

No. of Printed Pages : 6

MCS-202

**POST GRADUATE DIPLOMA IN
COMPUTER APPLICATIONS
(PGDCA-NEW)**

Term-End Examination

June, 2023

MCS-202 : COMPUTER ORGANISATION

Time : 3 Hours

Maximum Marks : 100

Weightage : 70%

Note : *Question Number 1 is compulsory and carries 40 marks. Attempt any **three** questions from Question No. 2 to Question No. 5.*

1. (a) Perform the following operations using signed 2's complement notation of size 8 bits, which includes the sign bit. Also indicate overflow or no-overflow, giving reasons. Thereof : 6
 - (i) Add -39 and $+126$

P. T. O.

(ii) Subtract – 38 from 90

(iii) Add –79 and –49

- (b) Simplify the following function using Karnaugh's map : 5

$$F(A, B, C, D) = \Sigma(5, 6, 8, 11, 13, 14, 15)$$

Draw the logic circuit for the simplified function.

- (c) Explain the Direct Cache mapping scheme with the help of an example. 5
- (d) What is an interrupt ? List all the steps that are required to be performed by hardware or software to process an interrupt. 5
- (e) Explain the steps required to process Branch (BR) instruction, subroutine call and return instruction of a computer which uses a stack for storing the return address. You may assume the necessary registers required for this purpose. 5

- (f) Explain the horizontal and vertical micro-instructions with the help of a suitable diagram. 5
- (g) Explain the following instructions of 8086 microprocessor with the help of an example : 4
- (i) SHL
- (ii) RCL
- (h) Write a 8086 assembly language program to find the largest value in an array consisting of 5 values. You may assume that these values are stored in the memory. The largest value may be kept in AX register. Make suitable assumptions. 5
2. (a) Perform the following conversions : 5
- (i) $(225)_{10}$ to hexadecimal
- (ii) $(AAA)_{16}$ to octal
- (iii) $(6761)_8$ to hexadecimal
- (iv) $(ABC)_{16}$ to decimal
- (v) $(225)_8$ to decimal

- (b) Explain the functions of the components of a central processing unit with the help of a diagram. 5
- (c) Draw the truth table and logic diagram of a 4×1 multiplexer and explain its functioning. 5
- (d) Draw the logic diagram of a ripple counter and explain its functioning. 5
3. (a) Explain the structure of magnetic disk with the help of a diagram. Also, explain the term constant angular velocity (CAV) in this context. 5
- (b) Explain the concept of memory interleaving with the help of an example. 4
- (c) What is the role of Input/Output interfaces ? Explain. 5
- (d) Explain the following terms in the context of Input/Output technologies : 6
- (i) Refresh rate
 - (ii) Optical resolution
 - (iii) Impact printers

4. (a) Explain the following addressing schemes with the help of an example for each : 6
- (i) Immediate addressing
 - (ii) Direct addressing
 - (iii) Register addressing
- (b) Explain the microoperations required for Fetching an Instruction (FI). You may assume suitable registers for this. 5
- (c) Explain the working of a Wilke's control-unit with the help of a diagram. 5
- (d) Explain any *four* differences between the RISC and CISC machines. 4
5. (a) Compute the physical address in 8086 microprocessor for the following pairs : (all values are in hexadecimal) : 6
- (i) CS : IP \equiv 10FFh : 0111h
 - (ii) DS : BX \equiv 0322h : 20FFh
 - (iii) SS : SP \equiv 0111h : 2222h

- (b) Explain the differences between .COM programs and .EXE programs, in the context of Assembly language, with the help of an example. 5
- (c) Write a program in 8086 assembly language to interchange the values of two byte locations in the memory. 5
- (d) Explain the concept of FAR and NEAR procedures in 8086 assembly language. 4