

B.TECH. SEM -III ELECTRONICS / BIO MEDICAL / E & TC)
2014 COURSE (CBCS) : SUMMER - 2018
SUBJECT: SIGNALS AND SYSTEMS

Day: **Wednesday**
Date: **23/05/2018**

S-2018-2246

Time: **02.30 PM TO 05.30 PM**
Max. Marks: 60

N.B:

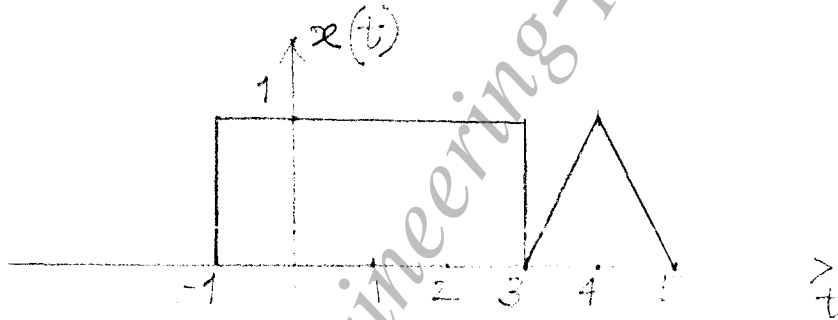
- 1) All Questions are **COMPULSORY**
- 2) Figures to the right indicate **Full** marks.
- 3) Use of non-programmable **CALCULATOR** allowed.
- 4) Assume suitable data wherever necessary.

Q.1 Determine the energy of the following discrete time signal **(10)**

$$x[n] = \left(\frac{1}{2}\right)^n u[n]$$

OR

Q.1 Draw the signal $y(t) = x(2t+1)$, given that $x(t)$ is as shown below **(10)**



Q.2 Find the convolution of discrete time signals **(10)**

$$x[n] = \left\{ \begin{matrix} 1, 1, 1 \\ \uparrow \end{matrix} \right\}$$

$$h[n] = \left\{ \begin{matrix} 1, 2, 3, 4, 5 \\ \uparrow \end{matrix} \right\}$$

The vertical arrow indicates the position of origin. The value of signals is zero elsewhere.

OR

Q.2 What is the impulse response of the system which is a series inter-connection of systems with impulse responses $h_1(t)$ and $h_2(t)$? Justify your answer. **(10)**

Q.3 Draw and find the Fourier transform of $x(t) = u(t) - 2u(t-1) + u(t-2)$. **(10)**

OR

Q.3 Prove that multiplication in time domain is equivalent to convolution in frequency domain. **(10)**

P.T.O.

- Q.4** Find the inverse Laplace transform of **(10)**
$$X(s) = \frac{1}{(s+1)(s+2)}, \text{Re}\{s\} > -1.$$

OR

- Q.4** What are the causality and stability criteria for LTI system in Laplace domain **(10)**

- Q.5** Find the inverse z- transform of **(10)**
$$H(z) = \frac{1/6z}{(z-1/2)(z-1/3)}, \frac{1}{3} < |z| < 1/2 .$$

OR

- Q.5** What is the criteria for stability in z – domain for a discrete time LTI system? **(10)**

- Q.6** What is the relation between the cross correlation sequences $r_{xy}(l)$ and $r_{yx}(l)$? Justify your answer. **(10)**

OR

- Q.6** Is there any loss of information if the sampling frequency is greater than two times the band limiting frequency (or $f_s > 2f_B$)? Justify your answer. **(10)**

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