

Seat No.	
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**T.E. (Electronics and Tele Communication) (Semester - V)**  
**Examination, May - 2017**

**SIGNALS & SYSTEMS (Revised)**  
**Sub. Code : 66316**

**Day and Date : Wednesday, 17 - 05 - 2017**

**Total Marks : 100**

**Time : 10.00 a.m. to 01.00 p.m.**

- Instructions :** 1) All questions are compulsory.  
 2) Assume suitable data wherever necessary.

**Q1) Solve any Two :**

- Show that time shifting and folding operations on continuous time signal  $x(t)$  are not commutative. [8]
- Sketch the following signal. [8]  
 $x(t) = r(t) - r(t-2) - u(t-4) - u(t-5)$
- Discuss the features of discrete time sequence  $x(n) = A \cos (\omega n + \theta)$  with reference to [8]
  - Periodicity
  - Frequency range
  - Maximum frequency

**Q2) Solve any Two :**

- Derive the equation for convolution sum for response  $y(n)$  of discrete time LTI system having impulse response  $h(n)$  & input  $x(n)$ . Also modify the same equation for causal input and causal system. [9]
- For continuous time LTI system having impulse response  $h(t) = u(t)$ . Determine the response of the system to the input  $x(t) = e^{-at} u(t)$ . Use graphical technique. [9]
- Classify the following systems on the basis of it's property. [9]
  - $y(t) = t x(t)$
  - $y(n) = A x(n) + B$

**P.T.O.**

Q3) Solve any Two :

- Write a note on interconnections of discrete time systems. [8]
- An analog signal is expressed by the equation,  
 $x(t) = 3 \cos 50\pi t + 10 \sin 300\pi t - \cos 100\pi t$ . Calculate the Nyquist rate for this signal. [8]
- State & prove sampling theorem. [8]

Q4) Solve any Two :

[16]

- Find Z-transform of following signals
  - $x[n] = a^n u[n]$
  - $x[n] = \sin[n\omega T]u[n]$
- Determine the DT sequence associated with Z.T. given below using P.F.E. method.

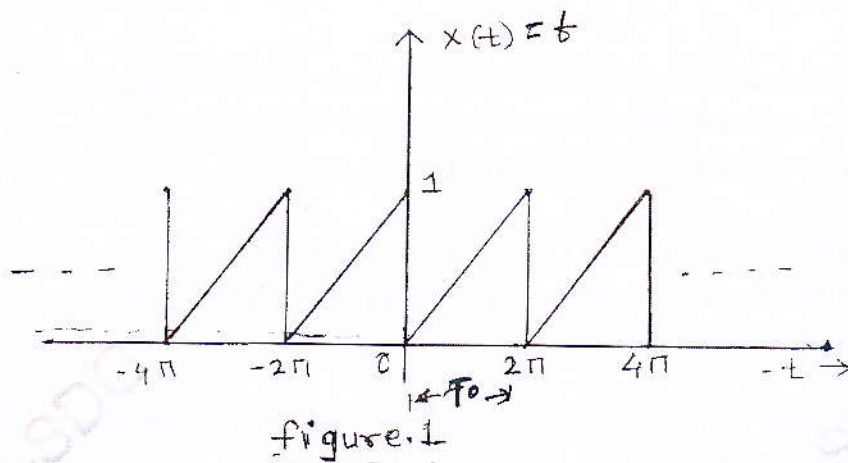
$$x[z] = \frac{10z}{(z-1)(z-2)}$$

- Explain properties of Z-transform in detail.

Q5) Solve any two :

[18]

- Find trigonometric Fourier series and Plot Fourier spectrum of time domain signal  $x(t)$  shown in figure. 1



- b) Explain properties of Fourier series in detail.
- c) Compute the exponential Fourier series and plot the magnitude and phase spectrum time domain signal shown in figure.2.

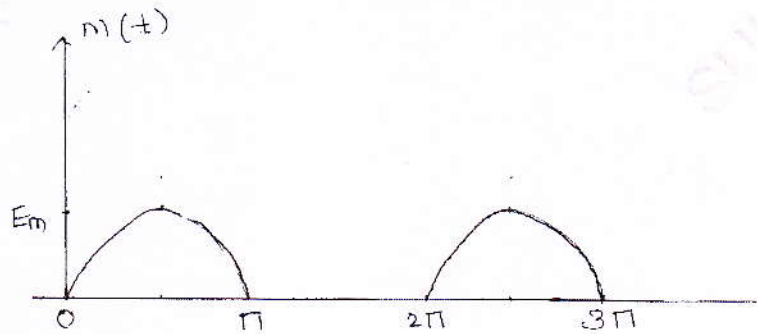


figure. 2.

Q6) Solve any two :

[16]

- a) Find the continuous spectrum of a non periodic signal  $m(t)$  shown in figure.3.

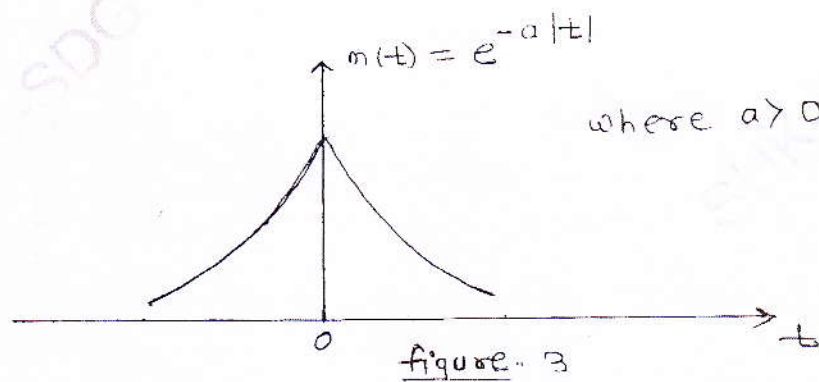


figure. 3

- b) Find the F.T. of signal  $p(t)$  given in equation using time shifting property,  
 $p(t) = m(t - t_0) + m(t + t_0)$ .
- c) Explain properties of Fourier transform in detail.

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