Mawlana Bhashani Science and Technology University

Department of Information and Communication Technology

3rd Year 1st Semester B.Sc. (Engg.) Final Examination 2023

Course Title: Microprocessor and Assembly Language — Marks: 70
Course Code: ICT 3105 — Time: 3 hours

Answer any 05 (FIVE) questions

1. a) What is a microprocessor? Briefly explain the main components inside the microprocessor. 4

   b) Explain the technique of Full/Partial decoding and Programmable Array Logic (PAL) in main memory array design. 6

   c) Write down the key features of 8086 Microprocessor. 4

2. a) Draw the main architecture of 8086 Microprocessor and explain its Bus Interface Unit (BIU). 6

   b) How does 8086 Microprocessor switch from minimum mode to maximum mode and Vice-versa? 3

   c) What are the addressing modes? Write at least five (5) addressing modes. Identify the addressing modes of the following instructions. 5
      i) MOV AL, 35H
      ii) MOV AX, [BX]
      iii) ADD AX, [BX+SI]

3. a) Write down the key operations of Accumulator, Counter, and Source index (SI) of 8086 registers. 5

   b) Briefly explain the 80186 microprocessor`s programmable interrupt controller and programmable DMA functional unit. 6

   c) List out the ten (10) new additional instructions of 80186 microprocessor beyond 8086 microprocessor. 3

4. a) Draw and discuss the functional block diagram of 80286 microprocessor. 6

   b) Briefly explain the different operational mode of 80286 microprocessor. 3

   c) Describe the 80386 Flag registers with appropriate illustration. 5

5. a) Write down the important features of *Intel`s Core i5* and *i7* microprocessor. 5

   b) What is Turbo Boost Technology for Intel`s microprocessor? Explain with proper diagram. 5

   c) Briefly explain the Intel`s core i9 microprocessor with its advantage and disadvantage. 4

6. a) What are some advantages and disadvantages of using assembly language compared to higher-level languagelike C or Python? 4

b) What are *dup* and *equ* operational codes (opcode) in assembly language? Explain with appropriate example. 4

c) Write an assembly language program to read one of the hex digits A-F, and display it on the next line in decimal. 6

Sample execution: Enter a Hex digit: C
In decimal it is: 12

7. a) Draw the operational flowchart of FOR and REPEAT loop in aspects of assembly language. 4

b) Write an Assembly language program that takes input in AL. If AL contains 1, 3, 7 then display `O` for odd values and if AL contains 2, 4, 8 then print `E` for even. For any other input, it gives option to enter again among the defined values. 6

c) What will happen when a Test instruction is being executed? Suppose DH contains 8Ah and CL contains 2. What are the values of DH and of CF after the instruction SHR DH,CL is executed? 4

8. a) What is Stack? What happens when a Push operation occurs in a Stack? Explain with a neat diagram. 4

b) Write a program using STACK to display initially a "?" and then read input/s until a carriage return count and finally display them in reverse order. 5

c) What is a macro? How do you define a macro? 2

d) Write a macro to move a word into a word. 3