No. of Printed Pages : 4

MCS-012

MASTER OF COMPUTER APPLICATIONS (REVISED)/ BACHELOR OF COMPUTER APPLICATIONS (REVISED)

(MCA/BCA)

Term-End Examination

December, 2022

MCS-012 : COMPUTER ORGANIZATION 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) Convert the following pairs of decimal numbers to 8-bit, signed, 2's complement numbers and add them. State, whether or not overflow occurs in each case : 6

   (i) 58 and 100

(ii) –71 and 13

(iii) –100 and –28

(b) What is the difference between combinational logic and sequential logic ? 2

(c) Design a combinational circuit using K-map, whose output is zero if the 4-bit input binary number is a multiple of 3, otherwise the output is one. 6

(d) What is the use of addressing modes ? Explain the base register addressing and relative addressing schemes with the help of ***one*** example of each. 6

(e) Explain the layout of a magnetic disk with the help of a diagram. Also, explain access time on a magnetic disk. 6

(f) Explain the concept of programmed input/output with help of a flowchart. 4

(g) Explain the Wilkes control unit with the help of a diagram. 5

(h) Write a program using 8086 assembly language that converts an ASCII digit stored in a memory location to equivalent binary value. This binary value should be stored in AL register. 5

2. (a) Explain the role of any ***five*** registers used in a basic computer. 5

   (b) Draw and explain the half adder circuit. 5

   (c) Explain the role of parity bit in error detection with the help of an example. 4

   (d) Explain the functioning of master-slave flip-flop with the help of a diagram. 6

3. (a) What is instruction cycle ? How are different kinds of instructions interpreted ? 6

   (b) Explain the role of flag registers in assembly language programming with the help of an example. 4

   (c) What is Cache Memory ? Why is it needed ? Explain the direct mapping cache organisation with the help of a diagram. 6

   (d) What are the differences between .COM and .EXE programs ? 4

4. (a) Explain the term micro-operation. How is a micro-operation different from an instruction ? Write the sequence of micro-operations required to fetch an instruction from the memory to CPU register. You may assume suitable set of registers. 8

(b) Explain the features of RISC architectures. 6

(c) Calculate the physical address for the following register values/offset in a 8086 microprocessor : 6

(i) CS = 2351 h and IP = 1256 h

(ii) DS = 4FFFh and offset in data segment = 0100h

(iii) SS = 3FFFh and SP = 0111h

5. (a) Represent the following numbers using IEEE-754 floating point single precision number format : 4

(i) 1010.0001

(ii) –0.0000111

(b) Write the assembly language code using 8086 assembly language for performing the following operation : 6

Z = ((A + B) / 5 * C) ** 2

(c) How many RAM chips of size 256 × 1 bit are required to build 1 M byte memory ? 5

(d) Explain the use of large register file in RISC with the help of a diagram. 5