



**UNIVERSITY EXAMINATIONS
EXAMINATION FOR SEPTEMBER/DECEMBER 2015/2016 FOR
BACHELOR OF SCIENCE IN COMPUTER SCIENCE**

RCCS 108: COMPUTER ORGANIZATION & ASSEMBLY

DATE: 2nd December-2015

TIME: 2 HOURS

GENERAL INSTRUCTIONS:

Students are NOT permitted to write on the examination paper during reading time. This is a closed book examination. Text book/Reference books/notes are not permitted.

SPECIAL INSTRUCTIONS:

This examination paper consists Questions in Section A followed by section B.

Answer **Question 1 and any Other Two** questions.

QUESTIONS in ALL Sections should be answered in answer booklet(s).

1. PLEASE start the answer to EACH question on a NEW PAGE.
2. Keep your phone(s) switched off at the front of the examination room and NOT on your person.
3. Keep ALL bags and caps at the front of the examination room and DO NOT refer to ANY unauthorized material before or during the course of the examination.
4. ALWAYS show your working.
5. Marks indicated in parenthesis i.e. () will be awarded for clear and logical answers.
6. Write your REGISTRATION NO. Clearly on the answer booklet(s).
7. For the Questions, write the number of the question on the answer booklet(s) in the order you answered them.
8. DO NOT use your PHONE as a CALCULATOR.
9. YOU are ONLY ALLOWED to leave the exam room 30minutes to the end of the Exam.
10. Calculators are required.
11. Instruction sets will be provided.

SECTION A (COMPULSORY)

Question (1) - (30Marks)

- a) Define the following terms. **(5Marks)**
- i. R.I.S.C.
 - ii. C.I.S.C.
 - iii. Hyper threading.
 - iv. Multiprocessing.
 - v. Parallel computing.
- b) In computer systems, Memories have undergone various evolutions in the bid of developing faster and more efficient computers. Elaborate on the following types of Memories and state their uses. **(5 Marks)**
- i. EPROM.
 - ii. EEPROM.
 - iii. SRAM.
 - iv. SDRAM.
 - v. DDR-SDRAM
- c) Differentiate between the high level and low level programming languages, hence give an example in each. **(4 Marks)**
- d) Highlight main differences between the Harvard and the Von Neumann architectures of computers. **(6 Marks)**
- e) Name five categories of instructions in Assembly language and give two example of instructions in each classification. **(10Marks)**

SECTION B (Answer Any Two Questions)

Question (2) - (20Marks)

- a) State five types of registers found in general microprocessors. **(10 Marks)**

Explain the purpose and functionalities for each type.

- b) With respect to Intel 8085 microprocessor, explain the functions of the following assembly instructions. **(10 Marks)**

- i. **STA** 4000H
- ii. **POP** B
- iii. **PUSH** B
- iv. **JNC** 2034_h
- v. **OUT** F8_h
- vi. **IN** 8C_h
- vii. **DCR** C
- viii. **MOV** A, M
- ix. **INX** H
- x. **MOV** M, A

Question (3) - (20Marks)

- a) Describe in details, the *Fetch Execute cycle* of a microprocessor, RAM. **(6 Marks)**

(A timing diagram can be used in describing)

- b) With respect to microprocessor system, what is the purpose of the following register?

(8 Marks)

- i. Program Counter.
- ii. Stack Pointer.
- iii. Flag register.
- iv. Index register.

- c) Name three types of buses used by a computer system and describe their functionalities.

(6 Marks)

Question (4) - (20Marks)

With reference to **Intel-8085** microprocessor and using a suitable flow-chart,
(The instruction set for Intel 8085 will be provided).

- a) Write a program to multiply two numbers stored in the memory locations 2000_{Hex} & 2001_{Hex} respectfully, and then store the result of the operation in the memory location 2010_{Hex}. **(8 Marks)**
- d) Given 8-chips of (8K X 8) and a (3 to 8) decoder chip (74LS138), design a suitable memory map, showing the data buses, address buses and indicating the memories chips and their addresses range. **(12 Marks)**

Question (5) - (20Marks)

- a) Assemble the assembly program below, hence evaluate the amount of memory in bytes that will be occupied by the assembly program code. **(10 Marks)**

(The instruction set for Intel 8085 will be provided).

Source program:

```
LXI H, 4000Hex      // Initialize HL index to points 4000H
MOV A, M           // Get first operand from Memory.
INX H              // Increment HL index to points 4001H
SUB M              // Subtract second operand
INX H              // Increment HL index to 4002H
MOV M, A           // Store result at 4002H.
HLT                // Terminate program execution
```

- b) In computer architecture, what is the purpose of the following? **(5 Marks)**
- Chipset.
 - Core Processor.
 - B.I.O.S.
 - D.M.A.C (Direct Memory Access Controller).
 - Interrupt controller.
- c) A computer system has 32 bits address buses, 16 bits data buses, and 8 bit control buses.
- What is the maximum size of the word can it handle? **(1 Marks)**
 - What is the maximum size of RAM can the system address? **(2 Marks)**
- d) What is the difference between RAM memory and Cache memory? **(2 Marks)**