Exam.Code:0927
Sub. Code: 33642

2076

B.E. (Electronics and Communication Engineering)

Third Semester

EC-302: Signals and Systems

Time allowed: 3 Hours Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Section. Use of scientific calculator is allowed.

x-x-x

Q.1. Attempt the following questions: -

(a) Define the Impulse Response of a Linear Time-Invariant (LTI) system. (2)

(b) What is the Fourier Transform of a constant DC signal? (2)

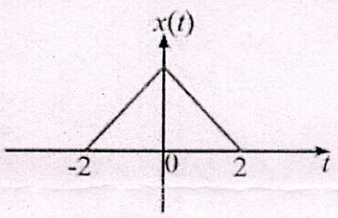
(c) What is the purpose of a reconstruction (anti-aliasing) filter? (2)

(d) State the necessary and sufficient condition for a system to be BIBO stable. (2)

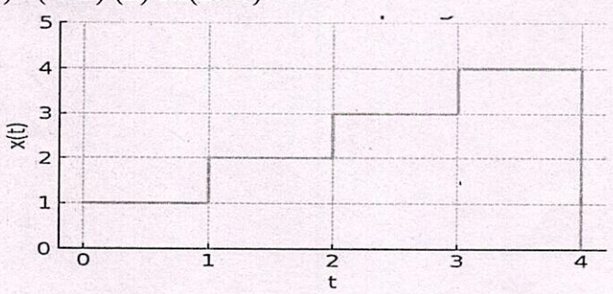
(e) Define a causal signal and provide an example. (2)

Section- A

Q. 2 (a) Sketch the even & odd parts of the following signal shown in figure below. (5)

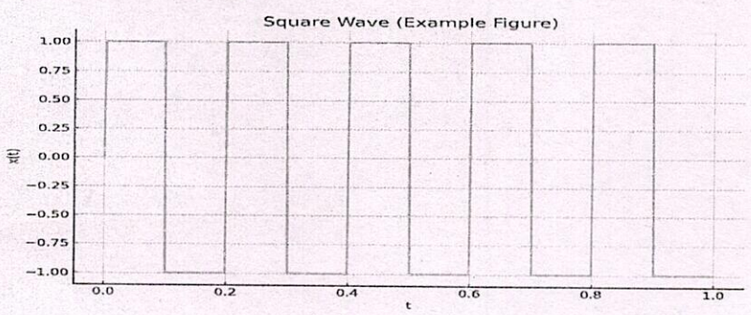


(b) Construct (i) x(-t+2) (ii) 3x(2t+1)



(5)

Q.3 (a) For the following periodic square wave, determine the trigonometric Fourier series coefficients A_0, An, Bn.



(5)

(b) Compute the convolution sum of x[n]=u[n] and $h[n] = (\frac{1}{2})^{n-3}\, u[n-3]$ (5)

P.T.O.

Q.4 (a) Find out Fourier transform of (i) u(t) (ii)$e^{-at}u(t)$ (iii)$te^{-at}u(t)$ (5)

(b) Define Aliasing Effect, Nyquist sampling rate and Nyquist sampling interval (5)

Section-B

Q.5 (a) Determine the Laplace Transform and ROC of x(t)=$7te^{-2t}u(t)$. (5)

(b) Using partial fractions, find $L^{-1}\{ (3s+7)/(s^2+5s+6) \}$. (5)

Q.6 (a) Determine the Z-Transform and ROC of x[n]=$(\frac{3}{4})^n\ u[n]$ (5)

(b) Compute the inverse Z-Transform of X(z)= $(z^2)/(z-1)(z-2)$. (5)

Q.7 A system is described by: ẋ(t)= [[0,1],[-4,-5]]x(t)+[1;0]u(t). Find Φ(t) and system response for u(t)=e^{−t}. (10)

x-x-x