# Question Paper

## MANIPAL ACADEMY OF HIGHER EDUCATION

**INTERNATIONAL CENTRE FOR APPLIED SCIENCES
END SEMESTER THEORY EXAMINATION-MAY 2023
IV SEMESTER B.Sc.(APPLIED SCIENCES) IN ENGG.**

### OPERATING SYSTEMS [ICS 242]

**Marks: 50**                                                              **Duration: 180 mins.**

**Answer all the questions.**

**Missing data if any, may be suitably assumed.**

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|---|---|---|---|
| 1) | A) | If a process wants to fetch a massive volume of information from the memory what are the possible memory accesses available for achieving this. Justify the optimal one. | (3) |
| | B) | How do the I/O controllers help in fetching information? How is this information communicated to the operating system? | (2) |
| | C) | With the help of neat diagram, explain different states of a process. Mention the roles of Process Control Block along with all the pieces of information that is stored related to the process with neat diagram. | (5) |
| 2) | A) | Explain in detail about threading and its models with neat diagram. Explain the challenges in multicore programming. | (4) |
| | B) | With the help of a Gannt Chart for the following data calculate Average waiting time and Average turnaround time for FCFS, non-preemptive SJF and preemptive SJF. | (6) |

| Process | Arrival Time | Burst Time |
|---|---|---|
| P1 | 0 | 8 |
| P2 | 4 | 5 |
| P3 | 3 | 2 |
| P4 | 2 | 1 |

| | | | |
|---|---|---|---|
| 3) | A) | Write bankers algorithm for dead lock avoidance. Let us consider a system with five processes P0 through P4 and three resource types A, B, C as given below. i) Calculate the need matrix. ii) Check whether the system is safe or not? If safe, what is the safe sequence? iii) Calculate the total sum of each type of resource? | (7) |