Roll No. ☐☐☐☐☐☐☐☐☐☐☐   Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (EE/EEE)   (Sem.–4)
SIGNALS AND SYSTEMS
Subject Code : BTEE-404-18
M.Code : 77609
Date of Examination : 09-07-22

Time : 3 Hrs.   Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :
1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

1.   **Write briefly :**

a)   Define linearity property of Fourier transform.

b)   State sampling theorem.

c)   What is the periodicity of the signal?

d)   Differentiate the unit step signal from unit impulse signal.

e)   What are state equations? Write the mathematical expressions.

f)   Differentiate between the Fourier series and Fourier transform.

g)   Explain energy and power signals with examples.

h)   What is the function of filtering in signals and systems?

i)   Explain any two applications of signals and systems in engineering and sciences,

j)   Write the Laplace transform of unit impulse signal, draw its waveform.

SECTION-B

2. State and explain the Parseval's theorem of discrete time Fourier transform.

3. Derive an expression for the transfer function of zero order hold.

4. Explain the properties of Z-transform.

5. Explain any four system properties with examples.

6. Derive the expression for the convolution integral.

SECTION-C

7. a) Let the impulse response of a LTI system be $h(t) = \sigma(t - a)$. Determine the output of this system in response to any input $x(t)$.

   b) Explain briefly the classification of the signals, with expressions and waveforms.

8. Find the inverse Fourier transform of X $(j\ \omega) = (5j\omega + 12) / ((j\omega)^2 + j\omega + 6)$.

9. Write short notes on:

   a) Aliasing and its effects

   b) State transition matrix and mathematical expression.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.