

Seat No.	
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SJ - 785

Total No. of Pages : 4

**T.E. (Electronics & Telecommunication) (Semester - V)
(Revised) Examination, November - 2016**

SIGNALS & SYSTEMS

Sub. Code : 66316

Day and Date : Tuesday, 22 - 11 - 2016

Total Marks : 100

Time : 02.30 p.m. to 05.30 p.m.

- Instructions :**
- 1) All questions are compulsory.
 - 2) Figures to the right indicate full marks.

Q1) Solve any two :

- a) Give the classification of signals. Explain Deterministic & Non-deterministic, Causal & Non-causal signals in details. [8]

- b) Sketch the following signal [8]

$$x(t) = 2u(t) + tu(t) - (t-1)u(t-1) - 3u(t-2).$$

- c) Test the following signal for periodicity. Compute the period if signal is periodic. [8]

i) $x(t) = 3\cos\left(5t + \frac{\pi}{6}\right)$

ii) $x(n) = e^{j7\pi n}.$

Q2) Solve any two :

- a) Compute output sequence $y(n)$ for the LTI system whose Impulse Response and Input is given as follows. (Use graphical method). [9]

$$x(n) = \{1 \ 2 \ 3 \ 1\}$$

↑

$$h(n) = \{1 \ 2 \ 1 \ -1\}$$

↑

P.T.O.

- b) Define Convolution Integral. Also compute $x_3(t) = x_1(t) * x_2(t)$. [9]

Where $x_1(t) = u(t)$

$x_2(t) = e^{-t}$ for $t \geq 0$

- c) Test the following systems for linearity. [9]

i) $y(n) = A x(n) + B$

ii) $y(n) = e^{x(n)}$

Q3) Solve any two :

- a) What is Sampling Theorem? Explain Aliasing effect in detail. [8]

- b) Write short note on Interpolation. [8]

- c) Consider the analog signal $x(t) = 10 \cos 100\pi t$.

Find the DT signal $x(n)$ for sampling frequency $f_s = 75$ Hz. Also find aliasing frequency. [8]

Q4) Solve any two :

- a) i) Find the ZT of finite duration sequence [8]

1) $x[n] = \{1, 2, 3, 4, 5, 6\}$

2) $x[n] = \{2, 0, 8, 0, 32, 0\}$

- ii) Find the ZT and sketch ROC of following sequence

$X[n] = (0.6)^n u[n] + (0.4)^n u[n]$.

- b) Determine the DT sequence associated with Z-Transform given below using "Power Series Method". [8]

$X[z] = 1 / (1 - az^{-1}); \quad z < a$ R.O.C.

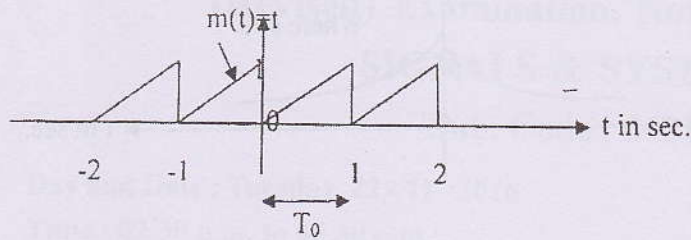
OR

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

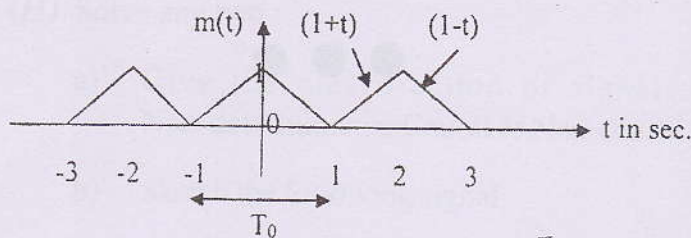
- c) Explain properties of Z-transform in detail. [8]

Q5) Solve any two :

- a) Draw the amplitude and phase spectrum of periodic time domain signal $m(t)$ shown in fig. using Trigonometric form $m(t)$. [9]



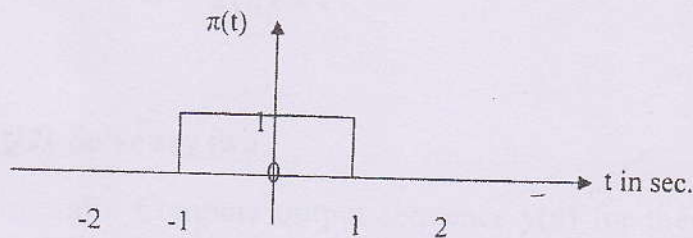
- b) Draw the amplitude and phase spectrum of periodic time domain signal $m(t)$ shown in fig. by exponential method. [9]



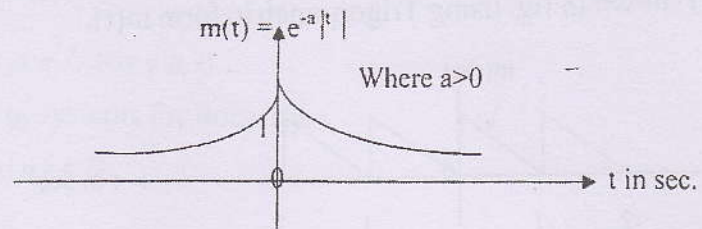
- c) Explain Properties of Fourier series in detail. [9]

Q6) Solve any two :

- a) Find continuous spectrum of a non periodic gate function shown in fig. [8]



- b) Find continuous spectrum of a non periodic signal $m(t)$ shown in fig.[8]



- c) Explain Properties of Fourier Transform in detail.

[8]

