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# B028414(028)

## B. Tech. (Fourth Semester) Examination, April-May 2021

### (Electronics & Tele. Communication Engg. Branch)

### SIGNALS & SYSTEMS

***Time Allowed : Three hours***

***Maximum Marks : 100***

***Minimum Pass Marks : 35***

***Note :*** *Attempt all questions. Part (a) from each question is compulsory. Attempt any* ***two*** *parts from part (b), (c) and (d) of each question.*

### Unit-I

**1.** (a) (i) Define the term signal. 2

(ii) Define continuous time and discrete time signal. 2

(b) find the even and odd components of signal 8

$$x(t) = \cos t + 2\sin t + 3\cos t \cdot \sin t$$

(c) Describe energy and power signals. 8

(d) Sketch and calculate their energies. 8

(i) $e^{-10t}u(t)$

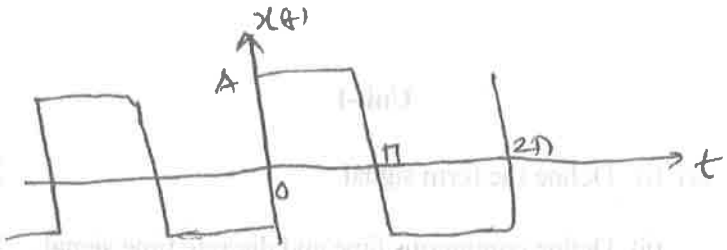
(ii) $u(t) - u(t-15)$

## Unit-II

2. (a) Define fourier series and give the Dirichlet's conditions. 4

(b) State and explain any five properties of fourier series. 8

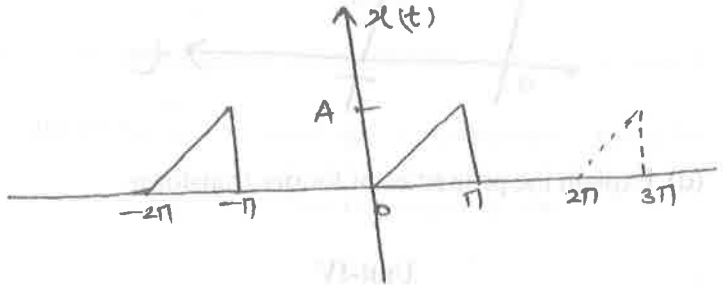
(c) Obtain the exponential fourier series for waveform shown in figure. 8








(d) Obtain the trigonometric fourier series for following waveform. 8




## Unit-III

3. (a) State and prove following properties of fourier transform : 4

(i) Time scaling

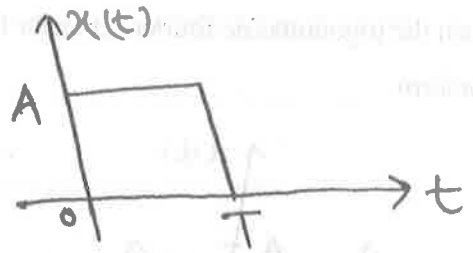
(ii) Time shifting

(b) Find the fourier transform for : 8

(i) $\cos w_0 t\, u(t)$

(ii) $\sin w_0 t\, u(t)$

(c) Find the fourier transform of the rectangular pulse shown in figure. 8




(d) Explain the properties of fourier transform. 8

## Unit-IV

**4.** (a) Explain any two property of z-transform. 4

(b) Find z-transform for : 8

(i) $x(n)=2^n u(n-2)$

(ii) $x(n)=n^2 u(n)$

(c) Find z-transform and ROC of 8

$$x(n)=(2/3)^n u(n)+\left(\frac{-1}{2}\right)^2 u(n)$$

(d) Find z-transform of following sequences : 8

(i) $a^{-n}u(-n-1)$





(ii) $a^{n+1}u(n+1)$

## Unit-V

**5.** (a) Write the properties of continuous time LTI system. 4

(b) If the impulse response of any system is given by $e^{-at}u(t)$. Determine the step response. 8

(c) Obtain the convolution of $x(t)=e^{-3t}u(t)$ and $h(t)=u(t-1)$. 8

(d) For an LTI system with unit impulse response $h(t)=e^{-2t}u(t)$ determine output to the input $x(t)=e^{-t}u(t)$. 8