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MIT(CS)-404

Computer Organization and Architecture

M.Sc. Cyber Security (MSCCS-18/21)

4th Semester Examination, 2021 (Winter)

Time : 2 Hours] **Max. Marks : 80**

Note : This paper is of Eighty (80) marks divided into two (02) Sections A and B. Attempt the questions contained in these sections according to the detailed instructions given therein.

SECTION–A

(Long Answer Type Questions)

Note : Section 'A' contains Five (05) long answer type questions of Twenty (20) marks each. Learners are required to answer any Two (02) questions only.

(2×20=40)

1. Answer the following : (4 marks each)

(a) What is the difference between Computer Organization and Computer Architecture?

(b) Explain the working principle of a binary storage cell.

(c) What are the key properties of semi-conductor memory?

(d) Why registers are used in CPU?

(e) What is the overall function of a processor's control unit?

2. Answer the following : (10 marks each)

(a) Draw a Block diagram of virtual memory and explain the address translation process in detail.

(b) Give and explain the instruction cycle state diagram.

3. Answer the following : (5 marks each)

(a) What are the functions of an I/O module?

(b) Briefly explain the techniques for performing I/O.

(c) What are the differences between memory mapped I/O and isolated I/O?

(d) Why we use and I/O module to connect the peripheral devices to the CPU?

4. Answer the following : (4 marks each)

(a) Explain the hand shake control of data transfer for asynchronous bus.

(b) What are the distinguishing characteristics of RISC organization ?

(c) Explain the concept of graph colouring to optimize the register uses.

(d) What is branch penalty? .

(e) What is a branch history table and how it is used to deal with branches?

5. Answer the following :

(a) What is a Loop buffer? How loop buffer is used to handle the branching in pipeline processor? 7

(b) What are the classification of systems with parallel processing capabilities given by Flynn? 7

(c) Explain the concept of Crossbar network. 6

SECTION–B

(Short Answer Type Questions)

Note : Section 'B' contains Eight (08) short answer type questions of Ten (10) marks each. Learners are required to answer any Four (04) questions only. (4×10=40)

1. Describe basic Computer Model and different units of Computer.

2. What do you mean by Memory hierarchy? The three characteristics of memory: cost, capacity and access time are related to each other as one goes down the memory hierarchy?

3. What is Cache? Discuss associative mapped cache organisation?

4. Explain the use of the following registers : (2 marks each)

(a) Program counter

(b) Instruction register

(c) Memory address register

(d) Memory buffer register

(e) Address Register

5. What do you mean by flag bits? Explain the use of the following flags- sign, zero, carry, overflow and equal.

6. How an interrupt mechanism works- explain briefly?

7. Explain the concept of daisy chain mechanism for device identification.

8. Answer the following : (5 marks each)

(a) What is zone and sector of a disk and how they differ?

(b) Explain the fixed head and movable head disk unit.