

ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)
ORGANISATION OF ISLAMIC COOPERATION (OIC)
Department of Computer Science and Engineering (CSE)

Semester Final Examination

Winter Semester: 2020-2021

Course Number : CSE 4503/4573

Full Marks: 75

Course Title : Microprocessors and Assembly Language

Time: 1.5 Hours

There are **3 (three)** questions. Answer all of them. Figures in the right margin indicate marks. The examination is **Online** and **Open Book**. Marks of each question and corresponding **CO** and **PO** are written in the brackets.

Write **Student ID** and **Name** top of the **first page** and write **student ID** and **page no** in every page of the answer script. Submission pdf of the answer script should be named as **Full_Student_ID<space>Course Code.pdf**

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|----|----|---|---------------------------|
| 1. | a) | What are real mode and protected mode? Which microprocessor(s) does first implement the protected mode and how? | 10
(CO4)
(PO1) |
| | b) | How does thread ensure faster processing? Discuss in the context of multi-core processor system? | 10
(CO1)
(PO1) |
| | c) | ‘Utilization of parallel processors can be achieved through parallel programming’. How? Prove with appropriate example. | 5
(CO1)
(PO1) |
| 2. | a) | Which memory locations are reserved for 8086 Interrupt Vector Table? Derive the specific memory locations where the CS and IP values of the following Interrupt Types can be found:
i. INT 10B
ii. INT 3 | 10
(CO4)
(PO2) |
| | b) | Let, in an assembly language code data segment is initialized at 0700h:0000h memory location of 8086 and variables are declared as follows:
.DATA
A db 1, 2, 3, 4, 5, 6, 7, 8, 9, 10
B db 'IUTOIC'
C dw 1234
D db 'Exam Date is 16 September, 2021', '\$'

Now, using appropriate instructions derive and store the initial offsets of variable A, B, C and D at SI, DI, BX, BP registers, respectively. Also, derive the DS register value. | 10
(CO1)
(PO1, PO2) |
| | c) | Write an assembly language code to take a single-character (digits 0 to 9 only) as an <i>input</i> and display the previous character (as in ASCII table) as an <i>output</i> in the new line with carriage return. | 5
(CO1)
(PO1) |
| 3. | a) | Draw the details of WRITE Bus timing diagram showing all the necessary/required signals of 8086. You should consider that the write operation will be made in the I/O port address of 1111h and there are 3-T states used in WAIT state. | 10
(CO4)
(PO2) |
| | b) | Let, in 8086 based system current SP value is FFFAh and the CS, IP and FL values are 7000h, 1000h and 1001h, respectively. Now, if at that instance an interrupt occurs, then show the stack increase and decrease scenario along with changes in SP values and stack contents. | 10
(CO2)
(PO1, PO2) |

c) Define the following terms with appropriate example:

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(CO2)
(PO2)

- i. Clock cycle
- ii. Bus cycle
- iii. Instruction cycle
- iv. Machine cycle
- v. 'T' duration (consider a microprocessor is having a clock speed of 12 MHz)