TE/Mech/Elc/ETRX/COM/EXTC Sem V
Environmental Studies

28/12/10

Con. 6493-10. **(REVISED COURSE)** **GT-3639**

(2 Hours) **[Total Marks : 50**

N.B. (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions from question Nos. **2** to **7**.

1. Solve any **five** :— 10
   (a) What is acid rain ? Give two effects of acid rain.
   (b) Differentiate between Bioprospecting and Biopiracy.
   (c) Write note on Cyclone Mitigation.
   (d) Name the fundamental principles of the environment.
   (e) Distinguish between Nuclear Fission and Nuclear Fussion.
   (f) Explain the term Sustainable Development.

2. (a) Give an account of Women and Child Welfare in India. 5
   (b) Discuss the causes and effect of Global Warming. 5

3. (a) Discuss the effect of Water Pollution. 5
   (b) Discuss the role of information technology in environment and human health. 5

4. (a) Short note on public awareness about the environment. 5
   (b) Explain Soil Errosion. How it happened give its types. 5

5. (a) What is Noise ? Describe briefly the effect of noise on human health. 5
   (b) Write an essay on Disaster Management. 5

6. (a) Give the effect of deforestation. 5
   (b) Describe the grassland and forest ecosystem. 5

7. (a) Give the fifteen principles of Environmental Education. 5
   (b) Explain the benefits of biological diversity. 5

T.E. Electronic / sem V / Rev

P4-Con No-22 · Microprocessor & Microcontroller I

Con. 6460–10. **(REVISED COURSE)** **GT–6684**

(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 required with justification.
(4) **Figures** to the **right** indicate **full** marks.

1 (a) Explain how to interface an 8253 with 8085 microprocessor in I/O mapped I/O. mode. Draw memory map and interface diagram. **10**

(b) Explain Asynchronous data communication with SFR's in 8051 Microcontroller, also specify the use of Timer in serial communication. **10**

2. (a) Draw the internal memory organization of 8051. Specify the use of bit addressable memory with one example. **10**
(b) Explain the software and hardware interrupts of 8051 with neat diagram. **10**

3. (a) Give the comparison of salient features of 8051 with it's derivatives like 89C51, 89C52 and 89C2052. **10**
(b) Explain the different Logical and Arithmetic instructions in ARM processor with addressing mode. **10**

4. (a) Define the terms Instruction Cycle, Machine Cycle and T state in 8085. Specify the machine cycles for following instructions. **10**
(i) LDA (ii) LXI (iii) INR M (iv) RRC (v) DAD H.
(b) Explain the multiplexed address/data bus and different machine cycles of 8085 with neat diagram. **10**

5. (a) Write the assembly language program for 8085 to unpack the packed BCD number stored at memory location E002H. Store result at B004H and B005H. Also draw the flow chart for the same. **10**
(b) with neat labeled diagram explain interfacing of LCD with 8051. Use port0 for Data bus and port1 for control bus. **10**

6. (a) Write the assembly language program for 8051 and draw the flow chart to Add two 4 digit BCD numbers. Store result in DPTR register after addition. **10**
(b) Draw and explain the register architecture of ARM processor in different operating modes. **10**

7. Write a short note on following: (Any four). **20**
(a) Program status register and Barrel shifter of ARM Processor.
(b) External and Internal memory organization of 8051.
(c) Addressing modes of 8051.
(d) 8085 Serial Communication.
(f) Interfacing Hex Keyboard with 8051.
(g) Interfacing 8155 with 8085.

TE/ ETRx/ sem v/ old
EMI

VT-Oct-10-24

Con. 5834–10. **(OLD COURSE)** **GT–6924**

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

N.B. : (1) Question **No. 1** is **compulsory**.
(2) Attempt any **four** questions out of the remaining **six** questions.
(3) **Figures** to the **right** indicate **full marks**.

1. (a) Explain need of delay line in C.R.O. **5**
   (b) Explain factors that causes error during Q–measurement. **5**
   (c) Explain factors involved in selection of voltmeter. **5**
   (d) What are merits of Electronic voltmeter over conventional type Analog voltmeter. **5**

2. (a) Explain with proper circuit the working of Electronic voltmeter using FET (differential) bridge. **10**
   (b) Discuss in brief the principle of working of true rms reading and average reading Electronic voltmeters. **10**

3. (a) Draw the pattern displayed on CRO in component testing mode for following :– **10**
      (i) Diode
      (ii) Resistor
      (iii) Capacitor
      (iv) Open Circuit
      (v) Close Circuit.
   (b) Explain the functions of various controls on the front panel of a CRO. **10**

4. (a) What is Q of a coil ? Explain the principle of operation of a Q-meter and how impedance measurement is done by it ? **10**
   (a) Describe phase measurement by balanced modulation type. **10**

5. (a) Explain with the help of neat diagram working of function Generator with proper waveforms at various points. **10**
   (b) Discuss the working of digital frequency meter and show how it is used for time interval measurement. **10**

6. (a) State different methods of Converting Analog Signal into Digital Signal. Explain SAR technique in detail. **10**
   (b) Explain the working of dual trace CRO and dual beam CRO with block diagram and waveform. **10**

7. Write short notes on any **three** :– **20**
   (a) Beat frequency oscillator
   (b) CRT tube
   (c) Lissajuous patterns for measurement
   (d) R. F. signal generator.

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TE / ETRX / Sem V / Rev
LIC & D.

P4–Con No–74

Con. 5701–10. **(REVISED COURSE)** **GT–6693**

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

N.B. : (1) Question No. **1** is **compulsory**.
(2) Solve any **four** questions from remaining **six** questions.
(3) Assume **suitable** data wherever **necessary.**

Q.1 Attempt any five. **20 Marks**

A) What are the characteristics of an ideal operational amplifier?

B) Explain in detail voltage to current converter.

C) What is roll of rate of first order filter?

D) Draw the characteristics of an ideal comparator. Explain about zero crossing detectors.

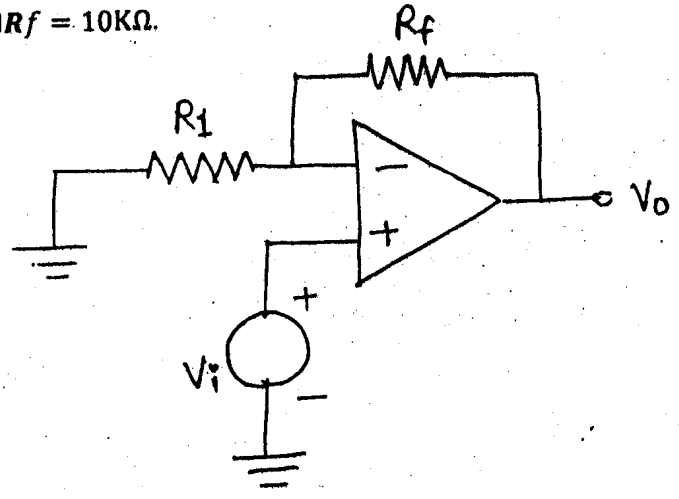
E) How current boosting is achieved in a 723 IC?

F) List the applications of Phase Locked Loop.

G) What are the different linear IC Packages?

Q.2 A) Explain briefly, why negative feedback is desirable in amplifier applications? List the four negative feedback configurations. **10 Marks**

B) Define the Common Mode Rejection Ratio. For the non-inverting amplifier in the below diagram, $R1 = 1K\Omega$ and $Rf = 10K\Omega$.



Calculate:

i) The maximum output offset voltage due to $Vios$ and Ib.
The amplifier is LM307 with $Vios = 10mV$, $Ib = 300nA$ and $Ios = 50nA$.
ii) Calculate the value of $Rcomp$ needed to reduce the effect of Ib.
iii) Calculate the maximum output offset voltage if $Rcomp$ as calculated in Q.2 B) ii, is connected in the circuit. **10 Marks**

Q.3 A) Design a forth order Butterworth low pass filter having upper cut-off frequency $1KHz$.

10 Marks

Q.4 A) With neat diagram and waveform, explain about **10 Marks**

i) Triangular wave generator

ii) Mono shot multivibrator

B) A Schmitt trigger is with the upper threshold level Vut=0V and hysteresis width$Vh = 0.2V$. Convert a $1KHz$ sine wave of amplitude $4Vpp$ into a square wave. Calculate the time duration of the negative and positive portion of the output waveform. **10 Marks**

Q.5 A) List the various techniques of analog to digital conversion. **10 Marks**

Also explain about i) R-2R Ladder digital to analog convertor

ii) The counter type analog to digital convertor

B) Explain in brief about fixed voltage series regulator. What is current limit protection? **10 Marks**

Q.6 A) Explain in detail about Wien Bridge oscillator. **10 Marks**

B) What is Phase Locked Loop? Explain about monolithic phase locked loop. **10 Marks**

Q.7) Write short note on any four of the following **20 Marks**

i) Integrator using operational amplifier

ii) Precision rectifier

iii) RC phase shift oscillator

iv) KRC filter

v)Summing amplifier

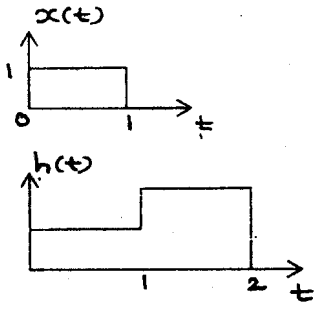
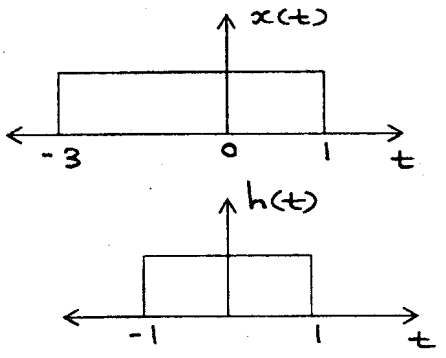
TE/ETRX/Sem V/Rev
Continous Time signals & SYS.

15/12/10

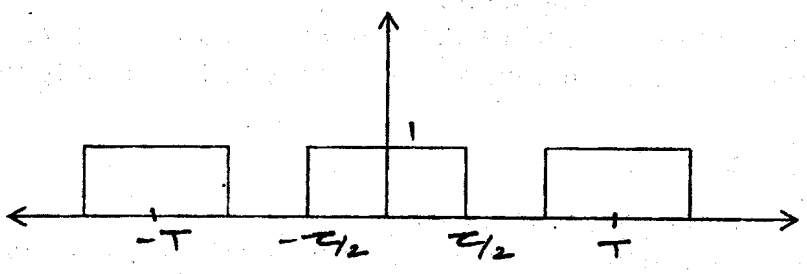
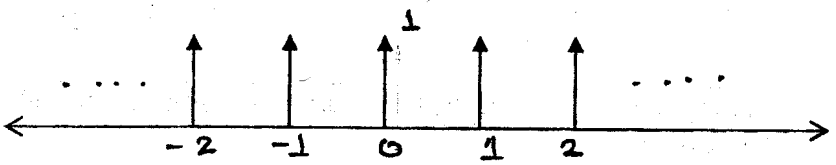
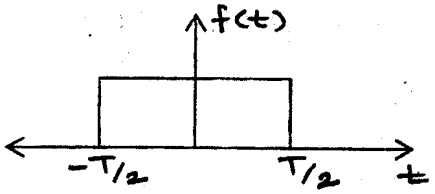
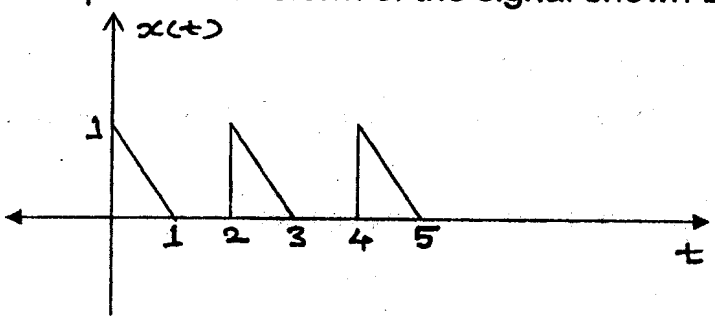
Con. 5814–10. (REVISED COURSE) GT–6690

(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.

Sr.No	Questions	Marks
Q.1	Answer any four questions.	
Q.1.a	State and explain the physical significance of scaling property of Fourier Series of C.T. Signal	05
Q.1.b	Determine whether following signal is periodic or non-periodic. $x(t)=2\sin\left(\frac{2}{3}t\right)+4\cos\left(\frac{1}{2}t\right)+4\cos\left(\frac{1}{3}t-\frac{1}{5}\pi\right)$	05
Q.1.c	Classify the following system on the basis of stability and causality. $y''(t)-2ty'(t)=x(t)$	05
Q.1.d	Explain the relationship between Fourier transform and Laplace Transform of a signal.	05
Q.1.e	Obtain the cross correlation of $x(t)$ & $h(t)$	05
		
Q.2.a	Sketch $x(t)$ if, $x(t)=r(t+4)-r(t+2)-r(t+2)$. Hence obtain $x(2t+2)$	10
Q.2.b	Convolve the following signals. 	10

Q.3.a	Determine the step response of the system whose impulse response is $h(t) = e^{-t}u(t)$	08
Q.3.b	A system has state equation as $\begin{bmatrix} \dot{x}_1(t) \\ \dot{x}_2(t) \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix}$ obtain the transfer function.	12

Q.4.a	Find the Fourier series of the following signal.	12
		
Q.4.b	Obtain the Fourier Transform of the signal shown below. 	08
Q5.a	Find the Fourier transform of the gate function and draw the spectrum. 	10
Q5. b	Find the Fourier transform of signum signal.	05
Q.5.c	State and prove convolution property of Fourier Transform in Time domain.	05
Q.6.a	Find the Laplace Transform of the signal shown below. 	08
Q.6.b	Describe the different random processes.	12
Q.7.a	The differential equation of the system is given as $\ddot{y}(t)+3\dot{y}(t)+2y(t)=x(t)$ With $x(t)=4e^{-2t}$ and $\dot{y}(t)=4$ Determine the total response of the system.	10
Q.7.b	Obtain the inverse Laplace Transform of $X(S)=\frac{4}{(S+1)(S+2)^3}$ For all possible region of convergence.	10

TE/ETRX/Sem VI/REV
Dig. Comm & Coding Techni

Con. 6063-10. **(REVISED COURSE)** **GT-6696**

21/12/10

(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** and justify it.

1. (a) Is it logical in source coding to assign less probable symbol longer string and more probable ones shorter ? Explain. **20**
(b) Define error control coding. Explain code rate, code efficiency and Hamming distance.
(c) Define Random Variable. Explain CDF and PDF.
(d) Write a note on PN sequence generator.

2. (a) How the capacity of a White Gaussian channel is calculated ? Explain bandwidth-S/N trade-off for the same. **6**
(b) A data stream to be coded is 18 repeating '10' starting with 1 :— **6**
(i) Show how parsing is done in LZ coding of this data.
(ii) If number of prefix used is 8, show how this data is encoded.
(c) For binary data sequence 1011001 sketch waveforms of :— **8**
(i) NRZ(polar)
(ii) BASK
(iii) BPSK
(iv) BFSK.

3. (a) What are Cyclic codes ? Why they are called sub class of Block codes ? Implement a (7, 4) Cyclic code encoder with $g(x) = x^3 + x^2 + 1$ and show that the code can be generated for $d_1 = 1010$ and $d_2 = 1011$. **10**
(b) Consider a (7, 4) systematic Block code with parity check equations :— **10**

$$c_1 = a_1 \oplus a_2 \oplus a_3$$

$$c_2 = a_1 \oplus a_2 \oplus a_4$$

$$c_3 = a_1 \oplus a_3 \oplus a_4$$

where a_1, a_2, a_3, a_4 are message bits,

c_1, c_2, c_3 are parity chick bits.

(i) Find 'G' and 'H' matrices.
(ii) Find code words for message 1101 and 0011.
(iii) For the received message 1100010, find the syndrome and hence the transmitted message.
(iv) Explain the encoder and decoder with block diagram.

[TURN OVER

4. (a) Explain ISI and ICI. What causes them ? Explain how they can be overcome ? 8
   (b) Explain the QASK system w.r.t. transmitter, receiver block diagram and signal space representation. 8
   (c) Compare MPSK and MFSK. 4

5. (a) Show how duobinary decoding is done when input {d(K)} = {0, 1, 1, 1, 0, 1, 0, 1, 1 ---------- } is 10
      (i) Precoded and
      (ii) not precoded
      (iii) Show in each case what happens if 4th bit is detected wrongly.
   (b) Explain QPSK with following points :— 10
      (i) Offset and Non-offset QPSK.
      (ii) Modulation block diagram of offset QPSK.
      (iii) Demodulation block diagram.
      (iv) Power spectral density plot, signal space representation and Eucledian distance.

6. (a) Derive the expression for signal to noise ratio of Integrate and Dump receiver filter. 10
   (b) Explain with neat block diagram, DS/BPSK system. What is processing gain and jamming margin ? 10

7. Write short notes on any **four** :— 20
   (a) Central limit theorem.
   (b) Viterbi algorithm.
   (c) FH spread spectrum.
   (d) Eye pattern.
   (e) Line codes.

T.E./ETRX/ Sem VI old

Microprocessor & Microcontroller

Con. 5704-10.

(OLD COURSE)

GT-6922

(3 Hours)

[Total Marks : 100

N.B. (1) Question No. 1 is **compulsory**.
(2) Attempt any **four** from remaining.

1. (a) Write 8086 ALP to find out how many negative words from given series of ten words. 8
(b) Draw Timing diagram for min mode of 8086. 6
(i) Read Bus Cycle
(ii) Write Bus Cycle.
(c) Branch related instructions of 8051 Micro Controller. 6

2. (a) What are the different multiprocessor configurations ? And explain any one in detail. 8
(b) Explain different data types supported by 8087 (NDP) and convert + 187·625 into short real format. 12

3. (a) Draw interfacing diagram for 8086 based system for : 12
(i) 12 KB ROM Using 2732 EPROM chips
(ii) 12 KB RAM Using 6232 RAM chips
(iii) Two 16 bit input port
(iv) Two 16 bit output port.
(b) Explain various addressing modes of 8051 Microcontroller with examples. 8

4. (a) Explain the following assembles directives and operators :— 12
(i) Org (ii) PTR (iii) Model (iv) PROC
(b) Explain priorities and interrupt structure of 8051 Micro Controller. 8

5. (a) Explain following instructions with example :— 12
(i) TEST (iv) MOVSW
(ii) SAL/SHL (v) LAHF
(iii) LOOPE/z (vi) AAA
(b) Find out the effective address and physical address for the following addressing modes :— 8
(i) Relative based indexed with BX and DI
(ii) Register relative with BP
Assume [CS] = 2383H ; [DS] = 1439H
[BX] = 234OH ; [BP] = 030OH

6. (a) Draw and explain physical structure of I/O ports of 8051 Microcontroller. 12
(b) Draw internal block diagram of 8289 bus orbiter and states it's features. 8

7. Write short notes on the following :— 20
(a) UART (8250)
(b) DMAC (8237)
(c) IEEE 488

TE/ETRX/EITC/SemV/Old.

Applied Mathematics V

28/12/10

P4–Exam.–Oct.–10–74

Con. 6696–10. **(OLD COURSE)** **GT–6885**

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

N.B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions out of the remaining **six** questions.
(3) **Figures** to **right** indicate **full** marks.

1. (a) A random sample of 50 items gives the mean 6.2 and Variance 1.24. Can it be regarded as drawn from a normal population with mean 5.5. 5
(b) If Eight persons are chosen from any group, Show that at least two of them will have the birthday on the same day of the week. 5
(c) Show that the set of fourth root of unity is a group under multiplication. 5
(d) A random variable x has the probability distribution $P(X = x) = \frac{1}{8}{}^{3}C_{x}$, 5
$X = 0, 1, 2, 3$. Find its mean and variance.

2. (a) Find Mean and Variance of Binomial Distribution. 6
(b) A samples of 200 fishes of a particular kind taken as random from one end of a lake had mean weight of 20 lbs & S. D. of 2 lbs. At the other end of the lake , a sample of 180 fish of the same kind had mean weight of 20 lbs. and S. D. of 2 lbs. Is the difference between the mean weights significant? 6
c) For the following data 8

X	1	2	3	4	5	6	7	8	9
Y	9	8	10	12	11	13	15	16	15

Find the lines of regressions.

3. (a) If f and g are defined as 6
$f : R \to R$, $f(x) = 3x + 1$
$g : R \to R$, $g(x) = 5x - 3$

Find fog , f^{-1}, g^{-1}, $(fog)^{-1} = g^{-1}of^{-1}$

(b) Fit Poisson Distribution of the following 6

X	0	1	2	3	4	Total
F(x)	109	65	22	3	1	200

(c) Show that the set $F = \{ a + b\sqrt{2} \}$, where a and b are rational numbers is a field under addition and multiplication. 8

4. (a) Sandal powder is packed into packets by a machine. A random sample of 12 Packets is drawn and their weights are found to be 0.49, 0.48, 0.47, 0.48, 0.49, 0.50, 0.51, 0.49, 0.48, 0.50, 0.51, 0.48 kg . Test if the average packing can be taken as 0.45 kg. by using student's t-test. 6

(b) Calculate the coefficient of correlation for the following data : 6

x: 36 56 20 42 33 44 50 15 60

y: 50 35 70 58 75 60 45 80 38

(c) In a precision bombing attack there is a 50% chance that any one bomb will strike the target. Two direct hits are required to destroy the target completely. How many bombs must be dropped to give at least 99% chance of destroying the target? 8

5. (a) In the normal distribution ,the mean is 6 and S. D. is 2 . Find P($4.5 < x < 7..7$), P($x > 7$) and P $(2 < x < 8.25)$ 6

(b) Let A = { 2,3, 6, 12, 24, 36} and R be the relation 'is divisible by ' i. e. aRb means a/b .Obtain the relation matrix and draw Hass diagram. 6

(c) Obtain the rank correlation coefficient from the data 8

X:	10	12	18	18	15	40
Y:	12	18	25	25	50	25

6. (a) Find the probability that at most 4 defective bulbs will be found in a box of 200 bulbs if is known that 2 percent of the bulbs are defective. 6

(b) Fit a second degree parabolic curve to the following data 6

X :	1	2	3	4	5	6	7	8	9
Y:	2	6	7	8	10	11	11	10	9

(c) Prove that Z_5 is a ring under addition and multiplication of modulo 5. 8

7. (a) Let A be a set of non – zero integers and let R be relation defined by (a, b) R (c, d) .If ad = bc . Prove that R is an equivalence relation. 6

(b) Find first four moments about origin of Binomial Distribution. 6

(c) The following data is collected on two characters. Based on this , can you say that there is no relation between smoking and literacy 8

	Smokers	Non-Smokers	Total
Literates	83	57	140
Illiterates	45	65	110
Total	128	122	250

T.E. ETRx / Sem V / old
Continuous Time signal & sys.

Con. 6586-10. **GT-6918**

(OLD COURSE)

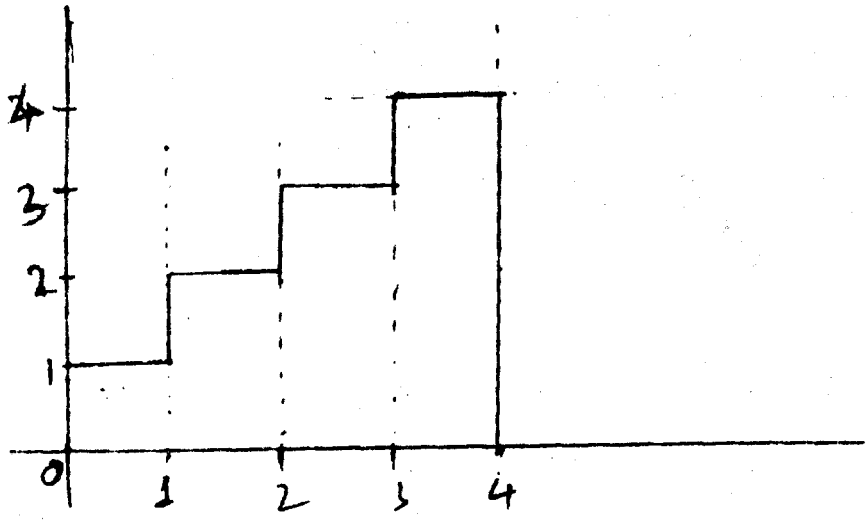
(3 Hours) **[Total Marks : 100**

N.B.: (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions out of the remaining **six** questions.
(3) **Figures** to the **right** indicate **marks.**

1. Solve any **four** of the following :– **20**
   (a) What do you understand by continuous time signals and systems ? Explain with example.
   (b) Sketch and define basic test signals such as unit step, unit impulse, unit ramp, etc.
   (c) Compare Fourier Transform and Laplace Transform.
   (d) Explain the following with examples:–
      (i) Power and Energy Signals
      (ii) Periodic and Aperiodic Signals.
      (iii) EVEN and ODD Signals
      (iv) Random and Deterministic Signals.
   (e) Explain Gibb's phenomenon.

2. Sketch the following signals :– **20**
   (a) $X(t) = 2\,u(t) + 2\,u(t-2) - 2\,u(t-4) - 2u(t-6)$
   (b) $X(t) = 4\,r(t) - 4\,r(t-2) - 8\,r(t-5) + 8\,r(t-6)$.

3. (a) Express the following signal in terms of unit step signal. **8**

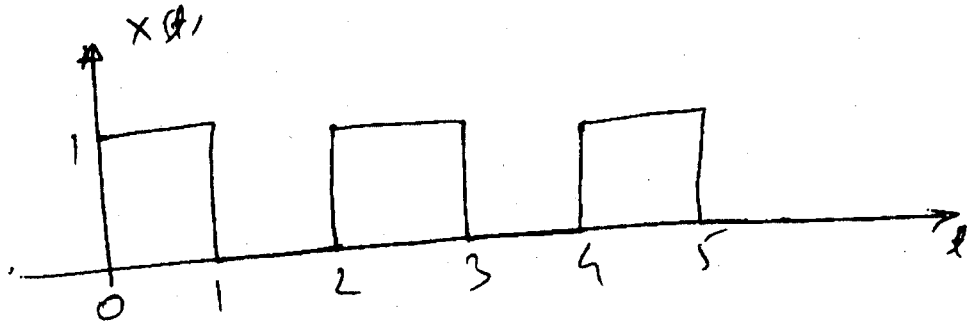


   (b) Obtain the convolution of two continuous time functions given below and sketch the results. Use graphical method. **12**

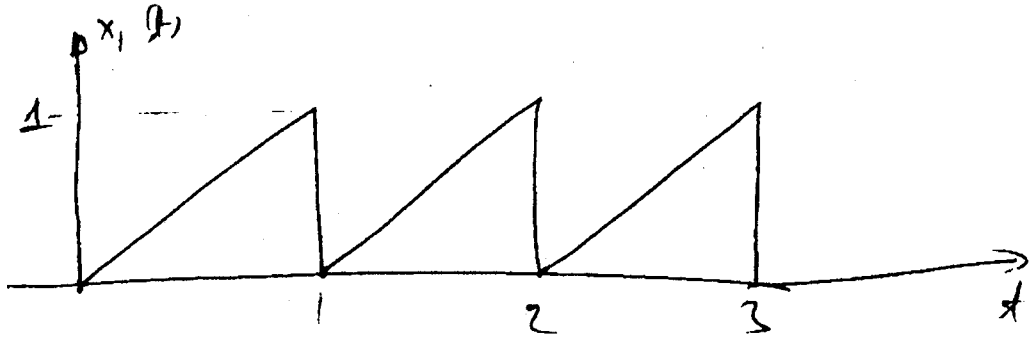
$x(t) = 2$ for $-2 \le t \le 2$
$= 0$ elsewhere
$h(t) = 4$ for $0 \le t \le 2$
$= 0$ elsewhere

4. (a) Determine the Laplace Transform of the following signals and specify ROC. **12**
   (i) $x(t) = Ae^{-at}$
   (ii) $x(t) = e^{-at}\,u(-t)$
   (iii) $x(t) = \sin wt\,u(t)$
   (iv) $x(t) = \cos h\,(w_0\,t)$

(b) Find Laplace transform of following periodic signals.

1) 

4

2) 

4

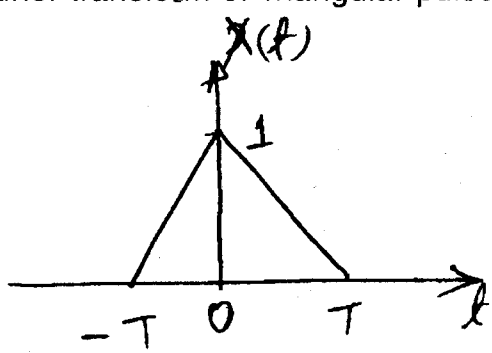
5. (a) Determine the impulse response h(t) of the following systems. Assume zero initial condition. 10

(i) $y(t) = x(t - t_0)$

(ii) $\frac{d^2y(t)}{dt^2} + 4\frac{dy(t)}{dt} + 3y(t) = \frac{d}{dt}x(t) + 2x(t)$

(b) State and derive the Differentiation and Convolution properties of Laplace transform. 10

6. (a) Find Fourier transform of Triangular pulse shown below :– 10



(b) State and prove the following properties of Fourier transform :– 10

(i) Time shifting property.

(ii) Frequency shifting property.

(a) Find Initial value and Final value of the following :– 5

(i) $X(s) = \dfrac{s+a}{(s+a)^2 + b^2}$

(ii) $X(s) = \dfrac{1}{s^2 + 2s + 1}$

(b) Find Inverse Laplace transform of following for all possible ROC's– 10

$$X(s) = \frac{s+3}{(s+1)(s-2)}$$

(c) Derive the relation between Fourier transform and Laplace transform. 5

T.E. Electronic Sem V / old Nov 2010

Engineering Electromagnetics

Con. 5782-10. **(OLD COURSE)** **GT-6915**

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

N.B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions from remaining.
(3) Vector notation should be used wherever **necessary**.
(4) Assumptions made should be **clearly** stated.

1. (a) Derive Poisson's and Laplaces equations. **5**
   (b) Discuss Maxwell's equations in point as well as integral form for steady electric and magnetic fields. **5**
   (c) Explain concept of retarded potentials. **5**
   (d) Explain surface impedance of a conductor. **5**

2. (a) State and prove Poynting Theorem. Explain the terms instantaneous, average and complex Poynting Vector. **10**
   (b) Derive the expression for the field components of transverse electric wave propogating through rectangular waveguide. **10**

3. (a) Derive expression for input impedance of a two wire transmission line. **10**
   (b) In free space $\vec{E}(z, t) = 50 \cos(wt - \beta z)\, \vec{a}_z$ V/m. Find average power crossing a circular area of radius 2.5 m in the plane z = constant. **10**

4. (a) Derive the expression for reflection and transmission coefficient for parallel polarised plane wave at oblique incidence. **10**
   (b) A normal incident $\bar{E}$ field has amplitude $E_0^i = 1\ V/m$ in free space just outside of seawater in which $\epsilon r = 80$ $\mu r = 1$ and $\sigma = 2.5$ s/m. For a frequency of 30 MHz at what depth the amplitude will be 1 m V/m for $\vec{E}$. **10**

5. (a) Using Smith chart find the imput impedance and reflection coefficient at a point 0.64 λ from load $Z_L = (75 - j25)\ \Omega$. Given characteristic impedance = 50 Ω. **10**
   (b) What is skin effect. Define skin depth and how is it related to attenuation constant. **10**

6. (a) Derive boundary conditions for electric and magnetic field vectors at boundary of two dielectric media. **10**
   (b) For an Electromagnetic wave travelling between a pair of perfectly conducting planes of infinite extent is y & z directions, analyse TEmn modes. **10**

7. Show that power radiated by short dipole is $P = 80\pi^2 \left(\frac{d\ell}{\lambda}\right)^2 I^2_{rms}$. **20**