

U.G. 4th Semester Examination - 2022

COMPUTER SCIENCE

[PROGRAM]

Course Code : BCOSCCRT 401

Course Title: Computer System Architecture

Full Marks : 40

Time : 2 Hours

The figures in the right-hand margin indicate marks.

Candidates are required to give their answers in their own words as far as practicable.

1. Answer any **ten** questions: $1 \times 10 = 10$
- a) What do you mean by De-Multiplexer?
 - b) Convert : $(5391.125)_{10} = (?)_2$
 - c) How do you design one AND gate by using NAND gate?
 - d) Find the 2's complement of $(1101110100.10010)_2$.
 - e) How many full adders are required to construct an m-bit parallel adder?
 - f) What are the basic operations of Boolean Algebra?

- g) What do you mean by Clear and Clear input of a Flip-Flop?
- h) What is the use of Address Bus?
- i) What do you mean by underflow?
- j) What is Latch in Sequential Circuit?
- k) What is Ring Counter?
- l) What is Assembly Level Language?
- m) Write two function of ALU.
- n) What is Micro Operation in Computer Architecture?
- o) Why NAND and NOR gates are called Universal Gate?

2. Answer any **five** questions: $2 \times 5 = 10$
- a) State the Duality Theorem of Boolean Algebra.
 - b) What do you mean by 4-to-1 mux?
 - c) Construct a Full Adder using Two Half Adder and a OR Gate.
 - d) What is Adder-Subtractor?
 - e) What is the difference between Synchronous and Asynchronous Sequential Circuit?

- f) Draw the block diagram of 3×8 line Decoder with the help of Two 2×4 Decoder.
- g) Explain the function of RAM chip.
- h) What is Interrupt Service Routine (Interrupt Handler)?
3. Answer any **two** questions: $5 \times 2 = 10$
- a) What is Interrupt? Discuss different types of interrupt briefly.
- b) What is Encoder? Design a 3×8 Encoder using its Truth Table.
- c) What is Counter? Draw and explain the circuit diagram and truth table of JK flip-flop.
4. Answer any **one** question: $10 \times 1 = 10$
- a) i) Discuss the BUS Architecture of Computer Architecture. 5
- ii) Define Instruction Format. Classify different types of Instruction Format according to their Word Length. 5
- b) i) What is Register? What is the main purpose of using Register in Computer Memory? 1+1
- ii) Write down the differences between Buffer Register and Shift Register. 2
- iii) What is Universal Shift Register? Draw the Circuit Diagram of Universal Shift Register. 6
- c) i) Draw the circuit diagram and explain the operation of D Flip-Flop. 5
- ii) What is Race Around Condition in J-K Flip-Flop? How it can be avoided? 2
- iii) What is T Flip-Flop? Why T Flip-Flop is also called toggle Flip-Flop? 3
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