## Scheme - I

## Sample Question Paper

| Program Name | $:$ Diploma in Information Technology |  |
| :--- | :--- | ---: |
| Program Code | $:$ IF | 2232 |
| Semester | $:$ Third | 2232 |
| Course Title | $:$ Digital Techniques and Microprocessor |  |
| Max. Marks | $: 70$ | Time: 3 Hrs. |

## Instructions:

1) All questions are compulsory.
2) Illustrate your answers with sketches wherever necessary.
3) Figures to the right indicate full marks.
4) Assume suitable data if necessary.
5) Any calculator is not permissible.
6) Preferably, write the answers in sequential order.
Q.1) A) Attempt any FIVE of the following.

10 Marks
a. Define
i. Byte
ii. Nibble.
b. Describe Necessity of Multiplexer \& Demultiplexer
c. State Four applications of flip-flops.
d. Write use of Index registers, base pointer, and Instruction pointer.
e. Write one application each of basic logic gate.
f. List any Four addressing modes and give one example of each
Q.2) A) Attempt any THREE of the following.

12 Marks
a) Convert the following octal number into Hexa-decimal number
i) $(626)_{8}$
ii) $(2571)_{8}$
b) Simplify the given min-term into standard SOP form:
$\mathrm{Y}\{\mathrm{P}, \mathrm{Q}, \mathrm{R}, \mathrm{S}\}=(\mathrm{P}+\overline{\mathrm{R}}+\mathrm{S})+(\overline{\mathrm{Q}}+\mathrm{R}+\overline{\mathrm{S}})$
c) Draw symbol and truth table of JK flip flop and D flip flop.
d) Simplify following expression and draw logic diagram.
$Y=(A \bar{B}+A+\bar{B}) A \cdot B$
Q.3) A) Attempt any THREE of the following.

12 Marks
a) Construct the following gates using NAND gate. Write necessary outputs of gates.
i) AND
ii) OR
b) Interpret the given program and specify the output for following situations:

MOV AX, 34F9H

MOV BX, 3A69H
i) Masking of lower nibble of AX.
ii) Rotate right through carry contents of $B X$ by 4 positions.
iii) Shift Left contents of BX by 6 positions.
iv) XOR AX,BX
c) Explain level triggered and Edge triggered with proper diagram.
d) Represent following expression using Multiplexer:

- $Y=\Sigma m(0,1,2,4,6,11,13,15)$
Q.4) A) Attempt any THREE of the following.

12 Marks
a) Explain the concept of physical address calculation with suitable diagram and example.
b) Draw half adder using basic gates and specify it's truth table.
c) Draw symbol and write truth table for following flip-flops with one example of each.
i) Clocked SR flip flop.
ii) T flip flop
d) Compare features of Microprocessor 8086 with Pentium processor III on the basis of following parameters :

- Memory size
- Address bus/ data bus width
- Clock speed (MHz)
- Modes of operation
e) Reduce the following Boolean expression and draw the logical diagram for reduced expression.
$\mathrm{Y}=\mathrm{A} \cdot \mathrm{B} \cdot \mathrm{C}+\overline{\mathrm{A}} \cdot \overline{\mathrm{B}} \cdot \mathrm{C}+\mathrm{A} \cdot \mathrm{B} \cdot \overline{\mathrm{C}}+\overline{\mathrm{A}} \cdot \overline{\mathrm{B}} \cdot \overline{\mathrm{C}}$


## Q.5) A) Attempt any TWO of the following.

12 Marks
a) Write an Assembly Language Program with algorithm for finding largest Number. from the array of 10 Numbers.(Assume Suitable data)
b) Refer given figure and Write the output(s) for each of the following input.


Refer given figure and Write the output(s) for each of the following input.

| $\mathbf{A}$ | $\mathbf{B}$ | $\mathbf{C}$ | $\mathbf{F}$ |
| :---: | :---: | :---: | :---: |
| 0 | 0 | 0 |  |
| 0 | 0 | 1 |  |
| 0 | 1 | 0 |  |
| 0 | 1 | 1 |  |
| 1 | 0 | 0 |  |
| 1 | 0 | 1 |  |
| 1 | 1 | 0 |  |
| 1 | 1 | 1 |  |

c) Draw maximum mode configuration of 8086 and explain any four control signals generated by bus controller.
Q.6) A) Attempt any TWO of the following.

12 Marks
a) Describe pipelined architecture concept of CISC, which helps in improving system throughput?
b) Design half Subtractor using NOR gate only. Write truth table.
c) Write algorithm and Assembly Language Program for find whether the no. is even or odd.

## Scheme - I

## Sample Test Paper - I

| Program Name | $:$ Diploma in Information Technology |
| :--- | :--- |
| Program Code | $:$ IF |
| Semester | $:$ Third |


| Course Title | : Digital Techniques and Microprocessor |  |
| :--- | :--- | :--- |
| Max. Marks | $: 20$ | Time: 1 Hour |

## Instructions:

1) All questions are compulsory.
2) Illustrate your answers with sketches wherever necessary.
3) Figures to the right indicate full marks.
4) Assume suitable data if necessary.
5) Any calculator is not permissible.
6) Preferably, write the answers in sequential order.

## Q. 1 Attempt any FOUR.

08 Marks
a) Define
i) Byte
ii) Nibble.
b) State significance of Combinational Logic circuit
c) Define min-term and max-term
d) Construct OR gate using NOR Gate.
e) Which basic gate will be used in following situation:
i) Where two inputs are different and output is high.
ii) Complement the given input.
f) Define min-term and max-term and give one example of each.

## Q. 2 Attempt any THREE.

12 Marks
a) Compare TTL and CMOS logic families on the basis of
i) Propagation delay
ii) Fan-in
iii) Fan-out
iv) Power dissipation
b) Represent following expression using K-map.
i) $Y=\Sigma m(0,1,2,4,5,6)$
ii) $Y=\Sigma_{\Pi}(0,2,4,5)$
c) Draw AND gate using NAND gate only and NOR gate only
d) Convert the following Boolean equation into standard SOP form
i) $\mathrm{Y}=\mathrm{AB}+\mathrm{A} \cdot \mathrm{B}+\mathrm{BC}$
ii) $\mathrm{Y}=\mathrm{AB}+\mathrm{B}(\mathrm{B}+\mathrm{C})+\mathrm{AB}$

## Scheme - I

## Sample Test Paper - II

| Program Name | : Diploma in Information Technology |  |
| :--- | :--- | ---: |
| Program Code | $:$ IF | 2232 |
| Semester | $:$ Third | 223 |
| Course Title | $:$ Digital Techniques and Microprocessor |  |
| Max. Marks | $: 20$ | Time: 1 Hour |

## Instructions:

1) All questions are compulsory.
2) Illustrate your answers with sketches wherever necessary.
3) Figures to the right indicate full marks.
4) Assume suitable data if necessary.
5) Any calculator is not permissible.
6) Preferably, write the answers in sequential order.

## Q. 1 Attempt any FOUR.

08 Marks
a) Define Sequential Logic circuit
b) Draw Flag register of 8086 with proper labeling
c) Define addressing mode and Give one example of any one addressing mode.
d) Find physical address of operand NUM1 for given data.

DS: $4300 \mathrm{H}, \mathrm{CS}=1200 \mathrm{H}, \mathrm{SP}=0500 \mathrm{H}, \mathrm{IP}=234 \mathrm{H}$
e) Write instruction for 8 bit and 16 bit operations from following with its syntax:

- Addition with carry
- signed multiplication
f) List any four characteristic of CISC processor
Q. 2 Attempt any THREE.

12 Marks
a) Explain positive edge triggering and negative edge triggering.
b) Compare 8086 microprocessor with Pentium III (any four parameters).
c) State TWO assembler directives of following with suitable example.

- Related to segment
- Related to procedure
d) Draw labeled architecture of 8086 microprocessor.
e)

