

Registration No :

--	--	--	--	--	--	--	--	--	--

Total Number of Pages : 02

B.Tech
REE4D002/ REL4D002

4th Semester Regular/Back Examination: 2022-23

SUBJECT: Signal and Systems

BRANCH(S): EEE, ELECTRICAL

Time : 3 Hour

Max Marks : 100

Q.Code : M110

Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.

The figures in the right hand margin indicate marks.

Part-I

Q1 Answer the following questions: (2 x 10)

- Define any two properties of Fourier transform.
- Define signal bandwidth and system bandwidth.
- What is band pass sampling?
- Write any two properties of ROC in Z-transform.
- Evaluate the energy and power of a unit step signal.
- Distinguish between the recursive and non-recursive systems.
- Draw the wave form of $x(t) = u(t) - 2u(t - 1) + u(t - 2)$.
- Draw the wave form of Sinc function.
- Test the stability of the system $y(t) = x(-t - 2)$
- Find the convolution of $x(t + 5)$ with an impulse function.

Part-II

Q2 Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve) (6 x 8)

- Compare signal and system. What are the major classifications of signal?
- State and prove the final value theorem of z-transform.
- Explain the filter characteristics of linear system.
- Distinguish between continuous time and discrete time signal.
- Explain the significance of convolution integral.
- Explain with an example of the transfer function of a zero-order system.
- Write down the properties of DTFT.
- State the differences between casual and non-causal system.
- Find the Fourier Series coefficients of $(\cos t)^2$
- Find the Fourier Transform of $g(t) = 1/(1+t^2)$
- Find out Z-transform & the ROC of $x(n) = \{3, 2, 5, 7\}$.
- Find out Z-transform of the signal $x(n) = 2(3)^n u(-n)$

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

- Q3** (a) What are the differences between Fourier series and Fourier transform? Explain in detail with an example. (8)
- (b) Discuss sampling of continuous time signal with an example. (8)
- Q4** (a) Explain about LTI system by taking an example. (8)
- (b) Discuss the causality and physical reliability of a system. (8)
- Q5** (a) State and prove the properties of auto correlation function. (8)
- (b) State and prove time convolution and time differentiation properties of Fourier transform. (8)
- Q6** (a) Explain all types of correlation coefficients with an example of each one of them. (8)
- (b) State & explain Parseval's theorem. (8)