Code No: R1631023 **R16** SET - 1

III B. Tech I Semester Supplementary Examinations, May - 2019

SIGNALS AND SYSTEMS

(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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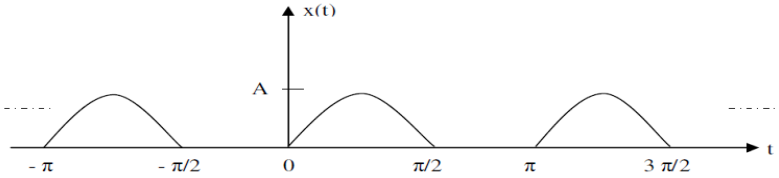
PART –A

1. a) State the condition for BIBO stability of the system. [2M]
   b) Write the trigonometric Fourier series representation of periodic signal with fundamental period T_0. [2M]
   c) What is aliasing effect? [2M]
   d) Write the output response of x(t)* $\delta(t-t_0)$, where x(t) is a continuous signal. [3M]
   e) State the relationship between Laplace transform and Fourier transform. [3M]
   f) Find the Z transform for casual signal x(n). [2M]

PART -B

2. a) A rectangular function f(t) is defined by [7M]
   $f(t) = 1\ ;\ 0 < t < \pi\ and\ f(t) = -1;\ \pi < t < 2\pi$ Approximate this function by a waveform sint over the interval [0, 2 π]. Find the optimum value such that mean square error is minimum.
   b) Define and sketch the following signals: [7M]
   i) Signum Function ii) Impulse function iii) Unit step function

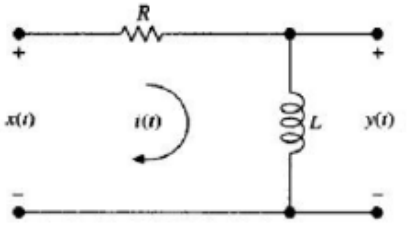
3. a) Find the Fourier series expansion of halfwave rectified sine wave shown below. [7M]



   b) State and prove Parseval's theorem. [7M]

4. a) Explain the following terms: [7M]
   i) Natural sampling ii) Importance of sampling theorem.
   b) Determine the Nyquist rate for the given continuous time signal: [7M]
   x(t) = 6 cos50πt+20 sin 300πt+10 cos 100πt.

5. a) State and Prove Properties of auto correlation function. [7M]
   b) Find the impulse response and Transfer function of the following circuit: [7M]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6. a) If F(s) = (s+2)/(s+3)(s+4), find all possible f(t). [7M]

   b) Define Laplace transform. Distinguish between Laplace transform and continuous time Fourier transforms. [7M]

7. a) Determine the final value of the signal corresponding to the following Z-transform: [7M]

$$X(Z) = \frac{2Z^{-1}}{1 - 1.8Z^{-1} + 0.8Z^{-2}}$$

   b) State and prove any four z-transform properties. [7M]

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