(T) Roll No. .....

PAPER ID—13650

B. Sc. EXAMINATION, 2023

(First Semester)

COMPUTER SCIENCE

Code : 1.2

Computer Architecture

Time : 3 Hours *Maximum Marks : 40*

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. **1** is compulsory. All questions carry equal marks.

1. (a) Write a short note on Multiplexers. **2**

(b) What is a shift register ? **2**

(c) What is race around condition ? **2**

(d) What is D flip-flop with truth table ? **2**

Unit I

2. (a) Discuss Karnaugh simplification in detail. **4**

(b) Obtain the minimal POS expression for the function given below using a four variable K-map F (A, B, C, D) = π (2, 4, 6, 7, 10, 11, 13, 14, 15). **4**

3. (a) State and prove De Morgan law. **4**

(b) Simplify the following Boolean expression :

$A\bar{B}\bar{C}\bar{D} + ABCD + AB\bar{C}\bar{D} + A\bar{B}CD$. **4**

Unit II

4. Define and design Half Subtractor and full Subtractor. **8**

5. What are Encoders and Decoders ? Draw and explain an Octal to Binary encoder. **8**

Unit III

6. What do you mean by flip-flops ? Draw and explain the working of S-R flip-flop and D flip-flop. 8

7. Draw and explain the working of Ring and Modulo counter. 8

Unit IV

8. (a) What are the types of micro-operations ? Discuss shift micro operations in detail. 4

   (b) Write a short note on register transfer language. 4

9. What is an instruction, instruction code and instruction cycle ? Explain various phases of instruction cycle. 8