Hall Ticket Number :										

R-15

Code: 5G333

II B.Tech. I Semester Supplementary Examinations February 2022

Signals and Systems

(Electronics and Communication Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)

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Marks

UNIT–I

1. a) Define Fourier series of signal f(t) .Derive the Relationship between various types of Fourier series representation 7M
   b) Differentiate clearly between the even, odd and half wave symmetry waveforms with respect to their Fourier coefficients (use appropriate waveform) in their Fourier series representation 7M

OR

2. a) Write the Classification of systems based on certain properties. 7M
   b) Determine whether the following signals are energy signals or power signals and calculate their energy or power 7M

   i) $x(n) = (\frac{1}{2})^n u(n)$ ii) $x(t) = \cos^2 \mu_0 t$

UNIT–II

3. a) State and prove Differentiation and integration properties of Fourier Transform. 7M
   b) What is the Significance of Hilbert Transform? Explain 7M

OR

4. a) Find the Fourier transform of DC Signal 7M
   b) State and prove Time Convolution property of Fourier Transform. 7M

UNIT–III

5. a) Prove that bandwidth and rise time of an LTI system are inversely proportional to each other. 7M
   b) Discuss the conditions for distortionless transmission. 7M

OR

6. a) The output response of a continuous time LTI system is $2e^{-3t}u(t)$ when the input x(t) is u(t) find the Transfer function. 7M
   b) Determine whether the following systems are Linear or Nonlinear, Shift variant or Invariant, Causal or Non-causal, Stable or unstable. (i) y(t) = x(t+10) + x2(t) (ii) dy(t)/dt + 10 y(t) = x(t) 7M

UNIT–IV

7. a) Derive the relation between PSDs of input and output for an LTI system 7M
   b) State and prove any four properties of Cross correlation function 7M

OR

8. a) State and explain Parseval's theorem. 7M
   b) Explain about the properties of LTI system 7M

UNIT–V

9. a) Find the Laplace transform of the signal x(t)= e^{-at} u (t)+ e^{-bt} u(t) 7M
   b) Explain the Concept of region of convergence (ROC) for Laplace transforms 7M

OR

10. a) Prove the differentiation property of Z-transform. Explain the concept of ROC in Z transform 7M
    b) Give the relationship between z-transform ,Fourier transform and Laplace Transform 7M

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