Total No. of Printed Pages: 02

SUBJECT CODE NO:- H-1079
FACULTY OF SCIENCE AND TECHNOLOGY
S.Y.B.Tech. (ETC) (Sem IV)
Signals & Systems
[OLD]

[Time: Three Hours] **[Max.Marks: 80]**

Please check whether you have got the right question paper.

N.B i) Q. 1 & Q. 6 are compulsory.
ii) Attempt any two questions from remaining in each section separately.

Section - A

Q.1 Solve. 10

a. Define time invariant and time variant systems.
b. What are Dirichet's conditions?
c. Define signal
d. What is static system? State with example.
e. Find fourier transform of x(+)=1.

Q.2 a. Consider $x(k) = (1, 2, 3, 4) \& b(k) = (-1, -2, -3, -4)$. Determine Linear convolution. 08
$y(k) = x(k) \times h(k)$ using tabular method. (Sliding Tape method)

b. Determine whether the following systems are 07
i. Linear
ii. Causal
iii. Time invariant
iv. Stable

$$y(t) = e^{x(t)}$$
$$y(n) = nx(n)$$

Q.3 a. State and prove any two properties of Fourier transform. 08
b. Define basic signal with their graphical representation. 07

Q.4 a. A discrete time signal is given by 08
$x(n) = \{3, 1, 2, 3, 1\}$ the draw.

i. $x(-n)$
ii. $x(n+1)$
iii. $x(n)\, x(n-1)$
iv. $x(n-1)\, \delta(n-1)$

b. Distinguish between. 07
   1. Even and Odd signal
   2. Energy and Power signal

Q.5 Write short notes. 15
1. Dirichlet's conditions
2. Gibb's Phenomenon
3. Fourier Transform

Section - B

Q.6 Solve. 10
a. What is PSD?
b. Write properties of cross-correlation.
c. Define spectrum.
d. What is particular solution?
e. Find inverse Z transform of $X(Z) = 1 + 2z^{-1} - 3z^{-2}$.

Q.7 a. Find inverse Z – transform of 08

$$X(Z) = \frac{z+2}{z^2+8z+15} |Z| > 5$$

07

b. Explain properties of Z-transform.

Q.8 a. What is auto-correlations? Give its properties. 08
b. State and prove any two properties of Z-transform. 07

Q.9 a. State and explain properties of ESD. 08
b. Determine particular solution for 07

$y(n) + 2y(n-1) + y(n-2) = x(n) + x(n-1)$ with $x(n) = \left[{}^{1}/_{2}\right]^{n} u(n)$

Q.10 Write notes.
i. PSD 07
ii. Auto correlation 08