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Question Paper Code : 90919

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2025.

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/Information Technology)

(Regulations 2021)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Draw the block diagram of 4-bit parallel adder.
2. What is the purpose of priority encoder?
3. Why do we require flip-flop?
4. What is shift register?
5. List the different types of addressing modes.
6. Compare between JMP and JNZ control instructions.
7. What is the purpose of program counter?
8. What do you understand by the term 'latency' in pipelining?
9. Compare static RAM and dynamic RAM.
10. What do you mean by direct memory access?

PART B — (5 × 13 = 65 marks)

11. (a) Construct Half - Adder and Full Adder Circuits and explain its flow.

Or

- (b) Explain 8×3 Encoder with the help of block diagram.

12. (a) Describe about J - K and D Flip Flops with the necessary diagrams and characteristic tables.

Or

- (b) Explain the working of SISO and PIPO Shift Registers with necessary diagrams.

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

Or

- (b) Describe about RISC instruction set with the help of an example.

14. (a) Explain about a pipeline organization with its five stages.

Or

- (b) Compare and contrast between hardwired and microprogramed control with neat diagrams.

15. (a) Describe about direct and associative mapping functions related with cache memory.

Or

- (b) (i) Write in detail about virtual memory. (6)
(ii) With neat diagram, explain the I/O interface of interrupt I/O. (7)

PART C — (1 × 15 = 15 marks)

16. (a) Find the minimum SOP using K - Map:

$$F(P, Q, R, S, T) = \sum_m (0, 5, 6, 8, 9, 10, 11, 16, 20, 24, 25, 26, 27).$$

Or

- (b) Design a counter using T Flip Flop that generates the following sequence:
000, 010, 100, 110, 000 (repeat).