

**Professional Course (Odd) Examination, 2025**

( 3rd Semester )

**BACHELOR OF COMPUTER APPLICATIONS**

**( Operating Systems )**

Full Marks : 75

Time : 3 hours

*The figures in the margin indicate full marks for the questions*

**( PART : A—OBJECTIVE )**

( Marks : 25 )

SECTION—I

( Marks : 15 )

I. Tick (✓) the correct answer in the brackets provided : 1×10=10

1. The objective of \_\_\_\_\_ is to have some processes running at all times, so as to maximize CPU utilization.

(a) multitasking ( )

(b) multiprogramming ( )

(c) batch system ( )

(d) real-time system ( )

2. The interval from the time of submission of a process to the time of completion is called
- (a) throughput ( )
  - (b) waiting time ( )
  - (c) turnaround time ( )
  - (d) response time ( )
3. OS classifies the threads as
- (a) security and memory level ( )
  - (b) OS and CPU level ( )
  - (c) kernel and user level ( )
  - (d) motherboard level ( )
4. Find the odd one out of the following.
- (a) Mutual exclusion ( )
  - (b) No preemption ( )
  - (c) Circular wait ( )
  - (d) Hold and release ( )
5. A \_\_\_\_\_ sometimes called a lightweight process is a basic unit of CPU utilization.
- (a) thread ( )
  - (b) program ( )
  - (c) semaphore ( )
  - (d) kernel ( )

6. \_\_\_\_\_ is a technique of gradually increasing the priority of a process that waits in the system for a long time.
- (a) Deadlock ( )
  - (b) Starvation ( )
  - (c) Inversion ( )
  - (d) Aging ( )
7. The operating system is responsible for which of the following activities in connection with process management?
- (a) Free-space management ( )
  - (b) Allocating and deallocating memory space as needed ( )
  - (c) Suspending and resuming process ( )
  - (d) Supporting primitive for manipulating files and directories ( )
8. In this strategy, we allocate the smallest hole that is big enough. This dynamic storage allocation strategy is known as
- (a) best fit ( )
  - (b) first fit ( )
  - (c) worst fit ( )
  - (d) last fit ( )
9. The run-time mapping from virtual to physical addresses is done by
- (a) swapping ( )
  - (b) reallocation register ( )
  - (c) memory management unit ( )
  - (d) fragmentation ( )

10. In a \_\_\_\_\_ operation of a file, the user may erase the contents of a file but keep its attributes.

(a) combining ( )

(b) repositioning ( )

(c) deleting ( )

(d) truncating ( )

II. State whether the following statements are *True (T)* or *False (F)* by putting a Tick (✓) mark in the brackets provided : 1×5=5

1. Systems designed for graceful degradation are also called Fault Tolerant.

( T / F )

2. In indirect communication of IPC, messages are sent to and receive from ports.

( T / F )

3. An unsafe state always leads to a deadlock state.

( T / F )

4. In a file, the user name and the file name define a path name.

( T / F )

5. An address generated by the CPU is commonly referred to as a physical address.

( T / F )

SECTION—II

( Marks : 10 )

III. Answer the following questions :

2×5=10

1. What do you mean by CPU scheduler and Job scheduler?
2. What do you mean by semaphore?
3. What do you mean by page fault?
4. Explain with example resource allocation graph.
5. Differentiate between preemptive and non-preemptive scheduling.

( PART : B—DESCRIPTIVE )

( Marks : 50 )

IV. Answer the following questions :

10×5=50

1. (a) Explain the components of a computer system. 5  
(b) What are the services provided by operating system? 5

OR

2. Discuss the different types of operating system in detail. 10
3. (a) Define process. Explain process states with a neat and labelled diagram. 1+5=6  
(b) Explain the dining philosophers problem. 4

**OR**

4. (a) Explain PCB with a neat and labelled diagram. 5
- (b) Consider the following set of processes with Arrival Time and Burst Time. Draw a Gantt chart, calculate the completion time, turnaround time, waiting time and response time for Shortest Job First (non-preemptive mode) algorithm : 5

<i>Process</i>	<i>Arrival Time</i>	<i>Burst Time</i>
P1	2	1
P2	1	5
P3	4	1
P4	0	6
P5	2	3

**OR**

5. (a) Define deadlock. What are the necessary conditions for deadlock to occur in the system? 5
- (b) Explain the Banker's algorithm with example. 5

**OR**

6. (a) Discuss how to recover from deadlock in detail. 6
- (b) Differentiate between deadlock and starvation. 4
7. (a) What do you mean by page fault trap? Write the steps for handling page trap with a neat diagram. 1+4=5
- (b) How does segmentation differ from paging? Explain how a trap occurs in segmentation. 2+3=5

**OR**

8. (a) What is demand paging? List the various steps that are undertaken when a page fault occurs. 2+4=6
- (b) Write a short note on virtual memory. 4

9. Explain file concept, file attributes and file operations. 2+4+4=10

**OR**

10. (a) Describe how Access Control List can be useful for managing file access. 4
- (b) What do you mean by FAT? 2
- (c) Write a note on file protection with a suitable example. 4

\*\*\*