http://www.howtoexam.com

Roll No. ..... Total No. of Pages : 2

BT-4/J07 8650

Signals and Systems

Paper : ET-202

Time : Three Hours] [Maximum Marks : 75

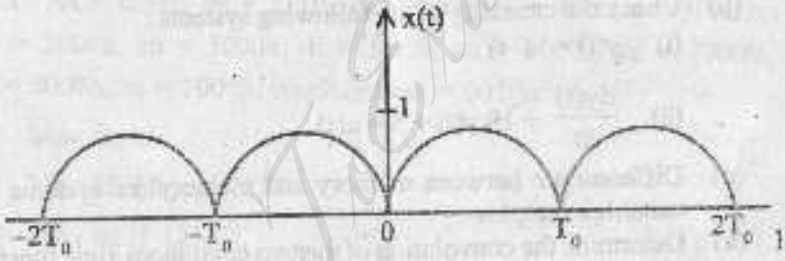
Note :- Attempt any **FIVE** questions.

1. (a) Explain the difference between deterministic signal and random signal with suitable example. 6

   (b) Show that the signal given by $x(t) = t^{1/4}. u(t-1)$ is neither an energy signal nor a power signal. 9

2. (a) Explain the linearity and time scaling properties of Fourier transform. 5

   (b) Find the trignometric Fourier series representation for the rectified sine wave shown in fig. 1



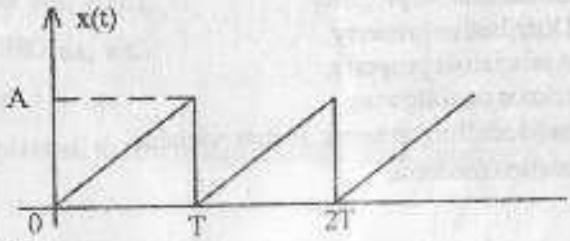
10

Fig-1

3. (a) Define probability density function (PDF). Explain different properties of PDF. 6

   (b) State and explain sampling theorem for continuous time signals. 9

4. (a) Obtain the Laplace transform of the periodic sawtooth waveform shown in fig.



10

College semester examination question papers for all subjects and branches

http://www.howtoexam.com

5. (a) A causal discrete time LTI system is described by

$$y(n) - \frac{3}{4}y(n-1) + \frac{1}{8}y(n-2) = x(n)$$

where x(n) and y(n) are the input and output of the system respectively.

(i) Determine the system function H(z).

(ii) Find impulse response h(n) of system.

(iii) Find step response s(n) of system. 9

(b) Explain scaling, differentiation and time-reversal property of z-transform. 6

6. (a) Determine whether the following system is linear or not :

$$5\frac{dy(t)}{dt} + y(t) = 5x(t).$$ 5

(b) Check the causality of the following systems :

(i) $y(t) = x(-t)$

(ii) $\frac{dy(t)}{dt} + 10\,y(t) + 5 = x(t)$. 6

(c) Differentiate between memory and memoryless systems with suitable examples. 4

7. (a) Determine the convolution of the two continuous-time functions given below :

$x(t) = 3 \cos 2t$ for all t

and $h(t) = e^{-|t|} = \begin{cases} e^{t} & \text{for } t < 0 \\ e^{-t} & \text{for } t \geq 0. \end{cases}$ 9

(b) Discuss the following properties of discrete time LTI systems in brief :

(i) Commutative property

(ii) Distributive property

(iii) Associative property. 6

8. Write short notes on following :

(i) System Modelling in terms of state variable

(ii) Convolution theorem. 7½+7½

College semester examination question papers for all subjects and branches