

(OLD COURSE) QP Code : 11979

(2 ½ Hours)

[Total Marks : 75]

- N.B. :** (1) Question No. 1 is compulsory.
(2) Solve any **four** questions from the remaining.
(3) Assume **suitable data** if necessary & justify the assumption.

1. (a) For an electromagnetic wave prove that $\vec{E} \cdot \vec{H}$ & $\vec{E} \times \vec{H}$ give direction of propagation of wave. 5
- (b) Explain pulse broadening in dispersive media. 5
- (c) Derive wave equations for time harmonic fields 5
- (d) Explain electrostatic discharge. 5

2. (a) A 50Ω transmission line is terminated on load of $(25-j30) \Omega$. The length of line is 0.15λ . Evaluate reflection coefficient, input impedance of line and VSWR. Use Smith Chart only. 10
- (b) What are different sources of EMI. Discuss need for electromagnetic compatibility. 10

3. (a) With reference to electromagnetic wave explain Linear, circular & elliptical polarization. 10
- (b) Derive expression for radiation resistance of an antenna. Calculate radiation resistances of Hertzian dipoles of length $\lambda/40$, $\lambda/60$ & $\lambda/80$ 10

4. (a) Explain the concept of displacement current and retarded potentials. 10
- (b) State and prove poynting Theorem. Explain the terms instantaneous, average & Complex poynting vector. 10

5. (a) Derive the expressions for reflection and transmission coefficients in cases of reflection from perfect dielectric at normal incidence. 10
- (b) Explain potential functions for sinusoidal radiation oscillations. 10

6. (a) For a medium with $\sigma = 0, \mu = \mu_0, \epsilon = \epsilon_0$ 10

$$\vec{E} = Z_0 \sin(10^8 t - \beta z) \vec{a}_y \text{ v/m}$$
- (b) Explain impedance matching in detail. 10

7. (a) Find directivity of half wave dipole 5
- (b) If $\nabla^2 = x^2 yz + A^2 y^3 z$, find A so that Laplace's equation is satisfied. 5
- (c) Derive equation for characteristic impedance of a line in terms of primary constants of line. 5
- (d) Explain surface impedance of conductor. 5

(OLD COURSE)

QP Code : **12019**

(3 Hours)

[Total Marks : 100

- N.B. :** (1) Question No. 1 is compulsory.
(2) Attempt any **four** questions out of remaining **six** questions,
(3) Assume suitable **data** wherever **necessary**.
(4) **Figures** to the **right** indicate **full** marks.

1. (a) How current limit is achieved in IC 7231. 5
(b) Explain voltage to current converter. 5
(c) Explain any two applications of PLL. 5
(d) What is a roll of rate of first order filter ? 5
2. (a) Derive the expression for Q and cutoff frequency for second order low pass KRC Filter. 10
(b) Compare different types of ADCs based on their working principle. 10
Explain working of any one of ADC.
3. (a) Draw and explain functional diagram of PLL IC 565. 10
(b) With proper derivation and circuit, explain the working of full wave precision rectifier. 10
4. (a) Explain in detail about Wien bridge oscillator. 10
(b) Explain in brief about fixed voltage series regulator. 10
5. (a) Design a monostable 555 timer circuit to produce output pulse 5 second wide, Draw circuit diagram. 10
(b) Draw the circuit diagram of three OP-AMP Instrumentation Amplifier. 10
Derive expression for Output.
6. (a) What is comparator ? Draw the characteristics of ideal comparator. 10
What is difference between basic comparator and Schmitt trigger ?
(b) Draw and explain the circuit diagram to generate triangular waveform using OP-AMP. 10
7. Write short notes on any **two** :—
 - (a) Analog switches. 5
 - (b) Summing amplifier. 5
 - (c) Sample and Hold circuit. 5
 - (d) RC- phase shift oscillator. 5
 - (e) Current feedback amplifiers 5

(OLD COURSE)

QP Code :12061

(3 Hours)

[Total Marks : 100

- N.B. : (1) Question No. one is compulsory.
(2) Attempt any four from remaining six questions.

Q.1. Design 8085 based system with following specifications. Draw detail interface diagram.

- i) CPU operating at 3 MHz
- ii) 16KB EPROM using 4 KB devices
- iii) 16KB SRAM using 8 KB devices
- iv) One 8 bit input and one 8bit output port performing simple I/O data transfer in I/O mapped I/O.

Give its memory mapping & I/O mapping and use absolute decoding approach. 20 marks

Q.2. a) Explain the memory organizing of 8051 Microcontroller 10 marks

b) Explain following instruction of 8085 microprocessor with one example

i) ADD M ii) XCHG iii) PUSH iv) RRC v) JZ address 10 marks

Q.3. a) Explain the I/O operating modes of 8255 PPI in details. 10 marks

b) Explain the block diagram of 8259 peripheral IC 10 marks

Q.4. a) Write a program to generate a square wave of 2 KHz using 8155 timer. Timer operate at 3 MHz. 10 marks

b) Draw and Explain the interrupt structure of 8051 Microcontroller, also explain IE register. 10 marks

Q.5. a) Explain with suitable example addressing modes of 8085 microprocessor 10 marks

b) Compare memory mapped I/O with I/O Mapped I/O 10 marks

Q.6. a) Draw & explain architecture of ARM processor 10 marks

b) Draw & Explain interfacing of 8253 with 8085 microprocessor using I/O mapping technique. 10 marks

Q.7 Write a short note on 20 marks

a) Interrupt structure of 8085 Microprocessor

c) Operating modes of ARM processor

(OLD COURSE) QP Code 12097

(3 Hours)

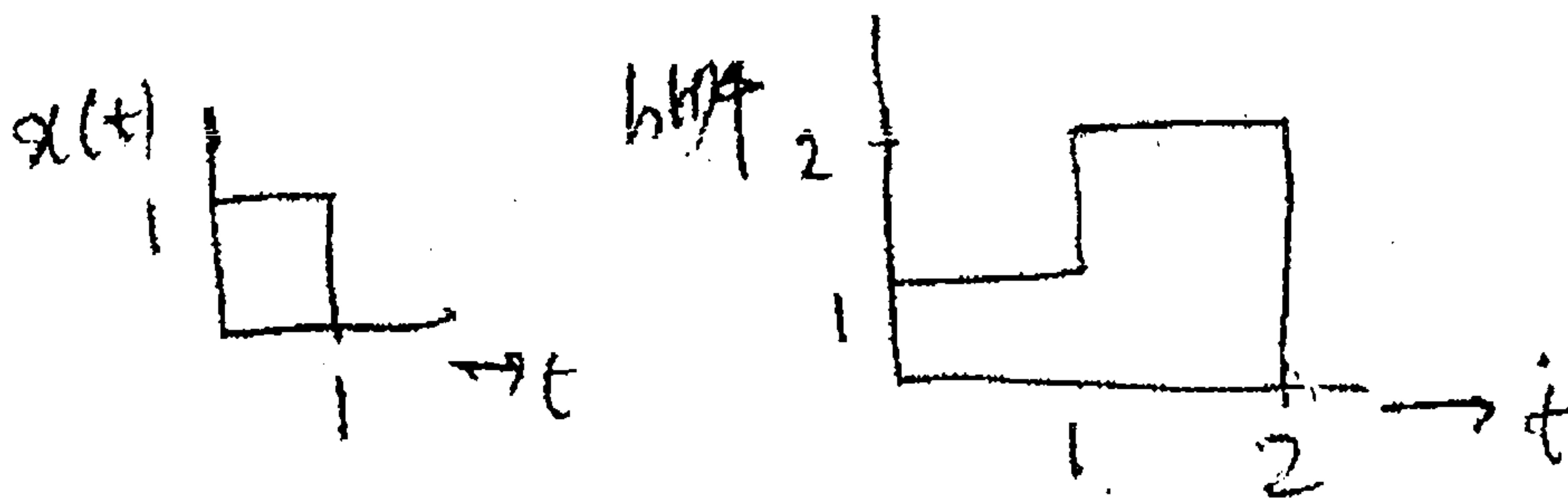
[Total Marks : 100

- N.B.:** (1) Question No. 1 is compulsory.
 (2) Answer any **four** out of remaining **six** questions.
 (3) Assumptions made should be **clearly** stated.

1. Answer the following :-

(a) Obtain cross correlation of $x(t)$ and $h(t)$

5



(b) State and explain physical significance of scaling property of Fourier transform of CT signal.

5

(c) Check stability and causality of following CT system

5

$$\frac{d^2y}{dt^2} - 2t \frac{dy}{dt} = x(t)$$

(d) Explain relationship between Laplace transform and Fourier transform of CT signal.

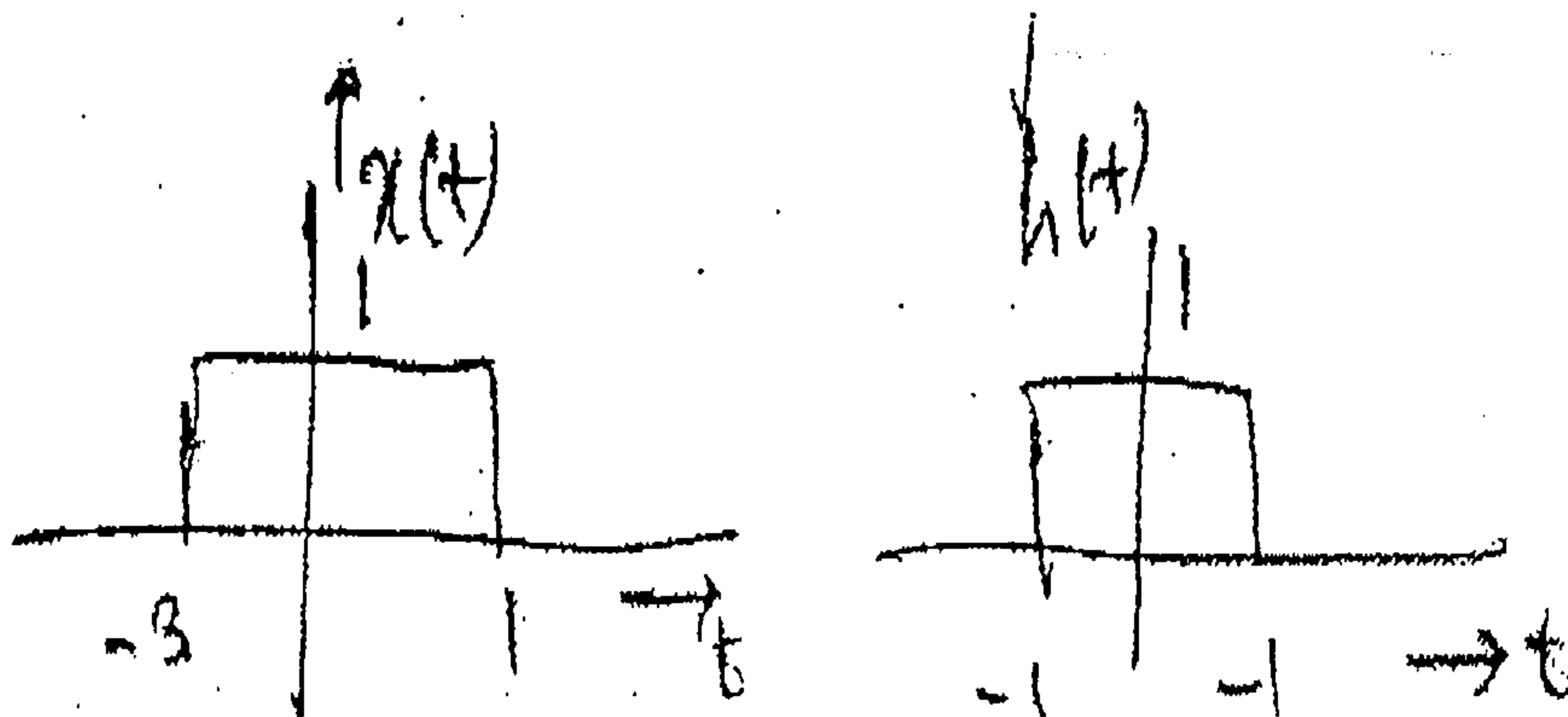
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2 (a) Determine step response of system whose impulse response is $h(t) = e^{-t} u(t)$

10

(b) Convolve the following signals.

10



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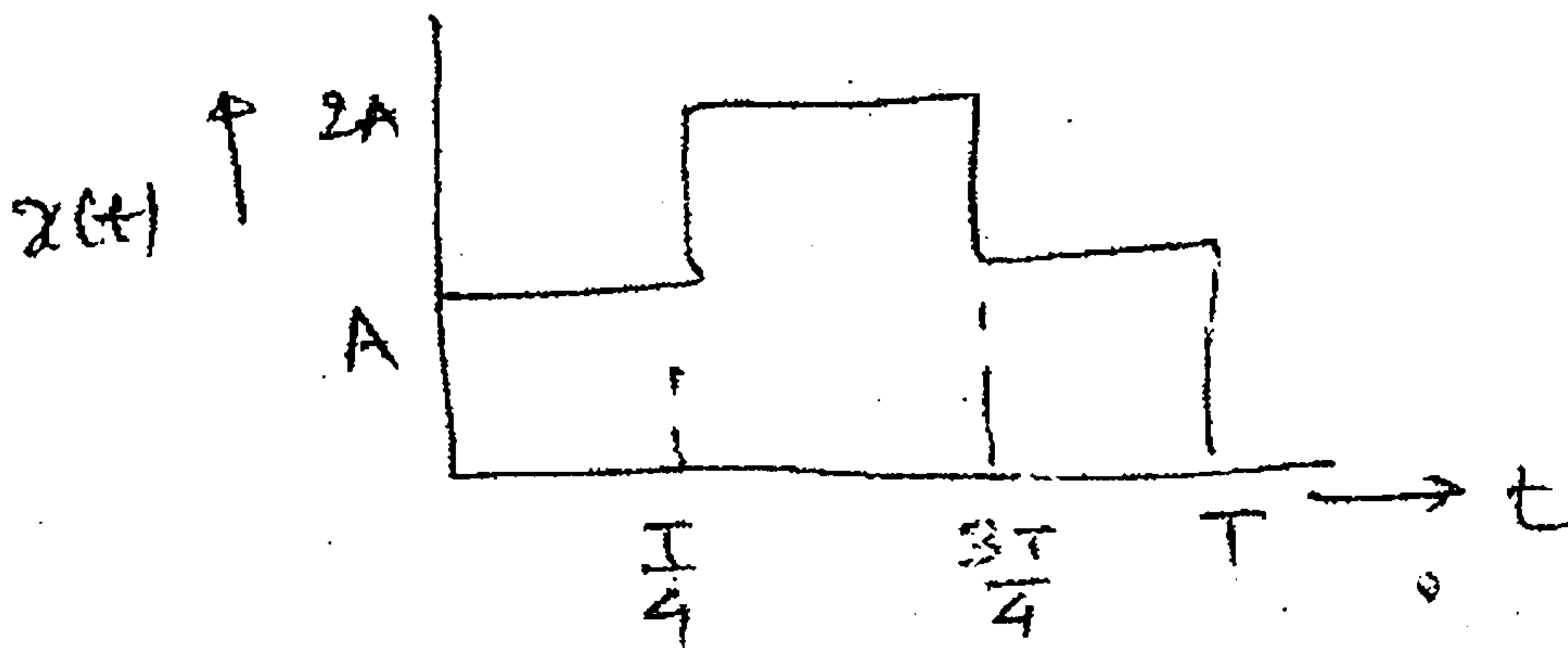
3. (a) Describe the different random processes. 10
 (b) Obtain transfer function for a system having state equation. 10

$$\begin{bmatrix} \dot{x}_1(t) \\ \dot{x}_2(t) \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix} \begin{bmatrix} x_1(t) \\ x_2(t) \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(t)$$

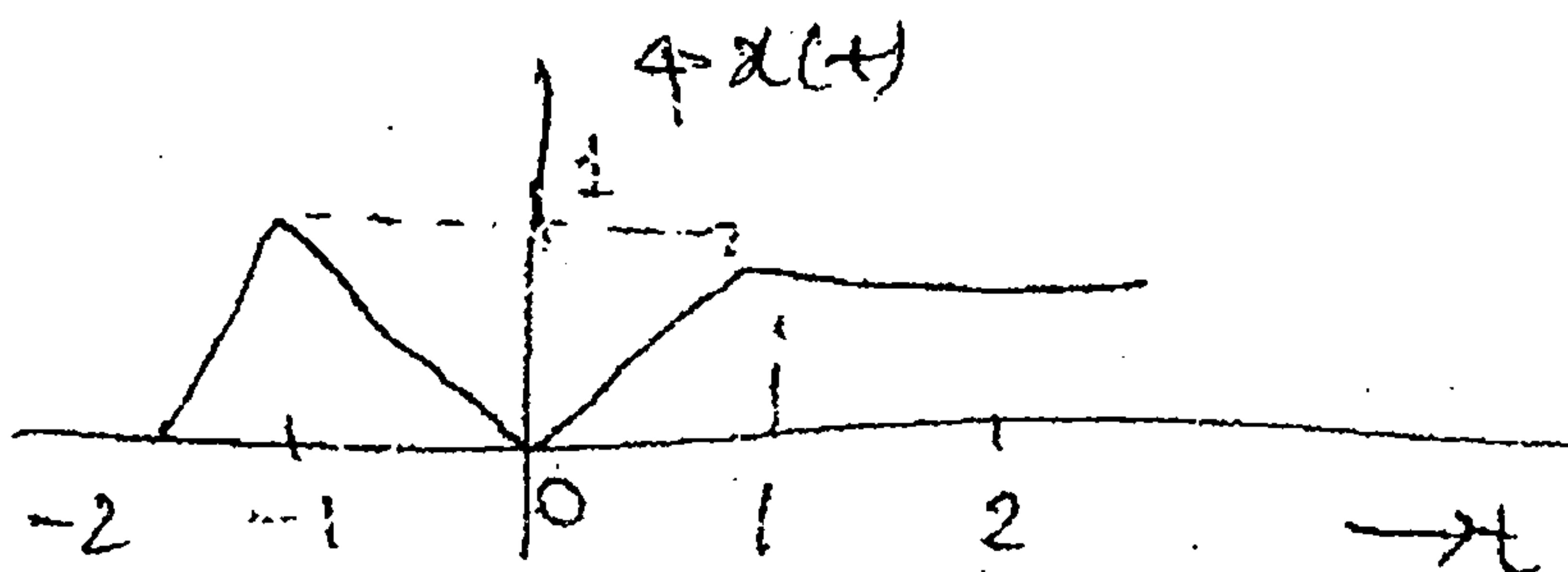
and output equation

$$y(t) = \begin{bmatrix} 1 & 0 \end{bmatrix} \begin{bmatrix} x_1(t) \\ x_2(t) \end{bmatrix}$$

4. (a) Using properties of Fourier transform and not otherwise find Fourier transform of signal shown 10



- (b) Determine Odd and even components of the signal. 10



5. (a) Discuss PDF of Uniform Exponential and Gaussian distribution. 10
 (b) Obtain inverse Laplace transform of 10

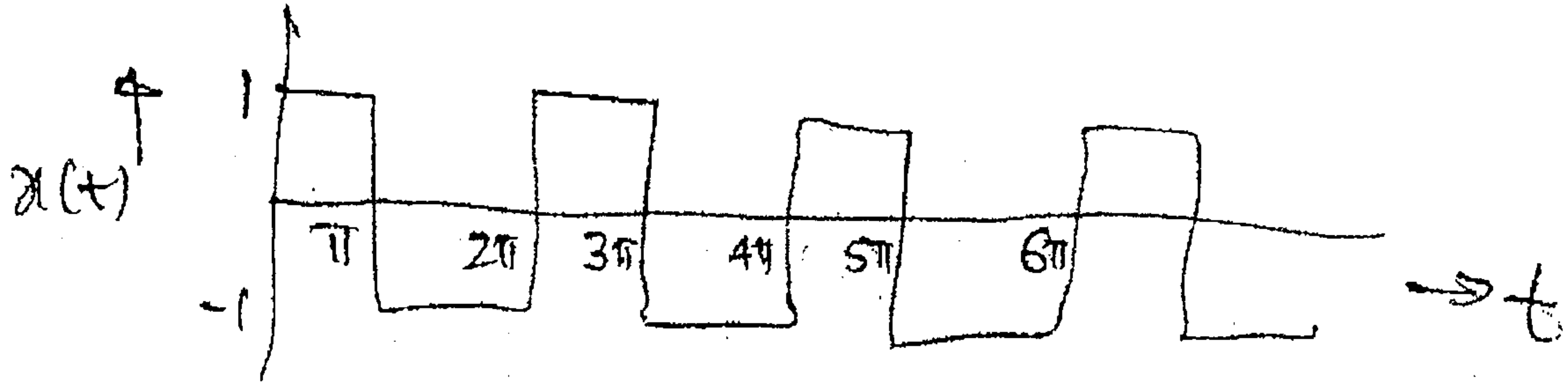
$$x(s) = \frac{4}{(s+1)(s+2)^2}$$

for all possible region of convergence.

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6. (a) Find trigonometric Fourier series of waveform shown below.

10



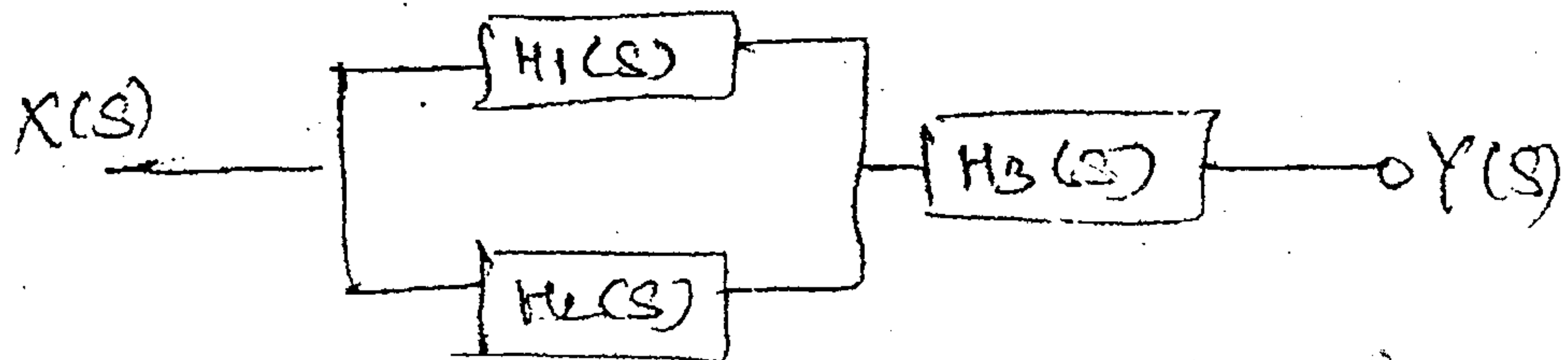
(b) Plot signal $x(t) = 2r(t) - 2r(t-1) - 2u(t-3)$ and sketch

10

- (i) $x(1-t)$
- (ii) $x(t+2)$
- (iii) $x(2t-1)$

7. (a) Find impulse response of overall system

10



$$H_1(s) = \frac{4}{s+2} \quad H_2(s) = \frac{-3}{s+1} \quad H_3(s) = \frac{s+2}{s-2}$$

(b) Evaluate $\int_{-2}^4 (2+t^2) dt \delta(t-1) dt + \int_{-1}^1 t^2 \delta(t+4) dt$.

5

(c) Sketch single sided and double sided spectrum of

5

$$x(t) = \cos\left(6\pi t + \frac{\pi}{3}\right) + 2\sin(10\pi t)$$