29 Dec 2010

T.E. / Electronic / Sem VI

Elective : I : Medical Electronics

V1-Oct-10-75

Con. 6079–10. **(REVISED COURSE)** **GT–7536**

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

N.B. : (1) Question **No. 1** is **compulsory**.
(2) Attempt any **four** questions from Q. Nos. **2** to **7**.
(3) Assume **suitable** data if **required**.

1. Attempt any **four** :– **20**
   (a) Explain with a neat diagram any one method for blood pressure measurement.
   (b) Explain the generation of Action Potential.
   (c) Explain the various transducers used in body temperature measurement.
   (d) With the help of a neat diagram, explain the principle of working of as Electromagnetic blood flowmeter.
   (e) Explain the principle of pulse oximeter.

2. (a) What is cardiac output ? Explain any scheme for cardiac output measurement. **10**
   (b) Draw as equivalent circuit when a pair of electrodes is placed in electrolytic contact with a subject and explain the same. **10**

3. (a) What is the Einthoven triangle ? Also explain, the various types of leads used in ECG measurement. **10**
   (b) Explain any two principles for Respiration Rate measurement. **10**

4. (a) Draw and explain a neat schematic diagram of an EEG machine. **10**
   (b) Draw and explain the schematic diagram of an instrumentation amplifier used in biomedical measurements. **10**

5. (a) Explain the need for a defibrillator and draw and explain the dc defibrillator. **10**
   (b) State the principle of diathermy and explain the circuit diagram of a Short Wave diathermy unit. **10**

6. (a) Explain the principle of computed tomography. **10**
   (b) Draw and explain the block diagram of bedside patient monitor. **10**

7. Write short notes on :– **20**
   (a) Impedance Plethy Sonogrophy
   (b) Electrical Safety Codes and Standards
   (c) Electronic Spirometer
   (d) Positron Emission Tomography.

29 Dec 2010 T.E. / Electronic / Sem VI

P4 Con No 50 Elective : I : Computer Organization

Con. 6485–10. **(REVISED COURSE)** **GT–7552**

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

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

1. **A)** Explain Restoring Division algorithm with example **05**
   B) Explain basic structure of 4 stage Pipelining. **05**
   C) Explain in Brief interface of Printer to Processor on Parallel port **05**
   D) Define the terms Hit Rate and Miss Penalty, Explain in brief **05**

2. **A)** Explain execution of a Complete instruction in details; How branch instructions are executed? **10**
   B) Explain Input and Output operation in Asynchronous Bus with the help of timing diagrams. **10**

3. **A)** What are different approaches to Bus Arbitration? Explain these techniques with the help of timing diagrams. **10**
   B) Explain Memory segmentation in Intel IA-32 architecture. **10**

4. **A)** Explain structure of Magnetic Hard disk; Hence explain Read/Write operation in details. **10**
   B) What are Exceptions in Interrupt Handling process? Explain Exception Handling in Intel IA-32 architecture. **10**

5. **A)** Explain Address translation process in virtual memory; Hence explain use of Translation Lookaside Buffer (TLB). **10**
   B) Explain Execution of Branch instruction in ARM Family architecture (RISC). **10**

6. **A)** What are instruction Hazards? Explain effect of Branch Instructions in pipelining with examples. **10**
   B) Explain Register structure in ARM Family architecture (RISC). **10**

7. Write short notes on:(Any **TWO**) **20**
   A) RAID Disk
   B) Cache Architectures
   C) Superscalar Architecture.

T.E. Electronic Sem VI / Rev
Microwave Devices Circuits

Con. 5716-10. **GT-7530**

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

N.B. : (1) Question No. **1** is **compulsory.**
(2) Attempt any **four** questions fout of the remaining **six** questions,
(3) Assume any **suitable** data wherever **required** justify the **same.**

1. (a) A rectangular cavity resonator has dimensions of a = 5 cm, b = 2 cm, and d = 15 cm. Compute : **20**
   (i) the resonant frequency of the dominant mode for an air-filled cavity.
   (ii) the resonant frequency of the dominant mode for a dielectric filled cavity of $\epsilon_r = 2{\cdot}56$.
   (b) Compare IMPATT and TRAPTT diodes.
   (c) What are slow-wave structures ? For what purpose are the, slow-wave structures used in microwave devices ?
   (d) Explain the following terms for waveguides :
   (i) Dominant mode
   (ii) Degenerate modes
   (iii) Group velocity
   (iv) Phase velocity
   (v) Cutoff frequency.

2. (a) Derive the field equations for TE modes in circular waveguides. **10**
   (b) Can TEM mode exist in hollow wave guides ? Justify your answer. **5**
   (c) An air-fielded waveguide with cross-section 2 × 1 cm transports energy in the TE_{10} mode at a rate of 0·5 hp. The impressed frequency is 30 GHz. What is the peak value of the electric field occuring in the guide ? **5**

3. (a) Explain the construction and working of a two-hole directional coupler. Define coupling coefficient and directivity of a directional coupler. **10**
   (b) Show that the scattering matrix for a series T-junction matched at arm 3 is given by— **10**

$$[s] = \begin{bmatrix} \frac{1}{2} & \frac{1}{2} & \frac{1}{\sqrt{2}} \\ \frac{1}{2} & \frac{1}{2} & -\frac{1}{\sqrt{2}} \\ \frac{1}{\sqrt{2}} & -\frac{1}{\sqrt{2}} & 0 \end{bmatrix}$$

4. (a) Explain velocity modulation in Reflex Klystron. How does it help in bunching the electrons ? Obtain an expression for the bunching parameter of the Reflex Klystron oscillator. **15**

[TURN OVER

(b) A Reflex Klystron operates under the following conditions : 5

V_0 = 500 V
R_{sh} = 20 kΩ
f_r = 8GHz
L = 1 mm is the spacing between repeller and cavity.

The tube is oscillating at f_r at the peak of the n = 2 mode or $1^3/_4$ mode. Assume that the transit time through the gap and the beam loading effect can be neglected.

(i) Find the value of the repeller voltage, V_r.
(ii) Calculate the electronic efficiency.

5. (a) Draw a neat labelled diagram of a four port circulator. Explain how the flow of power is maintained only in one direction in the circulator. Design the same circulator using two magic tees and a phase shifter. 12
(b) Compare Klystron amplifier and a TWT based on their operation, efficiency, output power, applications, bunching process of electrons and operating frequencies. 8

6. (a) Explain the working of a Faraday Rotation Isolator. 6
(b) A matched isolator has insertion loss of 0·5 dB and an isolation of 25 dB. Find the scattering coefficients for the isolator. 4
(c) Explain Gunn effect with the two-valley model of Gunn diode. What are the criteria that the semiconductor must satisfy in order to exhibit negative resistance ? 10

7. Write short notes on :
(a) Striplines 6
(b) π-mode of operation of a cavity magnetron. 8
(c) Wavemeter method of frequency measurement. 6

TE / ETRX / Sem VII / Old
Computer Organization 4-12-10

ws Oct- 10 190

Con. 6109–10. **(OLD COURSE)** **GT–7282**

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

Note: Question No.1 is compulsory
Out of the remaining solve any four
Figures to the right indicate full marks

Q.1 a. Solve using Booth's algorithm 5
Multiplicand M=–7(1001) and Multiplier Q= +3(0011).
b. Explain the following performance measures of CPU . 5
Throughput, Response time/Execution time, MIPS and MFLOPS.
c .Explain in brief using memory segmentation how 64 Terabytes of 5
Virtual memory address can be accessed?
d. Explain data hazard and code hazard in pipelining 5

Q.2 a.Explain various addressing modes of Pentium processor 10
b.Explain various modes of DMA transfer 10

Q.3a Explain with the help of diagram paging mechanism and role of TLB 10
b Draw and explain various cache architectures .Mention their advantages 10
and disadvantages.

Q.4 a. What is cache coherency? Explain various cache write policies 10
b. For the following memory structure show various address fields 10
for i)Direct mapping ii)2 way Set associative memory mapping
Main memory=4MB, Cache memory=16KB .line size =4 bytes.

Q.5 a.What is bus arbitration? Explain various methods to resolve 10
bus arbitration .
b.Explain microprogrammed control unit 10

Q.6 a. Explain any one hardwired technique of control unit design. 10
b. Explain operation of a 5 stage pipelining process 10

Q.7 a. Explain various cache issues in multiprocessor systems 10
b. Explain different multiprocessor configurations 10

TE/ETRx/SemVII/Old
Discrete time signal processing 16/12/10

Con. 5569-10. **(OLD COURSE)** **GT-7275**

(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 if **necessary**.

1. (a) Find the impulse response of the filter if output y(n) = [2, 7, 8, 8, 6, 3, 1] in response to an input x(n) = 2 u(n) – u (n–1) – u (n–4). **5**

(b) State whether the following systems are FIR or IIR and stable or unstable. **5**

(i) $y(n) = 3x(n) - 4x(n-1) + 2x(n-2)$.

(ii) $H(z) = \frac{z}{(z-0.5)(z-0.6)}$

(iii) $y(n) - 2y(n-1) = x(n)$

(iv) 2 poles at origin, one zero at $\frac{1}{2}$ and one zero at 2

(v) $h(n) = u(n)$.

(c) Determine the energy of the sequence $x(n) = \begin{cases} \left(\frac{1}{2}\right)^n, n \geq 0 \\ 3^n, n < 0 \end{cases}$ **5**

(d) State and prove convolution property of Z - transform. **5**

2. A system is cascaded combination of two subsystems with system functions :

$$H_1(z) = \frac{z}{z^2 + 2 \cdot 5z + 0.5}; \quad H_2(z) = \frac{z}{z+1}$$

(i) Determine the impulse response of the cascaded system **6**
(ii) Realize the system in parallel form **4**
(iii) Sketch its poles and zeros **2**
(iv) Plot first five samples of impulse response **4**
(v) Determine its step response. **4**

3. (a) Find correlation of the following sequence : **6**
$x(n) = \partial(n) + 2\,\partial(n-1) + 3\,\partial(n-2)$
$y(n) = 0.5\,x(n-2)$.

(b) Determine the causal signal x (n) whose Z - transform is given by – **8**

$$x(z) = \frac{1}{\left(1 + z^{-1}\right)\left(1 - z^{-1}\right)^2}$$

(c) Find the magnitude response for a filter having transfer function : **6**

$$H(z) = \frac{z-4}{z-1/4}$$

[TURN OVER

4. (a) A second order discrets time system is characterised by the difference equation 10

$y(n) - 0{\cdot}1\, y(n-1) - 0{\cdot}02\, y(n-2) = 2x(n) - x(n-1)$

Determine y (n) for $n \geq 0$ when x (n) = u(n) and initial conditions are y (n–1) = –10 and y (–2) = 5.

(b) A System has unit sample response given by : $h(n) = \frac{1}{4}\delta(n+1) + \frac{1}{2}\delta(n) - \frac{1}{4}\delta(n-1)$ 10

(i) Is the system BI Bo stable ? Justify
(ii) Is the system causal ? Justify
(iii) Find the frequency response.

5. (a) State whether the following signals are periodic and find their periods : 4

(i) $\text{Cos}(0.2\,\pi\, n)$

(ii) $\text{Sin}(0.2\,\pi\, n) + \text{Sin}(0.18\,\pi\, n)$

(b) Determine the Convolution of $x_1(n)$ and $x_2(n)$ using Z - transform. 8
$x_1(n) = n\,u(n)$ and $x_2(n) = 2^n\,u(n-1)$

(c) If the Z - transform of a signal x(n) is given by $x(z) = \frac{z^2}{(z-0.5)(z+2)}$, find 4

x (0) and x (∞).

(d) Examine whether the following systems are of minimum phase, maximum phase for mixed phase type 4

(i) $H(z) = 1 + \frac{5}{3}z^{-1} - \frac{2}{3}z^{-2}$

(ii) $H(z) = 1 - z^{-1} - 6z^{-2}$

6. (a) Find the output of a system using circular convolution (in time domain) if the input and impulse responses are given by : 6
x (n) = (1, 2, 3, 1, 2) and h (n) = (2, 1, 4)
↑ ↑

(b) Explain the relation between Discrete Time Fourier Transform (DTFD, Z- transform and DFT, giving relevant expression. 6

(c) Find DFT of the following sequence using DIT FFT 8
x (n) = { 1, 1, 1, 1, 1, 1, 0, 0 }.
↑

7. (a) Derive the relations to find DFT of two real N point sequences using only a single N point DFT. 8

(b) Using the above relations, find DFTs of 8
$x_1(n) = \{1, 1, 1, 1\}$ and $x_2(n) = \{2, 1, 2, 1\}$

(c) Find IDFT of the sequences 4
x (k) = { 10, –2 + j2, –2, –2 –j2 } using
Diecimation in time algorithm.

TE/ETRX/Sem VI/Rev

Discrete Time signal & Sys.

16/12/10

Con. 5568-10. **(REVISED COURSE)** **GT-7533**

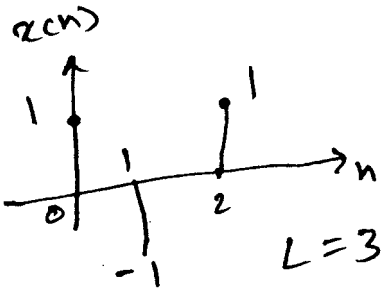
(3 Hours) **[Total Marks : 100**

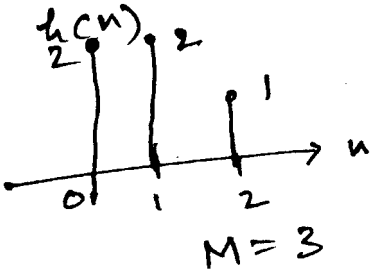
N.B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions from the remaining **six** questions.
(3) Assume **suitable** data if **required**.

1. (a) Find the z-transform of $x(n) = r^n \cos(n\theta)\, u(n)$. **5**
(b) Derive the relationship between z-transform and DFT. **5**
(c) If $y(n) = 2x(n) + \frac{1}{x(n-1)}$, is this system linear ? **5**
(d) Calculate the number of multiplications needed in the calculation of DFT using FFT algorithm with 32-point sequence. **5**

2. (a) Find the transfer function of the system given by $y(n) - \frac{1}{2} y(n-1) = x(n) + \frac{1}{3} x(n-1)$. **10**
(b) Consider a causal linear shift invariant system with $H(z) = \frac{1 - a^{-1} z^{-1}}{1 - a z^{-1}}$ **10**
where "a" is real. Determine, the range of values of "a" for which the system is stable. Plot the pole-zero diagram for $0 < a < 1$. Show that this system is an all pass system.

3. (a) The transfer function of a discrete time system has poles at $z = 0.5$, $z = 0.1 \pm j\,0.2$ and eros at $z = -1$ and $z = 1$ **10**
(i) Sketch the pole zero diagram for the system
(ii) Derive the system transfer function H (z)
(iii) Develop the difference equation
(iv) Find if the system in stable.
(b) Use DFT to compute the linear convolution of the signals shown below. **10**





4. (a) Determine causal, non-causal and both - sided signals associated with the Z-transform. **10**

$$x(z) = \frac{1}{1 - 1 \cdot 5z^{-1} + 0 \cdot 5z^{-2}}$$

(b) Derive composite radix for 6 = 2·3 algorithm and draw the flow graph. **10**

5. (a) Determine the frequency response, magnihide response and phase response for **10**

the system given by $y(n) - \frac{3}{4} y(n-1) + \frac{1}{8} y(n-2) = x(n) - x(n-1)$

for T = 1m sec, f = 0H z, 10H z, 100 H z and 1 KH z.

(b) A digital system is characterized by the difference equation. $y(n) = x(n) + e^{\alpha} y(n-1)$ **10**
Check the filter for BIBO stability.

6. (a) Derive the DFT of the sample data sequence α x (n = { 1,1,2,2,3,3 } and compute **10**
the corresponsing amplihide and phase spectrum.

(b) Compute the DFT of the sequence $x(n) = \cos \frac{n\pi}{2}$ where N = 4, using DIF FFT **10**
algorithm.

7. Write short notes on the following :– **20**

(a) Goertzel algorithm
(b) Applications of DSP to speech processing
(c) Applications of DSP to Biomedical image processing
(d) Write the properties of twiddle factor.

T.E / Electronic / Sem VI

Probability & Random Processes

Con. 6310-10. **(OLD COURSE)** **GT-7356**

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

N.B.: (1) Question No. **1** is **compulsory**.
(2) Attempt any **five** questions in **all**.

1. (a) State and explain with an example— **20**
(i) Conditional Probability (ii) Joint Probability.
(b) Define the expectation of continuous and discrete random variables with an example.
(c) Define random process. State four classes of random processes giving one example each.
(d) Define the moment generating function and characteristic function of a random variable. Give the significance of each.

2. (a) State and explain Baye's theorem with an example. An urn contains 10 white and 3 black balls. Another urn contains 3 white and 5 black balls. Two balls are drawn at random from the first urn and placed in the second urn and then 1 ball is taken at random from the latter. What is the probability that it is a white ball ? **10**
(b) The distribution function of a RVX is given by **10**
$F_x(x) = 1 - (1 + x)e^{-x} \quad x \geq 0$
Find the mean, variance and density function of X.
Also if $f_X(x) = K(1 + x) \quad 2 \leq x \leq 5$.
Find $P(X < 4)$

3. (a) If X is a Gaussian random variable with mean zero and variance σ^2. Find the pdf of $Y = |X|$. Also if $f_x(x) = 2x \quad 0 < x < 1$ **10**
$= 0 \quad$ otherwise
Find the pdf of $Y = 8x^3$.
(b) If X and Y are independent RVs each follwoing N(0, 2), prove that Z = X/Y follows a Cauchy's distribution. **10**
Also if X and Y each follow an exponential distribution with paramter 1 and are independent, find the pdf of U = X –Y.

4. (a) The joint pdf of (X, Y) is given by— **10**
$f_{xy}(xy) = 24xy \quad x > 0, \; y > 0$ and $x + y \leq 1$.
$= 0 \quad$ elsewhere
Find the conditional mean and variance of Y given X.
(b) Prove the following :— **10**
(i) $E(X + Y) = E(X) + E(Y)$
(ii) $E(XY) = E[X]\,E[Y]$ if X and Y are independent RVs.
(iii) $E[Y/X] = E[Y]$ If X and Y are independent RVs
$E[X/Y] = E[X]$

[TURN OVER

5. (a) Prove the following — 10

(i) If C_{xy} is the covariance of X and Y, prove that—

$$C_{xy} = E[XY] - E[X]\ E[Y]$$

(ii) If X and Y are independent RVs. Prove that—

$\gamma_{XY} = 0$, is the converse true

(iii) IF X and Y are uncorrelated RVs prove that—

$$Var[X + Y] = Var[X] + Var[Y]$$

(iv) When two RVs are said to be orthogonal.

(b) If the independent random variables X and Y have the variances 36 and 16 respectively. Find the correlation coefficient between (X + Y) and (X – Y). 10

6. (a) Show that the random process $X(t) = A\ cpos(w_0 t + \theta)$ is wide sense stationary. If A and w_0 are constant and θ is uniformly distributed RV in $[0, 2\pi)$. 10

(b) If autocorrelation function for a stationary ergodic process with no periodic component is— 10

$$R_{xx}(z) = 25 + \frac{4}{1+6z^2}.$$

Find the mean value and variance of process {X(t)}.

7. (a) Define the power spectral density function of a stationary process. If it is given by— 10

$$S(w) = 1 \qquad |w| < w_0$$
$$= 0 \qquad \text{elsewhere}$$

Find R(z) and show that X(t) and $X\left(t+\frac{z}{w_0}\right)$

(b) For the process {X(t)}, where X (t) = a cos (bt + Y) where Y is uniformly distributed over $(-\pi, \pi)$ and a and b are constants. Find the autocorrelation function and the spectral density. 10

TE / ETRx / Sem VI / old

communication system.

P4-Con No-51

Con. 5802–10. **(OLD COURSE)** **GT–7269**

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

N.B. : (1) Question No. **1** is **compulsory**.
(2) Answer 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	What is meant by saying that Satellite is stationary? Why are such Satellites used for world wide communication.	05
Q.1.b	Explain any four characteristics of an antenna.	05
Q.1.c	Why are equalizing pulse transmitted during the vertical synchronous pulses?	05
Q.1.d	Explain the basic radar system with a net sketch.	05
Q.1.e	State and explain Kepler's Law.	05
Q.2.a	Draw the standard T.V. Channel. Spectrum and explain total T.V. Channel bandwidth is, 7 MHz.	05
Q.2.b	Draw the block diagram of Horizontal Stage of T.V. receiver. What are the special features which makes the operation of the line output stage very efficient?	10
Q2.c	Draw the block diagram of sound section in a T.V. receiver with waveform and explain the function of trap circuit.	05
Q.3.a	What is the importance of frequency in Satellite communication ? With a neat sketch explain the working of Telemetry, Tracking and command system on board satellite.	10
Q.3.b	Explain the followings.	
	1. The role and function of transponders in satellite.	05

[TURN OVER

७·३·b	2. LEO and MEO Satellites.	05
Q.4.a	Determine the length of a half wave dipole antenna to be used to receive a 5 MHz radio signal. Assume that the velocity of electromagnetic waves on the antenna is 3×10^8m/s	04
Q.4.b	Explain the working of parabolic reflector antenna. What is the advantage using casse grain feed? With suitable sketch explain its working.	08
Q.4.c	In brief explain the importance of 1. Top loading 2. Folded dipoles 3. Antenna arrays(Broad side and end side)	08
Q.5.a	Explain what is meant by the Y,I and Q signals in colour T.V. and why they are generated	08
Q.5.b	Explain the interlaced Scanning.	06
Q.5.c	Draw the composite video signal at the end of either field ,labeling all the pulses shown.	06
Q.6.a	Explain what is meant by blind speed in MTI radar ,what is the method of overcoming the problem of blind speed in analog radar.	08
Q.6.b	Derive an expression for maximum possible range of radar. Calculate the maximum range of the radar system which operates at 3 cm with peak pulse power of 600 kw, and minimum receivable power is 10^{-13}watts.The capture area of its antenna is $5m^2$,and radar cross sectional area of the target is $20m^2$.	12
Q7.	Write short notes on the followings(any four)	
Q.7.a	Grounded and ungrounded Antennas.	05
Q.7.b	Features of Digital T.V.	05
Q.7.c	Multiple access techniques in Satellite communication.	05
Q.7.d	C W dopplar radar.	05
Q.7.e	Yagi-Uda antenna.	05

TE / ETRx / Sem VI / Rev
Electronic & Instrumentation

Con. 5558-10. **(REVISED COURSE)** **GT-7539**

(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**.
(4) **Figures** to the **right** indicate **full** marks.
(5) **Illustrate** answers with sketches wherever **required**.

1. (a) What is the order of a system ? Give an expression for a first order system with an example ? **5**
(b) What are the basic requirements of a transducer. **5**
(c) What is a need of logarithmic amplifier in instrumentation ? Explain logarithmic amplifier with neat circuit diagram. **5**
(d) Explain cascade controller with neat diagram. **5**

2. (a) Explain static and dynamic characteristics of instruments. **10**
(b) Explain the working of strain gauge in detail. Derive the expression for gauge factor for strain gauge. **10**

3. (a) What is LVDT ? Explain and draw the complete constructional diagram for it. State the specifications, features and limitations of this transducer. Compare the RVDT wiht LVDT. **12**
(b) Explain capacitive transducer for displacement measurement. Derive its expression. Give its advantages and disadvantages. **8**

4. (a) With the help of neat diagram explain the working of instrumentation amplifier also derive its expression. Also explain its advantages. **12**
(b) Design a second order active low pass filter for a cut off frequency of 1 KHz. **8**

5. (a) Explain with neat block diagram multichannel data acquisition system to monitor temperature, flow, pressure, displacement, level and force. **12**
(b) Explain distributed control system (DCS) with neat diagram. **8**

6. (a) Explain feed forward controller with example. **10**
(b) Explain P, PI, PD and PID controller with neat circuit diagram. Also derive the expression. **10**

7. (a) Explain standard calibration procedure. **5**
(b) What is five point calibration procedure. Explain in detail **7**
(c) What is need of controller tuning ? Explain different methods of controller tunning. **8**

T.E / Electronic / Sem VI / Rev

Computer Organization

P4 Con No 50

Con. 6485–10. **(REVISED COURSE)** **GT–7552**

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

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

1. **A)** Explain Restoring Division algorithm with example **05**
   B) Explain basic structure of 4 stage Pipelining. **05**
   C) Explain in Brief interface of Printer to Processor on Parallel port **05**
   D) Define the terms Hit Rate and Miss Penalty, Explain in brief **05**

2. **A)** Explain execution of a Complete instruction in details; How branch instructions are executed? **10**
   B) Explain Input and Output operation in Asynchronous Bus with the help of timing diagrams. **10**

3. **A)** What are different approaches to Bus Arbitration? Explain these techniques with the help of timing diagrams. **10**
   B) Explain Memory segmentation in Intel IA-32 architecture. **10**

4. **A)** Explain structure of Magnetic Hard disk; Hence explain Read/Write operation in details. **10**
   B) What are Exceptions in Interrupt Handling process? Explain Exception Handling in Intel IA-32 architecture. **10**

5. **A)** Explain Address translation process in virtual memory; Hence explain use of Translation Lookaside Buffer (TLB). **10**
   B) Explain Execution of Branch instruction in ARM Family architecture (RISC). **10**

6. **A)** What are instruction Hazards? Explain effect of Branch Instructions in pipelining with examples. **10**
   B) Explain Register structure in ARM Family architecture (RISC). **10**

7. Write short notes on:(Any **TWO**) **20**
   A) RAID Disk
   B) Cache Architectures
   C) Superscalar Architecture.

T.E. Electronics / Sem VI

Medical Electronic

VT-Oct-10-75

Con. 6079–10.

(REVISED COURSE)

GT–7536

(3 Hours)

[Total Marks : 100

N.B. : (1) Question **No. 1** is **compulsory**.
(2) Attempt any **four** questions from Q. Nos. **2** to **7**.
(3) Assume **suitable** data if **required**.

1. Attempt any **four** :– **20**
   (a) Explain with a neat diagram any one method for blood pressure measurement.
   (b) Explain the generation of Action Potential.
   (c) Explain the various transducers used in body temperature measurement.
   (d) With the help of a neat diagram, explain the principle of working of as Electromagnetic blood flowmeter.
   (e) Explain the principle of pulse oximeter.

2. (a) What is cardiac output ? Explain any scheme for cardiac output measurement. **10**
   (b) Draw as equivalent circuit when a pair of electrodes is placed in electrolytic contact with a subject and explain the same. **10**

3. (a) What is the Einthoven triangle ? Also explain, the various types of leads used in ECG measurement. **10**
   (b) Explain any two principles for Respiration Rate measurement. **10**

4. (a) Draw and explain a neat schematic diagram of an EEG machine. **10**
   (b) Draw and explain the schematic diagram of an instrumentation amplifier used in biomedical measurements. **10**

5. (a) Explain the need for a defibrillator and draw and explain the dc defibrillator. **10**
   (b) State the principle of diathermy and explain the circuit diagram of a Short Wave diathermy unit. **10**

6. (a) Explain the principle of computed tomography. **10**
   (b) Draw and explain the block diagram of bedside patient monitor. **10**

7. Write short notes on :– **20**
   (a) Impedance Plethy Sonogrophy
   (b) Electrical Safety Codes and Standards
   (c) Electronic Spirometer
   (d) Positron Emission Tomography.

****

T.E/ Electronics / Sem VI / Rev

Con. 5824-10. **(REVISED COURSE)** **GT-7542**

Communication System & Application

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

N.B. : (1) Question No. **1** is **compulsory**.
(2) Answer any **four** out of the remaining **six** questions.
(3) Draw **neat** sketches wherever **necessary**.

1. (a) Explain the term Dipole. Prove that the resonant length of a dipole is half wavelength. **5**
   (b) Explain the importance of pre and post equalizing pulses in the composite video signal of a TV system. **5**
   (c) What in the meaning of orbital perturbation and station keeping with reference to satellite communication ? **5**
   (d) What does an MTI radar actually do ? Give at least one instance of a radar application for which MTI cannot be used. **5**

2. (a) Explain the Yogi-Uda Anterna and Log-periodic antenna giving their sketch, radiation pattern, dipole spacing, dipole length and application. **10**
   (b) Determine the length of a half wave dipole antenna to be used to receive a 5 MHz radio signal, Assume that the velocity of electro-magnetic waves on the antenna is 3×10^8 m/sec. **5**
   (c) Determine the front to back ratio of an antenna which puts out 3 kW in its optimum direction and 500 W in the opposite direction. **5**

3. (a) Explain how the Y and colour difference signals are developed from camera outputs. Why is the Y signal set = 0.3 R + 0.59 G + 0.11 B ? **10**
   (b) Draw block diagram of an RF tuner and explain how incoming signals from different stations are translated to common picture IF and sound IF frequencies. **5**
   (c) Explain briefly how sync. pulses are separated from the composite video signal. **5**

4. (a) With a neat sketch explain the working of a satellite uplink, transponder and satellite downlink sections. **10**
   (b) State and explain Kepler's Laws. **5**
   (c) Explain the satellite launching mechanism. **5**

5. (a) Explain the operation of MTI system with a neat block diagram. What is meant by the term Blind speed in the MTI radar. Under what condition could this be an embarssment ? What is the method of overcoming this ? **10**
   (b) Derive the basic radar range equation as governed by the minimum receivable echo power P min. Using the derived equation calculate the maximum range of a radar system which operates at 3 cm with a peak pulse power of 500 kW if its minimum receivable power in 10^{-13} W. The capture area of its antenna is 5 m^2 and the radar cross sectional area of the target is 20 m^2. **10**

6. (a) Explain in detail the various losses in optical fiber cables. **10**
   (b) Compare the advantages and disadvantages of ILD's and LED's. **5**
   (c) Explain the difference between PIN diode and an APD. **5**

7. Write short notes on the following :– 20

(a) Antenna Array

(b) HDTV

(c) LEO and MEO Satellite

(d) Pulsed Radar System.

Con. 5824-10. (REVISED COURSE) GT-7542

T.E. Electronic Sem VI

(3 Hours) [Total Marks : 100

communication system & Applications

N.B. : (1) Question No. **1** is **compulsory**.
(2) Answer any **four** out of the remaining **six** questions.
(3) Draw **neat** sketches wherever **necessary**.

1. (a) Explain the term Dipole. Prove that the resonant length of a dipole is half wavelength. **5**
(b) Explain the importance of pre and post equalizing pulses in the composite video signal of a TV system. **5**
(c) What in the meaning of orbital perturbation and station keeping with reference to satellite communication ? **5**
(d) What does an MTI radar actually do ? Give at least one instance of a radar application for which MTI cannot be used. **5**

2. (a) Explain the Yogi-Uda Anterna and Log-periodic antenna giving their sketch, radiation pattern, dipole spacing, dipole length and application. **10**
(b) Determine the length of a half wave dipole antenna to be used to receive a 5 MHz radio signal, Assume that the velocity of electro-magnetic waves on the antenna is 3×10^8 m/sec. **5**
(c) Determine the front to back ratio of an antenna which puts out 3 kW in its optimum direction and 500 W in the opposite direction. **5**

3. (a) Explain how the Y and colour difference signals are developed from camera outputs. Why is the Y signal set = 0.3 R + 0.59 G + 0.11 B ? **10**
(b) Draw block diagram of an RF tuner and explain how incoming signals from different stations are translated to common picture IF and sound IF frequencies. **5**
(c) Explain briefly how sync. pulses are separated from the composite video signal. **5**

4. (a) With a neat sketch explain the working of a satellite uplink, transponder and satellite downlink sections. **10**
(b) State and explain Kepler's Laws. **5**
(c) Explain the satellite launching mechanism. **5**

5. (a) Explain the operation of MTI system with a neat block diagram. What is meant by the term Blind speed in the MTI radar. Under what condition could this be an embarssment ? What is the method of overcoming this ? **10**
(b) Derive the basic radar range equation as governed by the minimum receivable echo power P min. Using the derived equation calculate the maximum range of a radar system which operates at 3 cm with a peak pulse power of 500 kW if its minimum receivable power in 10^{-13} W. The capture area of its antenna is 5 m^2 and the radar cross sectional area of the target is 20 m^2. **10**

6. (a) Explain in detail the various losses in optical fiber cables. **10**
(b) Compare the advantages and disadvantages of ILD's and LED's. **5**
(c) Explain the difference between PIN diode and an APD. **5**

7. Write short notes on the following :– **20**
(a) Antenna Array
(b) HDTV
(c) LEO and MEO Satellite
(d) Pulsed Radar System.

30 Dec 2010 T.E. / Electronic & Biomedical / Sem VI

141 2nd half-Exam 10-Mina (a)

Analog Integranted Circuit Applicatio

Con. 6083-10. **(OLD COURSE)** **GT-7284**

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

N.B. (1) Question No. **1** is **compulsory**.
(2) Attempt any **two** questions from remaining **six** questions.
(3) Assume **suitable** data if **required** and state **clearly**.

1. (a) Define V-to-I converter. Draw the circuit of V-to-I converter and derive its output expression. **5**
   (b) Give any five Ideal characteristics of op-amp. Also give their practical values with respect to op-amp IC 741. **5**
   (c) Draw the circuit of precision full wave rectifier. Draw its input and output waveforms. Explain, why it is called precision. **5**
   (d) Design a monostable multivibrator using IC 555 for a pulse width of 1 msec. **5**

2. (a) What are the different types of analog to digital converters ? Explain any one of them with neat circuit diagram. **10**
   (b) Design a low pass, second order KRC Filter using equal component design for F_o = 2 kHz and Q = 5. Give its dc gain. **10**

3. (a) Design a phase shift Oscillator with f_o = 10 kHz. How is the peak to peak output voltage adujsted ? **10**
   (b) What are the main features of IC 8038 ? **10**

4. (a) Draw a functional block diagram of PLL IC 565 and explain its working. **10**
   (b) What are the switching voltage regulators ? How are they different from linear regulators ? Explain in brief the various topologies of switching regulations. **10**

5. (a) Draw a neat circuit of an Instrumentation amplifier. Derive its output expression. **10**
   (b) Draw the circuit diagram of peak detecher and explain its working. **10**

6. (a) Explain the frequency response of an ideal integrator and that of practical integrators with figures. **10**
   (b) Design a 1 amp current source using 7805 regulator IC. **10**

7. Write short notes on following :— **20**
   (a) Switched Capacitor Filter
   (b) Log Amplifier
   (c) Difference in Lowpass Filter and Integrator
   (d) Effect of Finite GBP on Integrator Circuits.

TE/ETRX/Sem VI/old
Microwave & fiber optic commu -hication 30/11/10

VT-Oct-10-52

Con. 6236–10. **(OLD COURSE)** **GT–7272**

(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. Answer any **four** :– **20**
   (a) Why TM_{01} or TM_{10} mode is not possible in rectangular waveguide ?
   (b) Draw the refractive index profile of step-index and graded index fiber.
   (c) State and explain the symmetry property of S-matrix.
   (d) What is cut off wavelength as applied to optical fibers ?
   (e) Stimulated emission in Lasers.

2. (a) An air filled rectangular waveguide of inside dimension a = 8 cm and b = 4 cm, operates in the dominant TE_{10} mode. Find – **10**
      (i) the cutoff frequency
      (ii) the group velocity of the waveguide at a frequency of 3·75 GHz.
      (iii) the guided wavelength at the same frequency.
   (b) Discuss the methods of exciting TE_{10} and TE_{20} modes in a rectangular waveguide. **10**

3. (a) Explain in brief the limitations of conventional vacuum tubes at microwave frequencies. **8**
   (b) Explain the velocity modulation and bunching process in Reflex Klystron, with necessary expressions. **12**

4. (a) Define coupling factor and directivity of a directional coupler. **5**
   (b) What are crossed field devices ? Explain the working principle in brief of any crossed field device. **5**
   (c) Obtain the S-matrix for magic Tee and with the help of it, explain the working of the magic Tee. **5**
   (d) Describe the operation of IMPATT diode. **5**

5. (a) What is a heterojunction structure ? How is it better than a homojunction ? **5**
   (b) What are direct bandgap and indirect bandgap semiconductors ? **5**
   (c) Distinguish between LED and LASER. **5**
   (d) Explain splices and connections in optical fibers. **5**

6. (a) With the help of a neat diagram, explain the modified chemical vapour deposition (MCVD) technique of fabricating an optical fiber. **10**
   (b) For a photodiode, explain the terms – (i) Responsivity (ii) Quantum efficiency (iii) Dark current (iv) Transit time. **4**
   (c) Compare p-i-n diode and p-n photodiode. **6**

7. (a) What is dispersion in optical fibers ? How does it affect the performance of the fiber optic link ? **4**

(b) A multi-mode guided index fitter exhibits total pulse broadening of 0·2 μs over a distance of 30 km. Find – **6**

(i) the maximum possible bandwidth on the link assuming no inter-symbol interference.

(ii) the pulse dispersion per unit length.

(iii) the bandwidth length product for the fiber.

(c) Compare the dispersion in graded index fiber and step index fiber. **5**

(d) Explain any one method of measuring dispersion in optical fiber. **5**

****