T.E. EXTC & Sem VI / old.

Analog Integrated circuits and Application

Con. 3925-10. (OLD COURSE) AN-4742

(3 Hours) [Total Marks : 100

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

1. (a) What is precision rectifier ? Explain the working of precision full wave rectifier. Draw its waveforms. **10**
   (b) Draw the circuit diagram of three Op-Amp instruction amplifier. Get an expression for the output. **10**

2. (a) Explain how a missing pulse can be detected using IC 555. **10**
   (b) Design a phase shift Oscillator with f_0 = 2 KHz. Explain how to adjust the peak-to-peak output voltage. **10**

3. (a) Design a lowpasss, second order KRC filter using equal component design for f_0 = 1 KHz and Q = 5. What is its dc gain ? **10**
   (b) Draw the circuit diagram for non-inverting schmitt trigger. Explain the working and give an expressions for V_{LTP} and V_{UTP}. **10**

4. (a) Draw and explain the functional diagram of PLL 565. **10**
   (b) Design Astable Multivibrator using IC 555 for output frequency of 1 KHz and duty cycle 60%. **10**

5. (a) What are the different types of Analog to Digital converters ? Explain one of the type in detail. **10**
   (b) What are the main features of IC 8038 ? **10**

6. (a) Design a voltage regulator using IC 723 to regulate the output voltage between 4 V to 20 V and output current of 200 mA. **10**
   (b) Draw the circuit diagram and explain multiplication and division of two analog signals using Op-Amp. **10**

7. Write short notes on any **two** of the following :– **20**
   (a) Switched capacitor filters
   (b) Gyrator
   (c) Peak detector.

ELXTC Sem VI Rev

Microprocessor & Microcontroller – II

Con. 3499-10. **(REVISED COURSE)** **AN–4453**

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

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

Q.1a) In an Design a 8086 based system with following specifications **12**
- CPU at 10MHz in minimum mode operation
- 32 KB SRAM using 8 KB devices
- 64 KB EPROM using 16 KB devices

Design system with **exhaustive decoding**. Clearly show memory map with address ranges and draw a neat schematic for chip selection logic.

b) Explain in brief support devices in PIC18F microcontroller and their use. **08**

Q.2a) Write a program for performing a 64 bit / 16 bit division using 8086 instruction set. The operands and the result is to be stored in memory. **10**

Q.2b) Explain following 8086 instructions **10**
a) STD b) MOVS c) AAS d) IMUL e) RCL

Q.3a) Write a program to generate a rectangular wave on 8255 port A with ON time = 2* OFF time. Explain the mode in which 8255 is used and its mode set control word. **10**

Q.3b) What are different function blocks in 8259 Programmable Interrupt Controller? Explain the role of IRR, ISR, IMR, and priority resolver in process of interrupt handling. **10**

Q.4a) Explain different modes of operation of 8237 DMA Controller. **10**

Q.4b) Write a program to calculate delay of 100 microsecond using PIC18F microcontroller (freq = 40 MHz) **10**

Q.5a) Explain block diagram of PIC18F architecture in brief with a neat diagram. **12**

b) In the following program, find the contents of Register 03h and identify the flags set at the end. **08**
Explain the program

```
MOVLW 0XA7
MOVWF 0x01,0
MOVLW 0x92
MOVWF 0x02,0
ADDWF 0x01,1,0
MOVWF 0x03,0
```

Q.6a) Write a program to divide the unsigned a 16 bit number 0F0FH stored in data registers REG1 and REG2 (MSB in REG2) by 8. **10**

Q.6b) Interface two common cathode seven segment LEDs to PIC18F microcontroller using PORT B and PORT C. Explain the working with the help of neat diagram and suitable program. **10**

Q.7a) Explain working and interface of numeric Data coprocessor 8087 with 8086 **10**

b) What are exceptions, hardware interrupts and software interrupts of 8086. Explain their priority structure and interrupt vector table. **10**

T.E. Electronics SEM VI REV EXAM.

Microwave Devices and Circuits

29 May 2010

Con. 3491-10. **(REVISED COURSE)** **AN-4442**

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

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

1. Attempt any **four** :– **20**
   (a) Explain group velocity and phase velocity in rectangular waveguide.
   (b) What is back heating ? How can it be avoided ?
   (c) Explain Gunn effect using two valley theory.
   (d) What are the advantages of microwave frequencies over low frequency ?
   (e) Explain Rat-Race junction.

2. (a) Compare the multicavity Klystron and TWT from the point of view of basic construction, performance and applications. **10**
   (b) A pulsed cylindrical magnetron is operated with the following parameters :– **10**
   Anode voltage = 25 kV, Beam current = 25A
   Magnetic flux density = 0·34 wb/m^2
   R_a = 5 cm, R_b = 10 cm.
   Calculate – (i) Angular frequency
   (ii) The cut off voltage
   (iii) Cut off magnetic flux density.

3. (a) Derive the wave equation for a TM wave and obtain all the field components in a rectangular waveguide. **12**
   (b) A TE11 mode is propagating through a circular waveguide having an air dielectric and a radius of 5 cms. Calculate the cut off frequency, guide wavelength and the wave impedance. **8**

4. (a) (i) For TE101 mode in a rectangular cavity resonator of width 'a', height 'b' and length 'd'. Show that the frequency of resonance is given by – **5**

$$f_r = \frac{c}{2d}\sqrt{1+\frac{d^2}{a^2}}$$

   (ii) For a = 2cm, b = 1cm, choose d so that cavity will resonate at 10 GHz for TE101 mode.
   (b) Why is hybrid Tee is referred as magic Tee ? Derive the scattering matrix for the same. **10**
   (c) Explain the operation of microwave isolator. **5**

5. (a) Describe the operation of IMPATT diode compare it with TRAPATT diode. **10**
   (b) Explain RF substitution method for measuring attenuation. **10**

6. (a) A symmetric directional coupler with infinite directivity and a forward attenuation of 20 db is used to monitor the power delivered to the load Z_l. Bolometer 1 introduces VSWR 2·0 on arm 4. Bolometer 2 is matched to arm 3. If Bolometer 1 reads 8 mW and bolometer 2 reads 2 mW. Find (i) the amount of power dissipated in the load Z_l. (ii) VSWR on arm 2. **10**

(b) Explain the construction and working principle of Reflex Klystron. **10**

7. Write short notes on any **four** :– **20**

(a) Working of circulator
(b) Strapping in Magnetron
(c) Double minimum method for measuring VSWR
(d) Excitation in Waveguides
(e) E-plane Tee.

T.E. Electronics sem VI old.

37-p3-upq-Con No. File

Computer Organisation

3 June 2010.

Con. 3553-10. **(OLD COURSE)** **AN–4744**

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

N.B. : (1) Question No. **1** is **compulsory.**
(2) Attempt any **four** questions from Question Nos. **2** to **7.**
(3) **Figures** to **right** indicates **full** marks.

1. a) Show2 way set associative mapping for following memory structure:- 10
Cache size=16Kbytes
Main Memory size=1Mbytes
b)Compare Paging and Segmentation 05
c)Solve using Booth's algorithm Multiplicand (M)=-7(1001), Multiplier (Q)=-3(1101),A=0000 05

2. a) Draw flowchart for Restoring Division Method and explain using Diagram steps for performing Restoring Division. Solve 8/3 (Eight divided by three) using the same. 10

b) Analyze 2 level memory hierarchy with following specifications:- 10

	Cache Memory (M1)	Main Memory (M2)
Size	4KB	64KB
Cost/Byte	0.5	0.05
Access time	20nsec	100nsec

Hit ratio=0.9
Calculate:
i) Average cost/byte
ii) Average access time
iii) Efficiency.

3. a)Explain concept of Cache memory with reference to principle of Locality, Hit ratio, and draw and explain different cache architectures. 10

b) Explain code hazard and data hazard in linear pipelining system and prove that for a K stage pipeline, the speed up factor = k. 10

4. a) What is microprogramming? Draw and explain micro programmed Control unit. 10

b) Explain various DMA transfer modes in brief with suitable example 10

5. a)Explain how a virtual address is converted into physical address using Paging, also explain TLB . 10

b) Explain various characteristics of Memory. 10

6. a)Explain different addressing modes in Pentium Processor, with Example. 10

b) What is bus contention? How is it resolved by using bus arbitration? Explain various bus arbitration methods 10

7. a) What is the necessity of replacement algorithm? Show how pages are Replaced between cache memory and main memory using replacement Policies? 10

i) LRU ii)FIFO iii)LFU find hit ratio.

Page stream in Main memory 2 3 2 1 5 2 4 5 3 2 5 2

Blocks in cache memory =3

b) Explain various steps taken by CPU in interrupt processing. Explain how multiple devices share a single interrupt line. 10

12 June 2010 T.E. Electronics sem VI Rev.

Discrete time signal & S.

88 : 1st half-Exm.10-Mina-(e)

Con. 3736-10. **(REVISED COURSE)** **AN-4450**

(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) Compare IIR and FIR systems. **5**
   (b) Determine IDFT of X(K) = {3, 2 + j, 1, 2 – j } **5**
   (c) What is the advantage of FFT over DFT in terms of calculations ? Justify your answer with a suitable example. **5**
   (d) Derive the relationship between Z-Transform and Discrete Fourier Transform. **5**

2. (a) If x(n) = { 1, 2, 3, 4 } and h(n) = { –3, 2, 1 }. Determine convolution between x(n) and h(n) using :— **10**
      (i) Linear convolution
      (ii) Circular convolution.
   (b) Determine causal, non-causal and both sided signal associated with the Z-transform : **10**

$$X(z) = \frac{1}{1 - 1 \cdot 5\, z^{-1} + 0 \cdot 52^{-2}}.$$

3. (a) Consider a sequence x(n) = { 1, 2, –3, 4, 4, –3, 2, 1 }. Determine the DFT of sequence x(n) using decimation in frequency (DIF) FFT algorithm. **10**
   (b) Find DFT of the following signal by using DFT only once : **10**
      $x_1(n) = [1\ 4\ 5\ 3]$
      $x_2(n) = [4\ 3\ 2\ 3]$.

4. (a) Derive the composite radix for 6 = 2·3 alongorithm and draw the flow graph. **10**
   (b) The transfer function of a discrete-time system has poles at z = 0·5, z = 0·1 ± j 0·2 and zeros at z = –1 and z =1 **10**
      (i) Sketch the pole-zero diagram for the system
      (ii) Derive the system transfer function H(z), from the pole-zero diagram
      (iii) Develop the difference equation
      (iv) Find if the system is stable.

5. (a) State the sampling theorem and explain the following terms :— **10**
      (i) Nyquist frequency
      (ii) Nyquist rate
      (iii) Sampling rate
      (iv) Sampling frequency.
   (b) Obtain the cross correlation function between the two sets of data { 1·5, 2·0, 1·5, 2·0, 2·5 } and { 0, 0·33, 0·67, 1·0 }. **10**
   Explain correlation, cross-correlation and auto-correlation.

6. (a) (i) Given X(K) = { 2, –6j, 2 – 8j, 6j, 2, –6j, 2 + 8j, 6j }. Find x(n) using any IFFT algorithm. **8**

(ii) Explain where overlap add and overlap save methods are used ? **2**

(b) With a block diagram, explain the aschitecture of TMS 320C5 × series of processors. **10**

7. Write notes on any **four** of the following :— **20**

(a) Goertzel algorithm

(b) Applications of FFT

(c) Applications of DSP of radar

(d) State any 4 properties of DFT

(e) Write the properties of twiddle factor.

T.E. Electronic Sem VI /old

Discrete time signal Processing

Con. 3751-10.

(OLD COURSE)

AN-4735

(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) State and explain Parseval's Theorem in DFT. How it can be used to find the energy of a finite duration sequence. 5

b) Determine whether the following systems are causal or non causal 5

(i) $y(n)=A\cos(w_o n)x(n)$ (ii) $y=\sum_{k=n_o}^{n} x(k)$

c) Test linearity and time invariance of the following system 5

$y(n)=A\cos(w_o n)x(n)$

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

$y(n)=b^{x(n)}$

$y(n) = \sum_{k=n_o}^{n} x(k)$

d) Determine the output y(n) of a relaxed linear time-invariant system with impulse response $h(n)= a^n u(n)$, $|a|<1$ when the input is $x(n)=u(n)$. 5

2. a) Compute the convolution x(n) of the signal using z-transforms 5

$x_1(n)=\{1,-2,1\}$

$x_2(n)= 1, \quad 0 \le n \le 5$

$= 0,$ elsewhere

b) Determine the system function and the unit sample response of the system described by the difference equation $y(n)=(\frac{1}{2})y(n-1)+2x(n)$ 5

c) Compute the convolution $y_i(n)$ and correlation $r_i(n)$ sequence for the following pair of signals and comment on the results obtained.

$x_1(n)=\{01,-2,3,-4\}$ $h_1(n)=\{\frac{1}{2},1,2,1,\frac{1}{2}\}$

$x_2(n)=\{1,2,3,4\}$ $h_2(n)=\{4,3,2,1\}$ 10

3. a) Determine the z-transform of the the signal $x(n)= a^n u(n) + b^n u(-n-1)$ 10

b) Determine the causal signal x(n) whose z-transform is given by 10

$X(z)=1 / (1+z^{-1})(1-z^{-1})^2$

[TURN OVER

4. a) By means of the DFT and IDFT, determine the response of the FIR filter with impulse response $h(n)=\{1, 2, 3\}$ to the input sequence $x(n)=\{1, 2, 2, 1\}$ 10
   ↑ ↑

   b) Determine the Fourier transform of the unit step function $x(n)=u(n)$ 10

5. a) Determine the cascade and parallel realization for the system described by the system function 15
   $H(z)=\{10(1-\frac{1}{2}z^{-1})(1-(2/3)z^{-1})(1+2z^{-1})\}/\{(1-0.75z^{-1})(1-0.125z^{-1})[1-(\frac{1}{2}+j\frac{1}{2})z^{-1})][1-(\frac{1}{2}-j\frac{1}{2})z^{-1})]\}$

   b) Compute the DFT of the four point sequence $x(n)=(0,1,2,3)$ using matrix of the linear transformation(W_N) 5

6. a) Compute the 8 point DFT of the sequence
   $x(n)=\{\frac{1}{2}, \frac{1}{2}, \frac{1}{2}, \frac{1}{2}, 0, 0, 0, 0\}$ Using decimation in frequency FFT algorithm. 10

   b) Compute the 8 point DFT of the sequence
   $x(n)=\{-1, 0, 2, 0, -4, 0, 2, 0\}$ Using decimation in time FFT algorithm. 10

7. Attempt any <u>four</u> of the following, write short notes on : 20
   (i) Effects of finite word length
   (ii) Comparison between IIR and FIR system
   (iii) Filtering of long data sequences
   (iv) Frequency analysis of signals using the DFT.
   (v) Stability of IIR and FIR systems.

T.E. Electronic Sem VI / Rev

Electronic Instrumentation

Con. 3616-10. **(REVISED COURSE)** **AN–4444**

(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 **suitable** data wherever **necessary.**

Q1. Answer any five of the following: (20)

a. What are the various types of the errors in measuring systems?
b. State the advantages of electrical transducers.
c. Define the gage factor in Strain Gage.
d. Explain the logarithmic compression used for signal conditioning in Instrumentation system.
e. Explain the role of final control element closed loop process control system.
f. What is calibration? State its importance?

Q2. a. What are the different errors encountered in measurements? Explain with suitable examples. (10)

b. Explain the types, construction, working principle and operation of ultrasonic flow meters with suitable sketch. (10)

Q3. a. Draw a neat block diagram of multichannel analog multiplexed Data Acquisition System and explain its operation. (10)

b. Draw the neat diagram of Solenoid valve and Servomechanism as an electrical actuators to control the air or liquid flow. (10)

Q4. a. What is the standard calibration procedure for calibrating a process? Hence give the steps for three point calibration method. What are the disadvantages of the 3-point method. (10)

b. The Pt 100 RTD is used to measure the temperature from 0 to 200°C. Suggest the signal conditioning scheme and hence design an instrumentation amplifier to give an output voltage from (0V to 200mV). (10)

Q5. a. Describe an operating principle of dew point instrument used to measure moisture and humidity in gases, with neat schematic diagram. (10)

b. Draw the neat block diagram of data logging system and hence differentiate with DAS? Give the advantages of data logging system. (10)

Q6. a. For proportional control mode explain how to calculate proportional gain and proportional band. State and explain the offset in proportional control mode. (10)

Q7. a. Differentiate between active and passive filters. (05)

b. What is RESET controller? (05)

c. What is the need of tuning of controller? Hence explain the steps used for tuning the controller using Zigler-Nichols Continuous Cycling Method for P, P+I and P+I+D controller. (10)

T.E. Electronics sem VI / old.
communication System

Con. 3649-10. (OLD COURSE) AN–4738

(3 Hours) [Total Marks : 100

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

1.	Answer any four questions	
(a)	Explain interlaced scanning. How flicker is reduced by interlaced scanning?	05
(b)	Explain the basic radar system with simple sketch. Which factor determines the short range or minimum range of radar?	05
(c)	State and explain keppler's law.	05
(d)	Why antenna coupling network are required? Explain π coupling networks of antennas.	05
(e)	Explain the importance of pre and post equalizing pulses in the composite video signal of T.V.System.	05
2(a)	Explain the any four characteristics of an antenna.	08
(b)	Explain construction, principle of operation, advantages and limitations of image vidicon camera tube.	12
3(a)	Explain various microwave antennas .	08
(b)	With a neat block diagram explain theworking of colour TV receiver.	12
4(a)	Draw the block diagram of Satellite Earth station and discuss function of various blocks in it.	08
(b)	Explain orbital perturbation .Elaborate the causes of orbital perturbation. What is orbit correction and how it can achived.	12
5(a)	State the reasons of the following . (1) odd number lines are used in Television Standards. (2) In TV systems ,use e/m d deflection and e/s focusing system.	10
(b)	Explain vidicon camera tube .	05
(c)	Explain the meaning interleaving of signal in TV Systems.	05
6(a)	What is pulsed radar system ? Explain basic pulse radar system with the neat sketch.	08
(b)	Explain Yagi Uda antenna and log periodic antenna w.r.t.their radiation pattern dipole spacing, dipole length and applications along with the sketch.	12
7.	Write short notes on the following (any four)	20
	(a)Antenna reciprocity (b) Surveillance radar (c) Tuner of TV	
	(d)IEEE frequency band.(e)DBS satellites (f) Propagation of waves.	

T.E. Electronics / sem VI / Rev.
Elective: 1: computer organization

Con. 3957-10. **(REVISED COURSE)** **AN–4462**

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

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

1. Solve any **'Four'** of the following :

a) Discuss Booth's algorithm for multiplication. Perform 1001 x 0011 using booth's algorithm. **05**

b) What is instruction pipelining? Write different branch prediction methods. **05**

c) Explain Memory read operation with timing diagram **05**

d) What is Memory Segmentation? Explain in Brief. **05**

e) Explain in Brief Optical memory. **05**

2. a) Explain in details organization of cache memory. Explain different replacement algorithms. **10**

b) What is micro programmed control? Explain in details. Write format of Microinstruction. **10**

3. a) Explain structure of serial and Parallel ports. Write methods to access it. **10**

b) Explain Different Hazards in pipelining in details. **10**

4. a) Explain in details Hardwired control. Discuss different methods to implement it. **10**

b) Explain concept of Virtual memory. What is address translation? Explain use of TLB. **10**

5. a) Explain register organization for IA-32 family. Hence explain different addressing modes for IA-32 architecture. **10**

b) Explain different I/O device access methods. Hence explain use of interrupts to access I/O Device. **10**

6. a) Explain different Mapping functions for Cache memory. **10**

b) Explain data transfer in Synchronous Bus with timing diagram. Hence explain bus arbitration schemes. **10**

7. Write short notes on (Any **TWO**) : **20**
i) RISC Vs CISC Characteristics
ii) Paging
iii) The ARM family Architecture(RISC)
iv) Superscalar Architecture.

T.E. Electronics Sem VI / Rev

Elective I: Communication Systems & Application.

VT-April-10- 194

Con. 3893–10. **(REVISED COURSE)** **AN–4459**

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

1. Attempt any **four** questions :– **20**
   (a) Find the length of a half wave dipole at 30 MHz, 300 MHz and 3000 MHz.
   (b) Define directivity, antenna gain, polarisation of antenna.
   (c) What is doppler effect ? (explain with relevant mathematical equation and example).
   (d) In color TV system, explain the significance of color difference signals.
   (e) Justify selection of 4·43 MHz as color subcarrier frequency.

2. (a) Derive an expression for maximum possible range of radar. **8**
   (b) What is pulsed radar system ? Explain basic pulse radar system with the neat sketch. **8**
   (b) Explain what is meant by term blind speed in MTI Radar. **4**

3. (a) Define the terms :– **8**
      (i) Apogee (iii) Ascending Node
      (ii) Perigee (iv) Descending Node.
   (b) With the help of neat block diagram explain satellite earth stations, discuss the functions of various blocks in it. Also derive the expression to show that a satellite launched into a circular orbit at a height (H) meters from the surface of the earth moving with a velocity (V). **12**

4. (a) Explain in detail the various mechanisms for fiber attenuation and dispersion. **12**
   (b) Explain with block diagram the various sub-parts of a fibre optic link. **4**
   (c) An optical fibre has NA = 0·20 and a cladding refractive index of 1·59. Determine – **4**
      (i) The acceptance angle for the fiber in water having refractive index of 1·33.
      (ii) The critical angle at the core-cladding interface.

5. (a) Explain Yagi-Uda antenna and log periodic antenna with respect to their radiation pattern dipole spacing, dipole lengths and applications along with the sketch. **12**
   (b) Explain the de-gaussing circuit. **4**
   (c) Discuss the broad side array and its radiation pattern. **4**

6. (a) Explain what is equatorial, polar and inclined orbits. 5
(b) Distinguish between the resonant and non-resonant antennas. 5
(c) Why green signal is not transmitted? 5
(d) Draw and explain composite video signal. 5

7. Write short notes on the following (any **four**) :– 20
(a) Effect of ground on antennas
(b) Satellite uplink and downlink models
(c) Digital TV
(d) Differentiate between LEO, MEO and GEO stationary satellites
(e) HDTV.

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T.E. Electronics sem VI Rev.

Elective : 1 Medical Electronics.

Con. 3894-10. **(REVISED COURSE)** **AN-4456**

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

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

1. Solve any **four** :– **20**
   (a) Explain Medical Instrumentation system
   (b) Explain Electro-Myogram
   (c) Explain Hemodialysis system
   (d) Explain Diagnostic Radiology system
   (e) Explain approaches to protect against shock.

2. (a) Explain different types of pressure transducers. **10**
   (b) Explain Electrodes for ECG. **10**

3. (a) Explain problems frequently encountered in Biopotential amplifiers. **10**
   (b) Explain Electroencephlograph (EEG) instrumentation system. **10**

4. (a) Explain Pulse Oximeter. **10**
   (b) Explain electromagnetic blood flowmeters. **10**

5. (a) Explain ventilators. **10**
   (b) Explain Muscle and Nerve Stimulator. **5**
   (c) Explain capacitive -discharge defibrillator. **5**

6. (a) Explain computed Tomography system. **10**
   (b) Explain principle magnetic Resonance Imaging. **5**
   (c) Explain positron emission tomography. **5**

7. Write short notes on :– **20**
   (a) Electrical safety codes and standards
   (b) Biomedical telemetry
   (c) Methods of accident preventions
   (d) Electro cautery machine.

T.E. Electronics SEM VI old · 24 May 2010

Microwave & fiberoptic communication

99 : 1st half-10-DD (F)

Con. 3536-10. **(OLD COURSE)** **AN-4732**

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

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

1. Answer any **five** from the following :— **20**
   (a) Differentiate between TE_{mn} modes and TM_{mn} modes in rectangular waveguides.
   (b) Show the division of field lines in the auxillary arms E-plane and H-plane Tees with the help of a schematic diagram.
   (c) Obtain the S-matrix for magic Tee.
   (d) Draw ray diagrams to illustrate the propagation path of light energy in single mode step index and single mode graded index fibers.
   (e) Draw the refractive index profile of a W-index fiber. What is its significance ?
   (f) Give two advantages and two disadvantages of Lasers over LED source.

2. (a) Explain different types of absorption losses in glass fibers. How are they dependent on the wavelength of light ? **10**
   (b) Explain the constructional details and working of a GUNN diode. **10**

3. (a) Explain the working of a two cavity Klystron amplifier with the help of a neat diagram. **5**
   Obtain the expression for the modulated velocity of electrons in a two cavity Klystron tube. **5**
   (b) A two cavity Klystron amplifier has the following specifications :— **10**
   $V_0 = 1000$ V, $R_0 = 40$ K Ω, $I_0 = 25$mA, f = 3 GHz
   Gap spacing in either cavity, d = 1 mm, spacing between the two cavities. L = 4 cm. Effective shunt impedance excluding beam loading. $R_{sh} = 30$ K Ω.
   (i) Find the input gap voltage to give maximum voltage V_2.
   (ii) Find the voltage gain neglecting the beam loading in the output cavity.

4. (a) What are different types of dispersion mechanisms seen in optical fibers? Explain them in brief. **10**
   (b) Explain the term 'mode' in an optical waveguide. What are the different modes in fiber guides ? Distinguish between them in terms of E-fields and H-field profiles. **10**

5. (a) Obtain the solution of wave equations for TE_{mn} modes in rectangular wave guide. **10**
   (b) Define group velocity and phase velocity for a wave propagating in rectangular waveguide. **3**
   Derive the relation between them. **3**
   A waveguide has a cutoff frequency of 3·75 GHz.
   Find the group velocity of this rectangular wave guide at 5 GHz.

6. (a) What are cross field devices ? Explain the working of cavity magnetron with the help of a schematic diagrams. **10**

(b) Obtain the expression for the numerical aperture of an optical fiber interms of refractive index of core and cladding. **4**

An optical fiber has refractive index of 1·6 for the core and 1·4 for the cladding. Calculate the critical angle, numerical aperture and maximum angle of acceptance. **6**

7. Explain in brief any **four** of the following :— **20**

(a) Faraday rotation isolater

(b) S-parameters

(c) Splices and connectors in optical fiber

(d) Cavity resonators

(e) Optical detectors.

T.E. Electrical ; Electronics ; Instrumentation
Sem VI / old.

Industrial Economics & Management.

Con. 3948-10. **(OLD COURSE)** **AN-4702**

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

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

1. (a) What is Management ? Explain the characteristics of Management ? **10**
   (b) What are the functions of Money ? **10**

2. (a) Discuss the application of Industrial Psychology in Human Resource Management. **10**
   (b) Describe various types of market. **10**

3. (a) Explain the meaning of black money and bring out its consequences on the economy and society in particular. **10**
   (b) Explain the term 'planning' and 'decision making'. **10**

4. (a) What are the determinants of economic development ? What are the characteristics of under development economy ? **10**
   (b) Explain Blanchard's Situational Leadership theory. **10**

5. (a) What is cost associated with inventory ? Explain ABC analysis as an inventory control techniques. **10**
   (b) Draw a balance sheet. Explain all terms used in it. **10**

6. (a) Explain the concept of matrix organisation and state its merits and limitation. **10**
   (b) Briefly explain Maslows theory of hierarcy and its drawback. **10**

7. Write short notes on any **four** of the following :– **20**
   (a) Payback method
   (b) Line and staff relation in an organisation
   (c) Advertising
   (d) Direct and indirect taxes
   (e) Delegation of Authority.

T.E. Electronics Sem VI / Rev.

Power Electronics.

Con. 3880-10. **(REVISED COURSE)** **AN-4447**

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

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

1. Answer any **four** of the following :— **20**
   (a) Draw and explain the V-I characteristics of power diode.
   (b) What do you mean by a snubber circuit ? Draw and explain the function of each component.
   (c) What are different methods for turning "off" an SCR ? Explain auxiliary commutation method in detail.
   (d) Draw and explain the over voltage protection circuit for SCRs.
   (e) Explain the effect of free wheeling diode in detail. Also justify the statement "free wheeling diode improves the power factor of the system."
   (f) Draw the waveforms of a 3-phase half-wave controlled rectifier with resistive load for —

   (i) $\alpha = 0°$ (ii) $0 \le \alpha \le \pi/6$ (iii) $\alpha \ge \frac{\pi}{6}$.

2. (a) What is necessity of connecting SCRs in series ? What are the problems associated with series connection of SCRs ? How are they eliminated ? **10**
   (b) What happens if $\frac{di}{dt}$ and $\frac{dv}{dt}$ applied to a device exceeds its $\frac{di}{dt}$ and $\frac{dv}{dt}$? Explain how to maintain $\frac{di}{dt}$ and $\frac{dv}{dt}$ below rated value ? **10**

3. (a) Draw a circuit diagram for ramp and pedestal trigger circuit used for the single phase semiconverter. Describe its operation with appropriate waveforms. **10**
   (b) Explain the integral cycle triggering method for controlling the ac power. Compare this with ac phase control. Discuss merits and demerits of each. **10**

4. (a) Draw and explain the single phase full wave controlled rectifier. Derive the equation for average output voltage and current. **10**
   (b) Explain the operation of 3-phase full wave controlled rectifier with resistive load. Sketch the associated waveforms also. **10**

5. (a) Draw and explain simple light dimmer circuit using DIAC and TRIAC. Draw the waveforms of voltage across the bulb and current passing through it for $\alpha = 0°$ and $\alpha = 90°$. **15**
   (b) For class C (Complementary commutation) the DC source voltage Edc = 120 V and current through the resistors (R_1 and R_2) = 20 A. The turn off time of both the SCRs is 60 μs. Calculate the value of commutating capacitance C for successful commutation. **5**

6. (a) A 1-phase fully controlled bridge converter supplies an inductive load. Assuming that the O/P current is virtually constant and is equal to Id, determine the following performance measures if the supply voltage is 230 V. And if the firing angle is maintained at (π/6) radians :— **10**

(i) Average output voltage
(ii) Fundamental power factor
(iii) Supply power factor
(iv) Voltage ripple factor
(v) Supply rms current.

(b) Derive an expression for the following performance factors of 1-phase fully controlled bridge rectifier :— **10**

(i) Input displacement factor
(ii) Input power factor
(iii) DC voltage ratio
(iv) Input current distortion factor
(v) Input harmonic factor
(vi) Voltage ripple factor.

7. Write short note on the following :— **20**

(a) Safe operating area of power MOSFET
(b) Firing circuit of SCR using UJT
(c) Zero voltage switch.