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MCS-012

MASTER OF COMPUTER APPLICATION/BACHELOR OF COMPUTER APPLICATION (REVISED) (MCA/BCA)

Term-End Examination

June, 2024

MCS-012 : COMPUTER ORGANISATION AND ASSEMBLY LANGUAGE PROGRAMMING

Time : 3 Hours *Maximum Marks : 100*

Note : *Question No.* ***1*** *is compulsory and carries* ***40*** *marks. Attempt any* ***three*** *questions from the rest.*

1. (a) What are the components of an EXE program ? What are the advantages of using EXE programs ? 5

(b) Explain the Instruction Pipelining with the help of a diagram. 5

(c) What is full-adder ? Draw the logic diagram of a full-adder circuit. 6

(d) How is the access time calculated on a hard disk ? 4

(e) Simplify the following Boolean function using K-map : 6

$$F(A, B, C, D) = \Sigma (0, 4, 5, 6, 12, 13, 14)$$

Also draw the logic diagram of the simplified circuit using AND, OR and NOT gates.

(f) What is the need of Cache memory ? Explain the direct mapping cache organisation with the help of a diagram/example. 6

(g) What is the sequence of micro-operations required for fetching an instruction from the memory. You may assume that machine uses Accumulator (AC) register, Program Counter (PC) register, Instruction Register (IR), Memory Address Register (MAR) and Date Register (DR). 5

(h) What is the role of Int 21h in 8086 micro-processor ? 3

2. (a) What is an interrupt ? What happens on the occurrence of an Interrupt ? Explain with the help of a diagram. 6

(b) Explain Von-Neumann architecture with the help of a diagram. 7

(c) Draw and explain the logic diagram of J-K flip-flop. Also, make the characteristic table of J-K flip-flop. 7

3. (a) Find 1's and 2's complement of the following fixed point numbers : 4

(i) 10100010

(ii) 00000000

(b) Represent the following numbers in floating point single procession number format : 6

(i) 1010.0001

(ii) – 0.0000111

(c) Explain the following addressing modes with the help of an example of each : 10

(i) Immediate addressing

(ii) Direct addressing

(iii) Register addressing

(iv) Indirect addressing

(v) Indexed addressing

4. (a) Explain the programmed I/O technique with the help of a flow chart. How is it different from DMA ? 8

(b) Explain the following terms in the context of Input/Output system : 12

(i) Device driver

(ii) Refresh rate of a monitor

(iii) Classification of printers

(iv) Modem

5. (a) Write a program using 8086 assembly language that converts an ASCII digit to equivalent binary value. 6

(b) What is the need of segment registers in 8086 micro-processor ? Explain the use of code segment and stack segment registers with the help of an example of each. 8

(c) Explain the following 8086 assembly commands : 6

(i) XCHG instruction

(ii) SHL/SHR instruction