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Roll No. :

328415(28)

**B. E. (Fourth Semester) Examination,
April-May 2021**

(Old Scheme)

(AEI, EI & Et&T Engg. Branch)

SIGNALS

SINGLES & SYSTEMS

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : Part (a) of each question is compulsory to alternate and attempt any two part from part b, c, d of each question.

Unit-I

1. (a) Define unit step signal.

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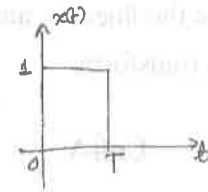
- (b) Sketch the signal $x(t) = e^{-at}$ for $a > 0$ and determine whether the signal is power signal or an energy signal or neither. 7
- (c) (i) Check whether the following systems are time-invariant or time-variant 7
- (1) $y(t) = \sin x(t)$
- (2) $y(t) = tx(t)$
- (ii) Determine if the systems described by the followed input-output equation are linear or non linear.
- (1) $y(n) = nx(n)$
- (2) $y(n) = x^2(n)$
- (d) State and explain the condition for signal is periodic or non periodic and even or odd signal. 7

Unit-II

2. (a) Define ROC. 2
- (b) State and explain any seven properties of founer transform. 7

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- (c) State and explain any seven properties of Laplace transform. 7
- (d) Find the fourier transform of rectangular pule shown in figure. 7



Unit-III

3. (a) Define transfer function. 2
- (b) Find impulse response of system described by the equation $2y'(t) + 3y(t) = x(t)$ 7
- (c) Drew direct-I and II structures for the difference equation $\frac{d}{dt}y(t) + y(t) = 5x(t)$ 7
- (d) Define state, state variable, state vectors and state space. 7

Unit-IV

4. (a) State the condition for existence of FT. 2

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- (b) Obtain DTFT of unit step 4 cm. 7
- (c) Obtain N-pant DFT of exponential sequence $x(n) a^n u(n)$ for $0 \leq n \leq n-1$. 7
- (d) State and prove the linearty and time stufing properties of Z transform. 7

Unit-V

5. (a) Define FFT. 2
- (b) List explain different building blocks are used in block diagram representation for LTI system described by difference equation. 7
- (c) Obtain linear convolution of following sequance using graphical method. 7
- $x(n) = \{1, 2, 1, 2\}$ and $n(n) = \{1, 1, 1\}$
- (d) Find out zero input response for a second order difference equation. 7

$$y(n) - 3y(n-1) - 4y(n-2) = x(n)$$