

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Bachelor of Technology (Information Technology) SEMESTER - 6 Winter 2025 (Supply.)

Course :Bachelor of Technology (Information Technology) Branch : Engineering and Technology

Semester : SEMESTER - 6

Subject Code & Name: BTITC601 - OPERATING SYSTEMS

Time : 3 Hours]

[Total Marks : 60

Instructions to the Students:

1. Each question carries 12 marks.
 2. Question No. 1 will be compulsory and include objective-type questions.
 3. Candidates are required to attempt any four questions from Question No. 2 to Question No.6
 4. Use of non-programmable scientific calculators is allowed.
 5. Assume suitable data wherever necessary and mention it clearly.
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- Q1. Objective type questions. (Compulsory Question) 12
1. Which operating system structure provides better system security and reliability?
A. Monolithic
B. Layered
C. Microkernel
D. Batch
 2. System calls are used to:
A. Access hardware directly
B. Communicate between user and kernel
C. Manage memory only
D. Compile programs
 3. Which scheduling algorithm may cause starvation?
A. FCFS
B. Round Robin
C. Priority Scheduling
D. FIFO
 4. Threads within the same process share:
A. Registers
B. Program counter
C. Stack
D. Address space
 5. Which of the following is NOT a process state?
A. Ready
B. Running
C. Waiting
D. Compiled
 6. Banker's Algorithm is used for:
A. Deadlock detection
B. Deadlock prevention
C. Deadlock avoidance
D. Deadlock recovery

- 7 Resource Allocation Graph is mainly used for:
- Memory allocation
 - Deadlock detection
 - Process scheduling
 - Paging
- 8 Which memory management technique suffers from external fragmentation?
- Paging
 - Segmentation
 - Contiguous allocation
 - Demand paging
- 9 Demand paging improves system performance by:
- Increasing page size
 - Loading only required pages into memory
 - Eliminating page faults
 - Increasing physical memory
- 10 In paging, logical address is divided into:
- Segment number and offset
 - Page number and offset
 - Frame number and offset
 - Base and limit
- 11 Which file access method allows random access?
- Sequential
 - Direct
 - Indexed
 - Both B and C
- 12 Which directory structure allows sharing of files between users?
- Single-level directory
 - Two-level directory
 - Tree-structured directory
 - Acyclic graph directory
- Q2. Solve the following.
- Define an Operating System. Explain the main functions and objectives of an Operating System. 6
 - Explain different Operating System structures in detail. 6
- Q3. Solve the following.
- What are Cooperating Processes? Explain their advantages and issues involved. 6
 - Explain Semaphores. Describe binary and counting semaphores with examples. 6
- Q4. Solve Any Two of the following.
- Define Deadlock. Explain the four necessary conditions for deadlock. 6
 - Explain Deadlock Prevention. How can deadlock be prevented by eliminating one of the four conditions? 6
 - Explain Recovery from Deadlock. Discuss different recovery techniques. 6
- Q5. Solve Any Two of the following.
- What is Belady's Anomaly? Explain with reference to FIFO algorithm. 6
 - Explain Page Fault handling mechanism in detail. 6

- C) Define virtual address and physical address. A computer has a 16-bit logical address and a page size of 1 KB. 6
Determine:

- Number of pages
- Number of bits used for page number and offset

Q6. Solve Any Two of the following.

- A) What is a File System? Explain the objectives and functions of a file system. 6
B) Describe file operations supported by an Operating System. 6
C) Explain file access methods such as sequential access, direct access, and indexed access. 6

*** End ***