

Operating System (315319)

MSBTE Diploma · K-Scheme · Model Question Paper — Set C

Time: 3 Hours
Max. Marks: 70
Instructions:

1. All questions are compulsory.
2. Answer each next main question on a new page.
3. Illustrate your answers with neat sketches wherever necessary.
4. Figures to the right indicate full marks.
5. Assume suitable data, if necessary.
6. Mobile phone, pager and any other electronic communication devices are not permissible in the examination hall.

Q.1 Attempt any FIVE of the following:
10

- a) List any four functions of an operating system.
- b) Define system call. Give any two examples.
- c) State the function of long-term scheduler.
- d) What is virtual memory? State any one advantage of it.
- e) State any two differences between a program and a process.
- f) List any four file types along with their usual extensions.
- g) Define: i) Logical address ii) Physical address

Q.2 Attempt any THREE of the following:
12

- a) Explain time-sharing operating system. How does it differ from a multiprogrammed operating system?
- b) Explain the use of the following operating system tools: i) User management ii) Task scheduler iii) Performance monitor iv) Device management
- c) Describe SRTN (Shortest Remaining Time Next) scheduling. Draw the Gantt chart and find the average waiting time for:

Process	Arrival time	Burst time
P1	0	8
P2	1	4
P3	2	2
P4	3	5

- d) Explain tree-structured directory with a diagram. State its advantages.

Q.3 Attempt any THREE of the following:
12

- a) Describe the activities of the operating system in: i) Process management ii) Secondary-storage management

- b) Explain many-to-one multithreading model with a diagram. State its drawbacks.
- c) Explain segmentation with the help of segmentation hardware diagram.
- d) Explain the following file operations: create, read, write and delete.

Q.4 Attempt any THREE of the following:

12

- a) Explain multilevel queue scheduling with a diagram.
- b) What is a safe state? Explain the relation between safe state, unsafe state and deadlock with a diagram.
- c) State and explain any four benefits of threads.
- d) Compare bitmap and linked-list free-space management techniques. (Any four points)
- e) State disadvantages of contiguous file allocation. Explain linked file allocation with a diagram.

Q.5 Attempt any TWO of the following:

12

- a) Consider the following processes (lower number = higher priority):

Process	Arrival time	Burst time	Priority
P1	0	5	3
P2	1	3	1
P3	2	8	4
P4	3	6	2
P5	4	2	5

Draw Gantt charts and calculate average waiting time and average turnaround time using: i) FCFS ii) SJF (non-preemptive) iii) Priority (preemptive)

- b) Compare shared-memory and message-passing models of inter process communication. Draw diagrams of both.
- c) A system has four resource types A, B, C, D and five processes P0–P4. The current state is:

Process	Allocation (A B C D)	Max (A B C D)
P0	1 0 2 0	3 2 2 2
P1	2 1 1 1	4 1 3 3
P2	0 1 2 2	1 3 4 4
P3	3 0 0 1	3 2 1 1
P4	1 2 1 0	2 4 3 2

Available = (A, B, C, D) = (1, 2, 1, 1). Using Banker's algorithm, calculate the Need matrix and find whether the system is in a safe state. Give the safe sequence.

Q.6 Attempt any TWO of the following:

12

- a) What is a system call? Explain how a system call is executed, with a diagram. Explain any two types of system calls with examples.

- b) Consider the page reference string: 3, 5, 2, 6, 5, 3, 1, 7, 5, 3, 5, 2, 8, 7, 2, 5, 3, 5, 2, 7. Find the number of page faults using FIFO and LRU page replacement algorithms with 4 page frames.
- c) Explain the following Linux commands with syntax and example: i) ps -u ii) wait iii) exit

Note: This is a **model question paper prepared by Ananda Technologies** only for practice and exam preparation, based on the pattern of previous MSBTE question papers and the K-scheme syllabus. It is **not an official MSBTE paper**, and it does **not** mean that these questions will come in the exam. Answers follow standard textbook points; marks shown are indicative. Free for students — anandatechnologies.in

