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MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
II B.Tech I Semester Supplementary Examinations, April 2023
### Signals and Systems
(ECE)

Roll No									

Time: 3 hours   **Max. Marks: 70**

Note: This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

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SECTION-I

1   **A**   Define any three signals.   **[6M]**

   B   Find the exponential Fourier series of the signal x(t) = 5cos 5t+10 sin 15t.   **[8M]**

OR

2   Determine the exponential form of the Fourier series representation of the   **[14M]**
signal shown below.
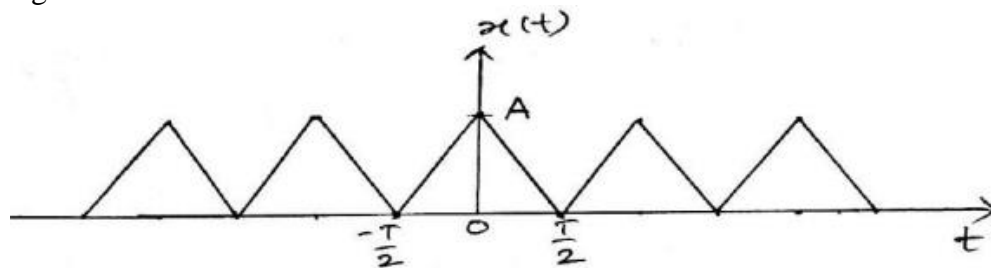
SECTION-II

3   **A**   Find the Fourier transform of x(t) =e $^{-at}$ u (t).   **[7M]**

   B   State and prove the convolution property of Fourier transform.   **[7M]**

OR

4   **A**   Write about the types of Sampling and compare the Impulse Sampling,   **[7M]**
Natural and Flat top Sampling methods.

   B   Find the Fourier transform of   **[7M]**

$$x(t) = \begin{cases} e^{-|t|}; & for -1 \le t \le 1 \\ 0; & otherwise \end{cases}$$

SECTION-III

5   Write short notes on the following.

   (a) Ideal filters characteristics.   **[7M]**

   (b) Filter characteristics of a linear system.   **[7M]**

OR

6   Define Time invariant and shift invariant systems and given the system   **[14M]**
function of a LTI system be 1/jw+2 evaluate the output of the system for an
input $(0.9)^t$ u (t)

SECTION-IV

7   **A**   State and prove properties of convolution   **[7M]**

   B   What is the overall impulse response h(n) when two system with impulse   **[7M]**
response h_1(n) and h_2(n) are connected in parallel and in series?

OR

8	A	Discuss and Prove Properties of auto correlation function	[10M]
	B	Derive the relationship between convolution and correlation.	[4M]

SECTION-V

9	A	Compute the Laplace transform of $x(t) = e^{-b\,|t|}$ for the cases of b < 0 and b > 0	[7M]
	B	Obtain the inverse Laplace transform of the function $X(s) = 1 / (s^2 + 3s + 2)$, ROC : $-2 < Re(s) < -1$.	[7M]

OR

10	A	Find the inverse Z-transform and ROC given $X(z) = \log(1/ 1 - az^{-1})$.	[7M]
	B	Derive relationship between z and Laplace Transform and describe about the stability	[7M]

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