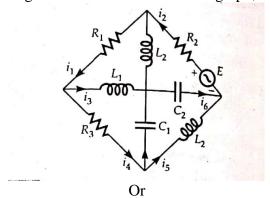
2. Find the trigonometric Fourier series of the signal,  $x(t) = A \sin \omega t$   $0 \le t < \pi$ 

=0  $\pi \leq t < 2\pi$ .

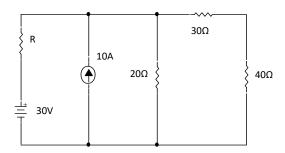
3. Calculate the different currents  $i_1$ ,  $i_2$  and  $i_3$  shown in the figure blow



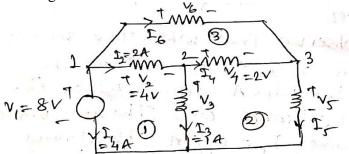
4. A network is shown in the figure below draw the directed graph, tree and show the loops



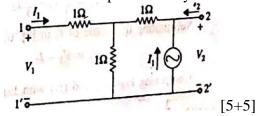
In the following circuit, find the value of the unknown resistance, R, so that maximum power will be transferred to load. Also find maximum power.



5. Check the validity of Tellegen theorem for below network



- 6. a) A coil of resistance 30  $\Omega$  and inductance 320 mH is connected in parallel to a circuit consisting of 75  $\Omega$  in series with 150  $\mu$ F capacitor. The circuit is connected to a 200 volt, 50 Hz supply. Determine supply current and circuit power factor.
  - b) Determine Z and transmission parameters of the network which is shown in below figure also show the network is neither reciprocal nor symmetric.



- 7. a) State and derive the mathematical expression of Parseval's theorem.
  - b) Find the convolution of

$$x=\{2 -1 \ 1 \ 3\}.$$
  $h(n) = \{3 \ 4 \ 2\}$ 

[6+4]

- **8.** a) Design a 2<sup>nd</sup> order Butterworth low pass filter with cut off frequency 1 kHz.
  - b) Find out the fourier transform of
  - i)  $\delta(t)$
  - ii) Triangular signal  $\Delta(t/\tau)$

[5+2+3]