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**Question Paper Code : 90255**

M.C.A. DEGREE EXAMINATIONS, APRIL/MAY 2022.

Second Semester

(Bridge Course)

**BX 4003 — INTRODUCTION TO COMPUTER ORGANIZATION AND  
OPERATING SYSTEMS**

(Regulations 2021)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

**PART A — (10 × 2 = 20 marks)**

1. What are Data Transfer Instructions? Give any two examples.
2. Mention what the conditional branch instructions BEQ and BNE mean with example?
3. Define Datapath element.
4. What is Pipelining and Pipeline Hazards?
5. Differentiate hit time and miss penalty.
6. Define DMA.
7. List the objectives of operating system.
8. Differentiate user threads and kernel threads.
9. What is Dispatcher Module and list its functions.
10. Define semaphore.

**PART B — (5 × 13 = 65 marks)**

11. (a) List the five main functional units of a computer system with a neat diagram and explain the functions of each unit.

Or

- (b) Explain in detail about the various Arithmetic, Logical operations and decision-making operators in MIPS with suitable examples.



12. (a) Explain the basic implementation of the MIPS subset and list the major functional units and the major connections between them with a neat diagram.

Or

- (b) Illustrate about the Pipelining Hazards and how Data and Control Hazards are handled in pipelining.
13. (a) List the four primary technologies used today in memory hierarchies and compare them with their merits and demerits.

Or

- (b) Explain in detail about the Interrupts and Interrupt handling Process.
14. (a) Summarize the various services and functions provided by the operating system for the user and the system.

Or

- (b) With a neat diagram explain about the process states and process control block in detail.
15. (a) What is critical section problem? Explain the three solutions to solve the critical section problem.

Or

- (b) Illustrate about the three Classic problems of Synchronization along with the structure for each of the problem.

PART C — (1 × 15 = 15 marks)

16. (a) Consider the processes P1, P2, P3, P4, P5 given in the below table, arrives for execution in the same order, with Arrival Time 0. Each process will run for the amount of time listed as Burst Time(ms) and the given priority. Answer the following:
- (i) Draw the Gantt Chart for FCFS, SJF Algorithm and Non-Preemptive Priority. (3)
- (ii) Calculate the Average Waiting Time and Average Turnaround time for FCFS Algorithm. (4)

- (iii) Calculate the Average Waiting Time and Average Turnaround time for SJF Algorithm. (4)
- (iv) Calculate the Average Waiting Time and Average Turnaround time for Non-Preemptive Priority Algorithm. (4)

Process	Burst Time(ms)	Priority
P1	8	4
P2	6	1
P3	1	2
P4	9	2
P5	3	3

Or

- (b) Illustrate the steps involved in the single-cycle Datapath with the pipeline stages with a neat diagram.

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