

Seat No.	
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SR - 525

Total No. of Pages : 4

**T.E. (Electronics & Telecommunication) (Semester - V)**  
**Examination, November - 2017**

**SIGNALS & SYSTEMS (Revised)**

**Sub. Code : 66316**

**Day and Date : Tuesday, 14 - 11 - 2017**

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

**Total Marks : 100**

- Instructions :**
- 1) All questions are compulsory.
  - 2) Draw neat sketches wherever necessary.
  - 3) Assume suitable data if required and state it clearly.

**Q1) Solve any two :**

**[16]**

- a) Referring to given  $x[n]$  sketch and label following signals

$$X[n] = \{1, 1, 1, 1, 1, 1/2\}$$

i)  $x[4-n]$

ii)  $x[2n+1]$

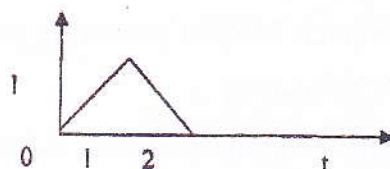
iii)  $x[n]u[2-n]$

iv)  $x[n-1]\delta[n-3]$

- b) Determine even and odd part of following signals

i)  $x[n] = \{-1, 2, 2, 1, 1, 2, -1\}$

ii)



- c) Test the following systems for *Time Invariance*.

i)  $y(t) = x(t)\sin(20\pi t)$

ii)  $y(n) = nx(n)$

**P.T.O.**

**Q2) Solve any two :**

**[18]**

- a) Explain basic elements of block diagram representation of CT-LTI system. Construct block diagram for following system

$$\frac{d^2 y(t)}{dt^2} + 2 \frac{dy(t)}{dt} + 3y(t) = 4 \frac{dx(t)}{dt} + 5x(t)$$

- b) Convolve the following sequences

$$x(n) = u(n)$$

$$h(n) = a^n u(n) \text{ for } |a| < 1$$

- c) Convolve the two DT sequences given below, also sketch the result.

$$x[n] = 1 \quad \text{for } 0 \leq n \leq 4$$

$$= 0 \quad \text{Elsewhere}$$

$$Y[n] = (2)^n \quad \text{for } 0 \leq n \leq 6$$

$$= 0 \quad \text{Elsewhere}$$

**Q3) Solve any two :**

**[16]**

- a) Write short note on sampling in frequency domain.  
b) Explain effect of under sampling: Aliasing  
c) State & explain properties of LTI system.

**Q4) Solve any two :**

**[16]**

- a) Find the ZT of finite duration sequence  
i)  $x[n] = \cos(n\omega T)u[n]$   
ii) Find the ZT and sketch ROC of following sequence  
 $x[n] = (2)^n u[n] + (3)^n u[-n-1]$   
b) Determine the DT sequence associated with Z-Transform given below using "Power Series Method".

$$X[z] = (z^2+z)/(z^3-3z^2+3z-1); z > 1 \text{ R.O.C.}$$

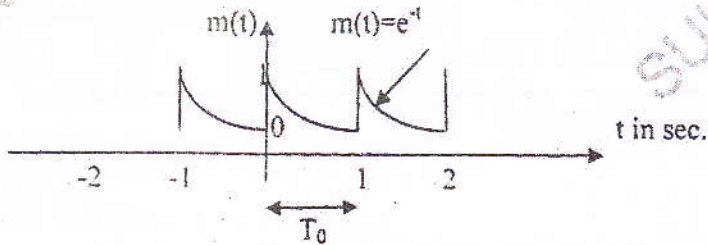
OR

- b) Determine the DT sequence associated with Z-Transform given below using "P.F.E" method.  $X[Z] = (4Z^2-2Z)/(Z^3-5Z^2+8Z-4)$ .  
c) Explain properties of Z-transform in detail.

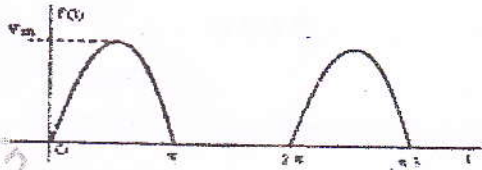
Q5) Solve any two :

[18]

- a) Draw the amplitude and phase spectrum of periodic time domain signal  $m(t)$  shown in fig. using exponential method.



- b) Draw the amplitude and phase spectrum of periodic time domain signal  $m(t)$  shown in fig. by trigonometric method.

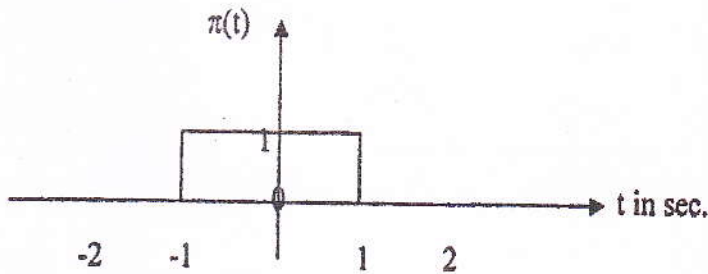


- c) Explain properties of Fourier series in detail.

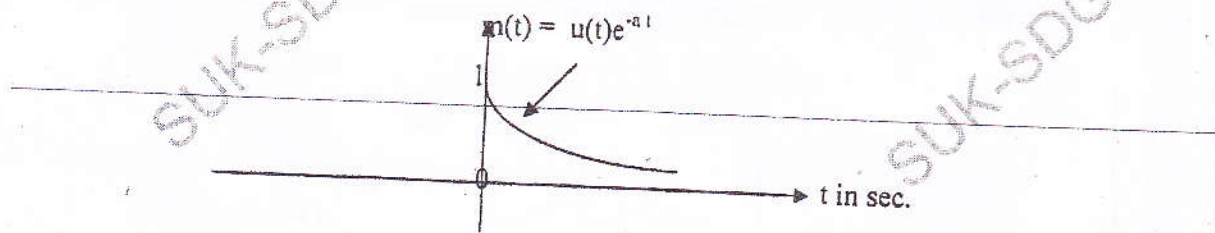
Q6) Solve any two :

[16]

- a) Find continuous spectrum of a non periodic gate function shown in fig.



- b) Find continuous spectrum of a non periodic signal  $m(t)$  shown in fig.



- c) Explain properties of Fourier Transform in detail.

