

(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** wherever **necessary**.

1. Attempt any **four** :-
 - (a) Write a short note on super scaler architecture. 5
 - (b) Draw and explain CPSR register for ARM. 5
 - (c) What is bus contention ? 5
 - (d) Write a short note on Booth's multiplication. 5
 - (e) Explain any three logical instructions of ARM. 5
 2.
 - (a) Explain Pentium addressing modes with suitable examples. 10
 - (b) Explain various DMA transfer modes in detail with diagrams. 10
 3.
 - (a) What is pipelining ? Show the example with 5 stage pipelined architecture. 10
 - (b) Draw and explain register structure IA-32 family. 10
 4.
 - (a) Explain various characteristics of memory. 10
 - (b) Design a 4 bit fast adder (carry look ahead adder). Draw Block diagram. 10
 5.
 - (a) Explain various page replacement policies. 10
 - (b) What is bus arbitration ? Explain any two methods of bus arbitration. 10
 6.
 - (a) Explain addressing modes of ARM. 10
 - (b) What is virtual memory ? Explain how paging is useful in implementing virtual memory. 10
 7. Write short notes any **four** :- 20
 - (a) What is segmentation ?
 - (b) Cache architecture - look through.
 - (c) Hazards in pipeline architecture.
 - (d) Compare RISC and CISC architecture.
 - (e) Explain cache hit and cache miss term related to cache memory.
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Con. 8549-13.

LJ-11565

(Revised Course)

(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**.

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|----|-----|---|----|
| 1. | (a) | What are the Classification of transducers? Explain any two requirements of a transducer. | 5 |
| | (b) | Explain the working of LVDT. What is the significance of nonlinear region of the curve. | 5 |
| | (c) | Derive expression for the principle of working of a switched capacitor filter. | 5 |
| | (d) | Explain the working of RTD. | 5 |
| 2. | (a) | Draw and explain pressure Sensing elements. | 10 |
| | (b) | Explain the working of Resistive type of transducer for measuring different types of displacement. | 10 |
| 3. | (a) | Draw various configurations of Thermistor. Draw its Resistance vs Temperature graph and justify its applications. | 10 |
| | (b) | Explain capacitive type of pressure transducer, with a neat diagram. | 10 |
| 4. | (a) | Derive Expression for First order Low-Pass filter. | 10 |
| | (b) | Draw and explain a multichannel data Acquisition System. | 10 |
| 5. | (a) | What are the advantages of Instrumentation amplifier? Draw and explain 3-opamp Instrumentation amplifier. | 10 |
| | (b) | Explain a basic Data Logger with a block diagram. | 10 |
| 6. | (a) | Draw and explain PID controller. | 10 |
| | (b) | Explain the principle and working of a thermocouple. Mention its advantages. | 10 |
| 7. | | Write short notes on any two :- | 20 |
| | (a) | Strain gauges | |
| | (b) | Distributed Control System | |
| | (c) | Controller tuning | |
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(3 Hours)

[Total Marks : 100

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

1. Solve any four :-

20

1. If F_s is sampling frequency then the relation between analog frequency F and digital frequency f is :-

$$(i) f = \frac{F}{2F_s}$$

$$(ii) f = \frac{F_s}{F}$$

$$(iii) f = \frac{F}{F_s}$$

$$(iv) f = 2\frac{F}{F_s}$$

Justify the answer with an example.

2. The evaluation of correlation involves :-

- (i) Shifting, rotation and Summation.
- (ii) Shifting, multiplication and Summation.
- (iii) Change of index, folding and Summation.
- (iv) Change of index, folding and Shifting.

3. Compare IIR and FIR.

4. State and explain Parseval's Theorem in DFT.

5. State the relationship between Z-Transform and DTFT.

2. (a) Determine the energy of the sequence :-

10

$$x[n] = \begin{cases} \left(\frac{1}{2}\right)^n & n \geq 0 \\ 3^n & n < 0 \end{cases}$$

and plot the same.

TURN OVER

(b) 10

$$\text{If } x[n] = \left\{ \begin{matrix} 1 \\ \uparrow \\ -2, 1 \end{matrix} \right\}$$

$$h[n] = 1 \quad 0 \leq n \leq 5 \\ = 0 \quad \text{elsewhere}$$

Determine linear convolution.

3. (a) Determine the response of the system :- 10

$$y[n] = \frac{5}{6}y[n-1] - \frac{1}{6}y[n-2] + x[n]$$

$$\text{for input } x[n] = \delta[n] - \frac{1}{3}\delta[n-1]$$

(b) Using Z transform properties, prove that :- 10

$$n x[n] \xrightarrow{z} -z \frac{dx(z)}{dz}$$

$$\text{if } x[n] \xrightarrow{z} x(z)$$

4. (a) The system function of the LTI system is given as :- 10

$$H(z) = \frac{3 - 4z^{-1}}{1 - 3.5z^{-1} + 1.5z^{-2}}$$

Specify ROC of $H(z)$ and determine unit sample response $h(n)$ for the following conditions.

(i) Stable system.

(ii) Causal system.

(b) Explain Overlap add and Overlap save method. 10

5. (a) Find the DFT of the following sequence using FFT :- 10

$$x[n] = \{1, 1, 1, 0, 0, 0, 1, 1\}$$

(b) Using the result derived in Q.5 (a) Find the DFT of the signal and not otherwise :- 10

(i) $x_1[n] = \{1, 0, 0, 0, 1, 1, 1, 1\}$

(ii) $x_2[n] = \{1, 1, 1, 1, 1, 0, 0, 0\}$

Con. 8823-LJ-11605-13.

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6. (a) Determine the frequency, magnitude and phase response of the system given by the differential equation :- **10**

$$y[n] = x[n] - x[n-1] + x[n-2]$$

- (b) Find the 4pt. DFT of the sequence :- **10**

$$x[n] = \cos \frac{n\pi}{4}$$

7. Write short notes any **four** :- **20**

- (a) Geortzel Algorithm.
- (b) The difference between DSP and Micro processor.
- (c) Applications of DSP [any **two**].
- (d) Mapping of s-plane to z-plane.
- (e) Properties of DTFT.

Con. 7351-13.

LJ-11470

(3 Hours)

[Total Marks : 100

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

1. (a) Explain the terms : Cut-off frequency, Dominant mode and Phase velocity. 5
 (b) Why TM_{01} or TM_{10} mode is not possible in rectangular waveguide? 5
 (c) Compare IMPATT and TRAPATT diodes. 5
 (d) How are microwave measurements different from low frequency measurements? 5

2. (a) Derive the wave equation for a TM wave and obtain all the field components in a rectangular waveguide. 12
 (b) A TE_{11} wave is propagating through circular waveguide. The diameter of the guide is 10 cm and the guide is air filled. Find f_c , λ_g at $f = 3$ GHz and wave impedance Z_g . Given that $P'_{nm} = P'_{11} = 1.841$. 8

3. (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. 12
 (b) A Reflex Klystron operates at the peak mode of $n=2$ having the beam voltage of 350 volts and beam current of 15 mA. If the signal voltage is 45 volts, calculate input power, output power and efficiency. 8

4. (a) What are cross field devices? Explain the working of cylindrical magnetron oscillator and π mode of operation. 10
 (b) Explain in brief construction, principle and working of two valley model of Gunn oscillator. 10

5. (a) Explain the operation of E-plane T and H-plane T with their S-matrix. 10
 (b) Explain the set-up for VSWR measurement in microwaves. 10

6. (a) Explain microwave propagation in ferrite devices 5
 (b) Explain with neat diagram working of Gyrator 5
 (c) Explain excitation of modes in rectangular waveguides 5
 (d) Explain the working of two-hole directional coupler. 5

7. Write short notes on any three of the following:- 20
 - (a) Cavity Resonators
 - (b) Measurement of power in microwave
 - (c) Applications of Microwaves
 - (d) Helical TWT.

T.E. ETRX sem VI NOV-13

sub-mpmc-II

28/11/13

46 : 2nd half.13-Avi(ar)

Con. 8270-13.

LJ-11516

(3 Hours)

[Total Marks : 100

N.B. : (1) Question No. 1 is **compulsory**.

(2) Attempt any **four** from remaining **six** questions.

Q 1. a) Design a 8086 based system with following specifications :

- CPU at 4.77MHz in minimum mode operation
- 16 KB SRAM using 4 KB devices
- 32 KB EPROM using 8 KB devices

Design system with absolute decoding. Clearly show memory address map and I/O address map. Draw a neat schematic for chip selection logic. 15 Marks

b) Explain Flag register of 8086 microprocessor. 5 Marks

Q 2. a). State the significance of LOCK signal in 8086? 5 Marks

b) What are the functions of bus interface unit (BIU) in 8086? 5 Marks

c) Draw & Explain maximum mode configuration of 8086 Microprocessor 10 Marks

Q3. a) Draw and explain the bus timing diagram for the Input/output read & write for 8086 microprocessor in minimum mode operation. 10 marks

b) Explain the following 8086 microprocessor instruction with example
i) SAHF/LAHF ii) CMP iii) MOVSB iv) LOOP v) STD/CLD 10 marks

Q4. Write 8086 assembly language program to perform the following

a) To move a string of words from offset 1000h to offset 6000h.

The Length of the string is 0Ch. 10 Marks

b) To add an array of bytes. The array contains 50bytes. 10 Marks

Q5. a) Explain working and interface of numeric Data coprocessor 8087 with 8086 10 marks

b) What are hardware and software interrupts of 8086 microprocessor. Explain dedicated interrupts of 8086 microprocessor. 10 marks

Q6 . a) Explain the application of timer in PIC18F microcontroller 10 marks

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

Q7. Write short notes on :

i) Operation modes of 8237 DMA Controller

ii) I/O modes of 8255 PPI

iii) PIC 18 Reset

iv) Address modes of 8086 microprocessor. 20 marks