

CMR ENGINEERING COLLEGE: : HYDERABAD
UGC AUTONOMOUS
II-B.TECH-I-Semester End Examinations (Supply) - December- 2024
SIGNALS AND SYSTEMS
(ECE)

[Time: 3 Hours]

[Max. Marks: 70]

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 20 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**(20 Marks)**

1. a) Explain any two basic operations on signals. [2M]
- b) Compare continuous-time and discrete-time signals. [2M]
- c) Write the procedure to find Fourier transform of periodic signals. [2M]
- d) Find the Fourier transform of Unit step function. [2M]
- e) Define system bandwidth and signal bandwidth. [2M]
- f) Mention the characteristics of distortion less transmission system. [2M]
- g) State initial and final value theorem of Laplace transform. [2M]
- h) Express the relation between LT & FT. [2M]
- i) Define aliasing. How it can be avoided? [2M]
- j) Write the expression for auto correlation. [2M]

PART-B**(50 Marks)**

2. Explain the analogy between two orthogonal functions $x_1(t)$ and $x_2(t)$ for a real variable t . [10M]
- OR**
3. Perform the following operations on signals with suitable example: [10M]
 - (i) Amplitude scaling
 - (ii) Addition
 - (iii) Multiplication of signals
 - (iv) Time reversal
 - 4.a) State the conditions for existence of Fourier Series. [5M]
 - b) Solve the Fourier transform of the signal given $x(t) = \cos \omega_0 t$ [5M]
- OR**
5. Express the trigonometric Fourier series for the signal $x(t) = A \sin(t)$, $0 \leq t \leq 2\pi$ and also plot the frequency spectrum. [10M]
 6. Explain the causality and physical reliability of a system and hence give poly-wiener criterion. [10M]
- OR**
7. Solve the Laplace transform of the signal [10M]

$$x(t) = e^{-2t}u(t) + e^{-3t}u(t)$$
 8. State and prove any five properties of Z-Transform. [10M]
- OR**
9. Explain about the properties of ROC in Laplace transform. [10M]
 10. Explain the process of sampling theorem. [10M]
- OR**
11. Explain about Auto-correlation function with their properties. [10M]
