TE|ETRX|V (R) 1|6|13

DCCT

V-A4-1st-Hf-Ex-13-E-80

Con. 9705-13. **GS-9228**

(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 any **suitable** data wherever **required** but **justify** the **same**.

1. Attempt any **four** from the following :— **20**
   (a) Justify : Phase continuity is maintained in MSK-Signal.
   (b) Justify : In DEPSK transmissioin, error always exists in pairs.
   (c) A 3 digit message is transmitted over a noisy channel having a probability of error P_e = (215) Per digit. Determine probability of errorless message and plot all possible probability of occurance of error.
   (d) Differentiate between Systematic and Non-Systematic Cyclic code with suitable examples.
   (e) Explain with Neat Eye diagram, how intersymbol interference can be analyse.

2. (a) A discrete memoryless source has in alphabet of fine Symbol with there probabilities an shown : **10**

Symbol	S_1	S_2	S_3	S_4	S_5
Probability	0·15	0·11	0·19	0·40	0·15

   (i) Construct Huffman code and calculate code efficiency and redundancy of the code.
   (ii) Repeat the same for Shannon-fana code and compare the result.
   (b) Does Rayleigh distribution consider two signal components, each having Gaussian distribution ? **5**
   (c) How are error function erf(u) and Complementary error funciton $erf_c(u)$ related ? **5**

3. (a) Prove with suitable power spectral density curve, the bandwidth of QPSK system is one half the bandwidth of BPSK system. **10**
   (b) Draw the phasor digram of 8-ary PSK and calculate the minimum distance between two symbol. **6**
   (c) Compare Orthogonal and Non-orthogonal FSK. **4**

4. (a) The Parity check matrix $\overline{H}$ of a linear (7, 4) block code is given as follows :— **10**

$$\overline{H} = \begin{bmatrix} 1 & 0 & 1 & 0 & 1 & 0 & 0 \\ 1 & 0 & 1 & 1 & 0 & 1 & 0 \\ 1 & 1 & 0 & 1 & 0 & 0 & 1 \end{bmatrix}$$

Show how data words (i) 0011 (ii) 0100 and (iii) 0110 are coded. Also show how error is detected when 2nd bit is detected erroneously for data word 0011.

[TURN OVER

(b) A (7, 4) cyclic code is generated using the Polynomial $x^3 + x + 1$ **10**
   (i) Generate the systematic cyclic code for the data 1100.
   (ii) Draw the encoder and show how Parity bits are generated for the data sequence 1100. Compare with (1).
   (iii) Draw the decoder for the same and obtain the syndrome for the received codeword 1011010.

5. (a) A convolutional encoder has single shift register with three Modulator, two adder and an output multiplexer. The following generator sequence are combined by the multiplexer to produce the encoder output **12**

$$g_1 = 010 \; ; \quad g_2 = 110 \; ; \quad g_3 = 111$$

   (i) Draw block diagram of the encoder.
   (ii) for the I/P message sequence 01101 determine the output sequence of the encoder.
   (iii) Draw the state and trallier diagram for the same.

(b) A communication receiver receive, the following codeword : **8**

01101001

Decode the received codeword using Viterbi algorithm, consider the same encoder design an in **Q5(a)**.

6. (a) Describe the expression for error probability of a matched filter and justify that P_e doesnot depend on the shape of the input waveform. **10**
   (b) Explain the basic principle of frequency hopped spread spectrum. **5**
   (c) Differentiate with proper waveform slow frequency hopping and fast freqeuency hopping. **5**

7. (a) A PN sequence is generated using a feedback shift register of length three with [3, 1] feedback taps. **10**
   (i) Draw the schematic arrangement.
   (ii) Find the generated output of the initial contents of the shift register is 101.
   (iii) If the chip rate is 10^6 chips/sec. Calculate the length of PN sequence.

(b) Differentiate between (any **two**) :— **10**
   (i) BPSK, BFSK and BASK
   (B.W required, Noise, transmission rate efficiency and application)
   (ii) Line coding, source coding and channel coding.
   (coding scheme, type and application)
   (iii) Duo Binary and Modified Duo Binary encoding.

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CTSS

P4–RT–Exam.–Feb.–13–3–128

Con. 6990–13. **GS–9090**

(3 Hours) **[Total Marks : 100**

N.B. : (1) Question No. **1** is **compulsory** and answer any **four** questions out of **remaining.**
(2) Assume **suitable** data, if **necessary** with proper **justifications.**

1. Attempt any **four** of the following :– **20**

(a) What is the condition for system to be stable in time domain ? If $h(t) = e^{-t}\, u(t)$, find L.T.; Is the system stable in Laplace domain ?

(b) Find whether following signals are Energy or Powers. Find corresponding Energy / Power if –

(i) $x(t) = Ae^{-at}\, u(t),\ a > 0$

(ii) $x(t) = \text{rect}\left[\dfrac{t}{T_0}\right]$

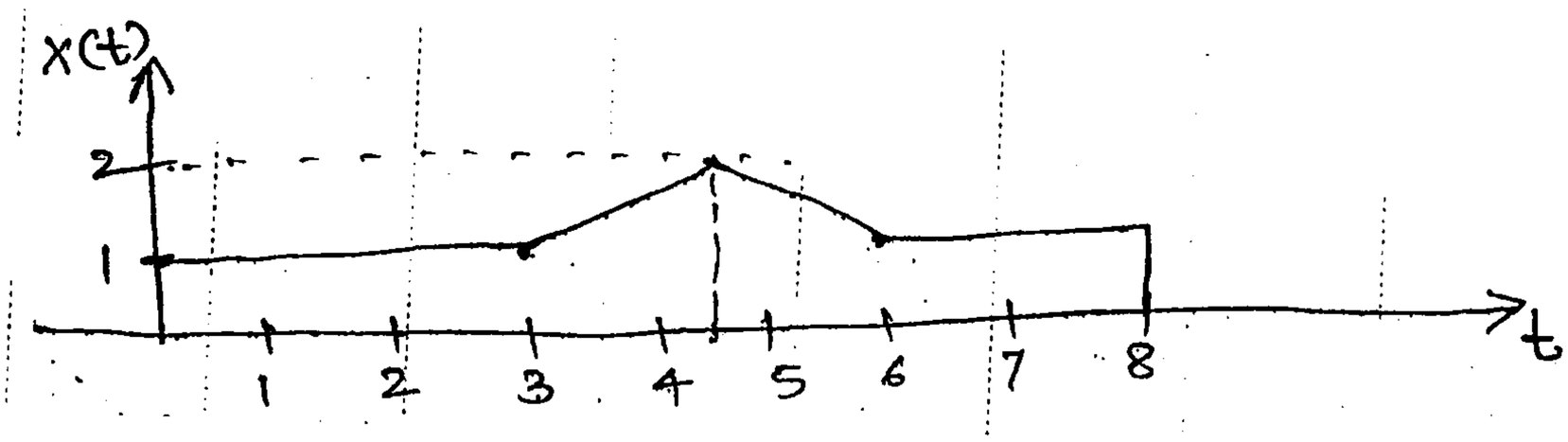
(c) For a system having input output relationship

$$y(t) = \int_{-\infty}^{\infty} x(t)$$

Check – Linearity, time variance, causality and invariability.

(d) State Initial and final value theorem in Laplace Transform. Also find initial and final value if $X(s) = \dfrac{s+10}{s^2+3s+2}$

(e) Express signal x(t) as shown in figure in terms of steps and/or ramp.



2. (a) Find zero i/p response, zero state response and total response of the system if – **10**

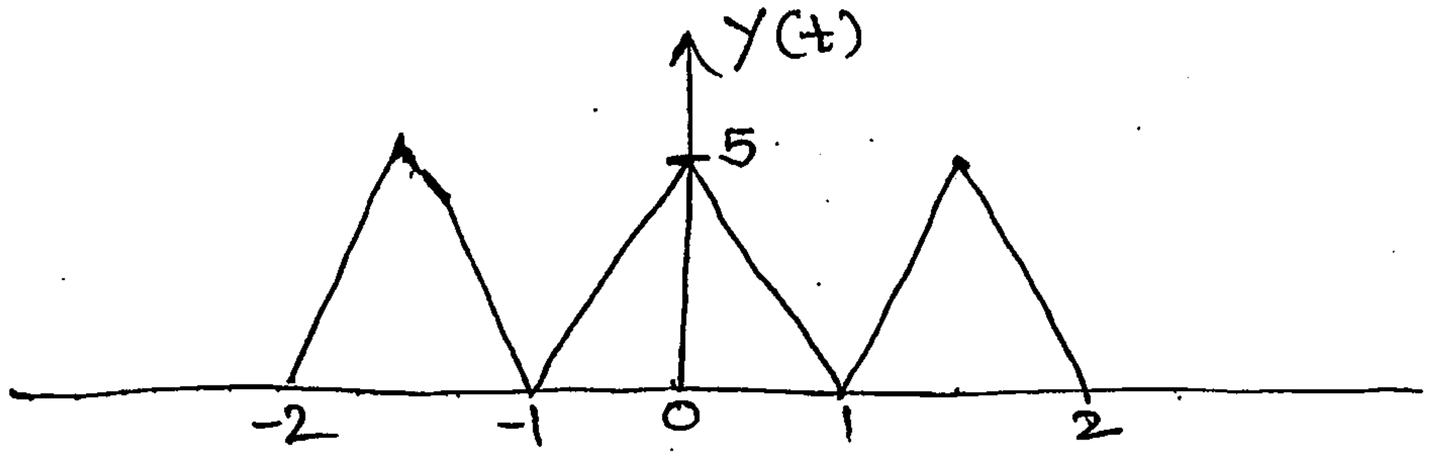
$$\frac{d^2x(t)}{dt^2} + 7\frac{dx(t)}{dt} + 12\,x(t) = u(t)$$

Subjected to the initial condition –

$$X(0^-) = 4 \quad \text{and} \quad \left.\frac{dx(t)}{dt}\right|_{t=0^-} = -8$$

[TURN OVER

(b) Find exponential Fourier series expansion for the signal shown below. Also find corresponding coefficients of trigonometric Fourier series by using the relationship between Trigonometric and Exponential F.S. **10**



3. (a) Explain convolution theorem and perform convolution in time domain if – **10**

$x(t) = t\ u(t),\quad h(t) = e^{-t}$ for $t \geq 0$

$= 0$ otherwise

(b) For all possible ROC conditions, obtain inverse Laplace Transform of – **10**

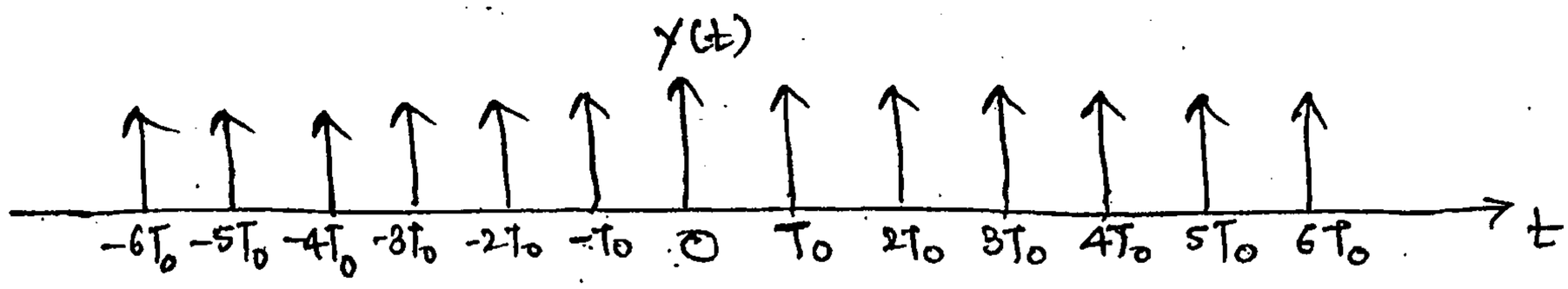
$$X(s) = \frac{5s^2 - 15s - 11}{(s+1)(s-2)^2}$$

4. (a) Compute the following integrals – **10**

(i) $\int_0^{\infty} t^2\ \delta(t-3)dt$ (ii) $\int_0^{5} \text{Sin } 2t\ \delta(t-3)dt$

(iii) $\int_{-\infty}^{\infty} (4-t^2)\ \delta(t+3)dt$ (iv) $\int_{-3}^{8} (6-t^2)\left[\delta(t+4) + 2\delta(2t+4)\right]dt$

(b) Find out exponential Fourier series for impulse train shown below – **10**



Plot its magnitude and phase spectrum.

5. (a) Define random variable and random process. Also draw and explain – **10**
   (i) Pdf of Gaussian Distribution
   (ii) Exponential distribution.

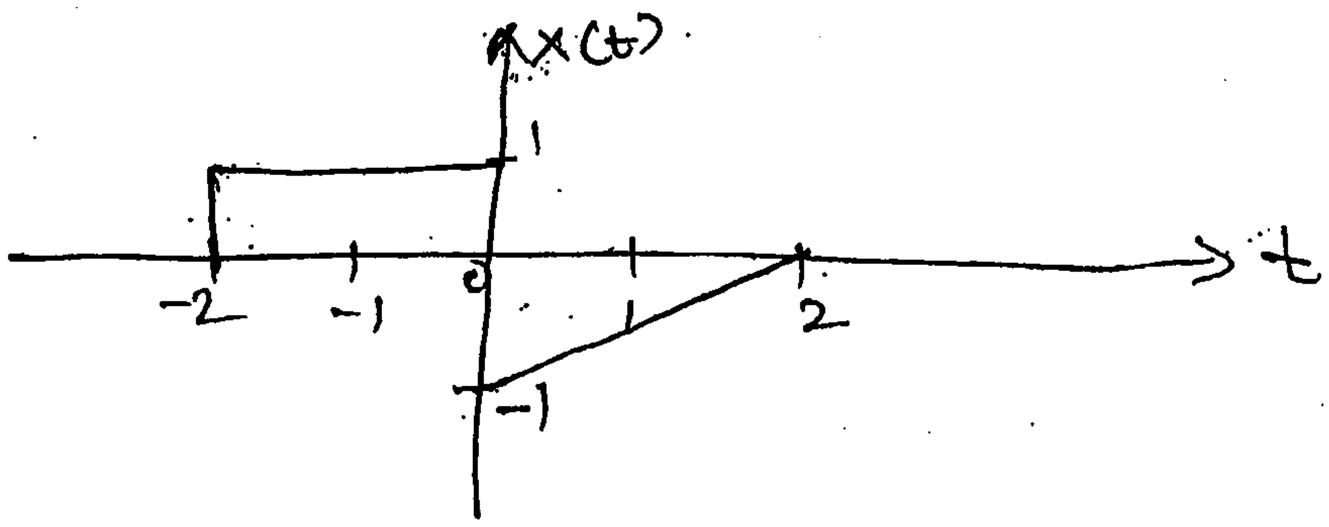
   (b) State and prove frequency shift property of Fourier transform. Explain power spectral density and state all its properties. **10**

6. (a) The T.F. of the system is given as – **10**

$$H(s) = \frac{s^2+s+5}{s^3+6s^2+8s+4}$$

Obtain state variable model using phase valuables.

(b) Signal x(t) is shown in figure below. Sketch and label following signal – **5**
(i) x(2t – 2) (ii) x(t + 5)



(c) Plot x(t) if – **5**

$$x(t) = \left[u(t) + r(t-1) - 2u(t-3)u(-t+5)\right]$$

7. Write short notes on the following :–
   (a) Relation between Fourier transform and Laplace Transform **5**
   (b) Gibb's phenomenon **5**
   (c) Parseval's theorem **5**
   (d) Draw double sided spectrum of – **5**
   $y(t) = 9 + 5\ \sin(120\pi t) - 10\ \mathrm{Cos}(40\pi t - 60°)$

TE sem V (Rev) (ETRX) 10/5/13

Electromagnetic Engg.

ws-Con-2013-1

Con. 7029–13. **GS–8745**

(3 Hours) **[Total Marks : 100**

N.B (1) Question no.1 is compulsory.

(2) Attempt any 4 questions from remaining questions.

(3) Vector notations should be used wherever necessary.

(4) Assume suitable data if necessary.

1. (a) Explain the concept of displacement current. 5

(b) Derive Poisson's and Laplace's equations. 5

(c) Derive wave equations for a conducting medium. 5

(d) Explain the concept of retarded potentials. 5

2. (a) Derive Maxwell's equations for static field in integral and point form. 10

(b) An electric field in a medium which is source free is given by 10

$E = 1.5\cos(10^8 t - \beta z)\,\hat{a}x$ V/m, where E_m is the amplitude of E, ω is the angular Frequency and β is the phase constant. Obtain D, B, H. Assume $\varepsilon_r = 1$, $\mu_r = 1$

3. (a) State and prove Poynting theorem. Explain the terms instantaneous, average and complex Poynting theorem. 10

(b) Define polarization of a wave. Explain the types of polarization. 10

4. (a) Define input impedance of a transmission line. Derive expressions for short and open

[TURN OVER

Circuit impedance of a two wire transmission line. 10

(b) A transmission line of length 0.40λ has a characteristic impedance of 100Ω and is Terminated in a load impedance of 200+j180Ω. Find using smith chart 10

(i) Voltage reflection coefficient

(ii) Voltage standing wave ratio

(iii) Input impedance of the line.

5. (a) Define uniform plane wave. Explain reflection of uniform plane wave at normal incidence. 10

(b) Explain pulse broadcasting in dispersive media. 10

6. (a) Explain different sources of EMI. What is the need of electromagnetic compatibility? 10

(b) Derive expression for expression for radiation fields of an alternating current element. 10

7. Write short notes on;
(a) Smith chart
(b) Ampere's law
(c) Electrostatic discharge
(d) Impedance matching techniques.

17|5|13

T. E. Electronics sem V may-13

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AGJ 1st half (d+) 17

Con. 6956-13.

GS–8862

(3 Hours)

[Total Marks : 100

N.B. : (1) Question No. **1** is **compulsory**.
(2) Answer any **four** out of the remaining **six** questions.
(3) Assumption made should be clearly **stated**.
(4) Assume any **suitable** data wherever required but justify the **same**.
(5) **Figures** to the **right** indicate **full** marks.
(6) **Illustrate** answers with sketches wherever **required**.

1. Solve any **ten** :– **20**

(a) Define input Bias current and offset current
(b) Explain in brief input offset-Error compensation
(c) Write the 741 specification rating's
(d) Write the 555 Ic specification rating's
(e) Write the 78xx Ic specification rating's
(f) Write the phase-Locked loop's Monolithic Ic Number and specification rating's
(g) Disadvange's of Analog Switches
(h) Advantages of precision Rectifier
(i) Write the list of Application for Voltage Comparator
(j) Draw the buffer circuit using IC 741
(j) Draw the power supply diagram, (Input 230V (50Hz) and o/p 5V dc supply)
(k) Draw the power supply diagram for output–5Vdc, Supply.

2. Solve any **four** :–

(a) Compare the inverting and noninverting Amplifier **5**
(b) Explain UGB. Unity gain bandwidth with formula. **5**
(c) Draw current to voltage circuit diagram and give the list of Application's **5**
(d) Draw sample and Hold Amplifier and give the list of the Application's **5**
(e) Draw Instrumentation Amplifier circuit's and give the list of the Advantages and disadvantages. **5**

3. (a) Explain in details cascade design for the Active filter. **10**
(b) Design a High pass second order filter for the cut off frequency of 1kHz. Passband gain $A_F = 2$. **10**

4. (a) Design 10kHz generator with 0·1 μF capacitor; IC 741. **10**
(b) Design the schmitt trigger circuit, (Draw the circuit). **10**

$V_{in} = 1V_{pp}$, $V_{ut} = 25mV$, $V_{it} = -25mV$

Voltage swinge ± 14 Volt,

Calculate R_1 and R_2, and R_{OM}

[TURN OVER

5. (a) Design the 15kHz generator with IC 555 **10**
   Capacitor C = 47 μF, duty cycle = 60%
   Calculate R_A, R_B,
   Draw waveforms.
   (b) Explain if above circuit diagram –
      (i) Duty cycle only adjusted. 40% – What is modification required ? **5**
      (ii) If duty cycle 50% – What is modification required ? **5**

6. (a) Explain 4 bit A to D convertor successive approximation method with tree. **10**
   (b) Draw functional block diagram of Dual slope – A to D converter. Explain its working with neat sketches. **10**

7. Write short notes on any **four** each :– **5**
   (a) Wavefrom generator IC 8038
   (b) DAC
   (c) Operational Amplifier block diagram
   (d) IC 555 internal block diagram
   (e) IC 723 internal block diagram
   (f) IC 1M–317 internal block diagram.

T.E (ETRX) V 22/5/13
up emc I.

65 : 1st half.13-shilpa(scan) (a)

Con. 9300-13. **GS-8985**

(3 Hours) **[Total Marks : 100**

N.B. 1. Question no. 1 is compulsory.
2. Answer any four questions from remaining six questions.
3. Assume suitable data if necessary.

Q.1.	a.	Explain following signals of 8085 1) ALE, 2) READY 3) INTR	05
	b.	Explain addressing modes of 8085.	05
	c.	Explain different assembly directives of 8051.	05
	d.	Explain control word of 8255.	05
Q.2.	a.	Explain interrupt structure of 8051.	10
	b.	Explain different modes of operation of 8254.	10
Q.3.	a.	Explain register architecture of ARM processor.	10
	b.	Explain architecture of 8051 with neat diagram.	10
Q.4.	a.	Explain interfacing of 8259 with 8085 showing decoding logic.	10
	b.	Explain architecture of 8051.	10
Q.5.	a.	Write assembly language program to read 4 x 4 keyboard interfaced through 8255.	10
	b.	Explain interfacing of external memory with 8051.	10
Q.6.	a.	Compare variants of 8051 such as 89C51, 89C52, 89C2051 and 89C2052.	10
	b.	Explain different I/O mapping techniques. Give suitable example.	10
Q.7.	Write short note :		
	a.	Serial communication supported by 8085	05
	b.	Program Status Word of 8051	05
	c.	Interrupt acknowledge bus cycle of 8085	05
	d.	Instruction set of 8085	05