Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 20864

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2023

Third Semester

Computer Science and Engineering

CS 3351 – DIGITAL PRINCIPLES AND COMPUTER ORGANIZATION

(Common to : Computer Science and Design / Computer Science and Engineering (Artificial Intelligence and Machine Learning) / Computer Science and Engineering (Cyber Security) / Computer and Communication Engineering / Artificial Intelligence and Data Science / Computer Science and Business Systems and Information Technology)

(Regulations 2021)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Write down the sum and carry expressions for half adder.

2. How many selection inputs, data inputs and output for 16 X 1 MUX?

3. What is shift register? List its types.

4. How many flip flops are required for designing BCD counter? Justify.

5. List the functional units of a digital computer.

6. Interpret the Instruction Set Architecture.

7. What is program counter?

8. When do data hazards occur in pipelining?

9. What is memory hierarchy?

10. Differentiate write back and write through.

PART B — (5 × 13 = 65 marks)

11. (a) Explain full adder and full subtractor with the help of circuit diagrams.

Or

(b) Explain binary to octal decoder and octal to binary encoder with the help of circuit diagrams.

12. (a) Describe J-K and D flip flops with the help of block diagrams and characteristic tables.

Or

(b) Explain Mealy and Moore Models with the help of block diagrams.

13. (a) Explain about any four addressing modes with example.

Or

(b) Describe Instruction sequencing and branching with examples.

14. (a) Depict how instruction is being fetched and executed through the data path in the processor?

Or

(b) Describe data hazards and control hazards. Explain with suitable techniques, how these hazards can be mitigated?

15. (a) Explain how memory mapping techniques are useful for finding the memory blocks in cache?

Or

(b) How virtual addresses are translated into physical addresses? Explain it with the help of virtual memory organization and page translation.

PART C — (1 × 15 = 15 marks)

16. (a) Using K – Map, find the sum of products and product of sums for the given function $F = \sum_m (0,2,6,7,8,10,12,14,15)$.

Or

(b) Design a Mod – 7 synchronous counter using J – K flip flop.