

Operating System (315319)

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

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) State any four services provided by an operating system.
- b) Define process. List the different states of a process.
- c) Define: i) Throughput ii) Waiting time
- d) What is a thread? Give any two advantages of multithreading.
- e) Define page fault. When does it occur?
- f) List any four attributes of a file.
- g) State any two differences between Linux and Windows operating systems.

Q.2 Attempt any THREE of the following:**12**

- a) Explain real-time operating system. State its types and any two applications.
- b) List the types of system calls and give two examples of each type.
- c) Explain fixed (static) partitioning of memory with a diagram. State its disadvantages.
- d) Describe single-level directory structure with a diagram. State its advantages and disadvantages.

Q.3 Attempt any THREE of the following:**12**

- a) With a neat labelled diagram, explain the different states of a process and the transitions between them.
- b) Explain one-to-one and many-to-many multithreading models with suitable diagrams.
- c) Compare paging and segmentation memory management techniques. (Any four points)
- d) Explain contiguous file allocation method with a diagram. State its advantages and disadvantages.

Q.4 Attempt any THREE of the following:**12**

- a) Memory partitions of 150K, 520K, 230K, 310K and 640K are available (in this order). How would first fit, best fit and worst fit algorithms place processes of 225K, 480K, 140K and 600K (in this order)? Which algorithm makes the most efficient use of memory?
- b) Describe the four necessary conditions for a deadlock to occur.
- c) Explain the functions of short-term and medium-term schedulers with a diagram.
- d) Explain the linked-list method of free-space management with a diagram.
- e) Explain Process Control Block (PCB) with a neat diagram.

Q.5 Attempt any TWO of the following:**12**

- a) Five processes P1, P2, P3, P4 and P5 arrive at time 0 in this order with CPU burst times 7, 4, 9, 3 and 6 ms respectively. Draw Gantt charts and calculate the average waiting time and average turnaround time for: i) FCFS ii) SJF iii) Round Robin (time quantum = 3 ms)
- b) What is Inter Process Communication (IPC)? Explain the message passing model with a diagram. State its advantages.
- c) Define deadlock. Explain Banker's algorithm for deadlock avoidance with its data structures and safety algorithm.

Q.6 Attempt any TWO of the following:**12**

- a) What is an operating system? Explain the following types of operating system with a suitable example of each: i) Batch operating system ii) Multiprocessor operating system
- b) Consider the page reference string: 4, 7, 6, 1, 7, 6, 1, 2, 7, 2, 4, 1, 6, 2, 7, 1. Find the number of page faults using FIFO and Optimal page replacement algorithms with 3 page frames. Which algorithm gives fewer page faults?
- c) Explain the following Linux commands with syntax and example: i) ps ii) kill iii) sleep

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