

- N.B. :** (1) All questions are compulsory.
 (2) Figures to the right indicate marks.
 (3) Illustrations, in-depth answers and diagrams will be appreciated.
 (4) Mixing of sub-questions is not allowed.

1. Attempt any two :- 12
- (a) Explain any 3 Features of following OS :-
 (i) Real time OS (ii) Parallel OS.
 (b) Explain in brief Layered Approach in comparison with Kernel based approach.
 (c) Write a short note on PCB.
 (d) Describe any two Components of OS along with their activities.
2. Attempt any two :- 12
- (a) Define the term Thread. Explain various Multithreading models.
 (b) Write a short note on critical section problem.
 (c) In Round Robin Scheduling algorithm if we increase the time quantum (time slice) by some units then what will be the effect on average time? Comment on the above statement with suitable example.
 (d) State producer and consumer problem and develop an algorithm for the same.
3. Attempt any two :- 12
- (a) Assume -
- (i) Total resources in system :
- | A | B | C | D |
|---|---|---|---|
| 6 | 5 | 7 | 6 |
- (ii) Available system resources are :
- | A | B | C | D |
|---|---|---|---|
| 3 | 1 | 1 | 2 |
- (iii) Processes [currently allocated resources] :
- | | A | B | C | D |
|----------------|---|---|---|---|
| P ₁ | 1 | 2 | 2 | 1 |
| P ₂ | 1 | 0 | 3 | 3 |
| P ₃ | 1 | 2 | 1 | 0 |
- (iv) Processes (Maximum Resources) :
- | | A | B | C | D |
|----------------|---|---|---|---|
| P ₁ | 3 | 3 | 2 | 2 |
| P ₂ | 1 | 2 | 3 | 4 |
| P ₃ | 1 | 3 | 5 | 0 |
- Compute the need array and check whether system is under safe state or not. Also find safe sequence.

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- (b) Explain the concept of page fault. How the same can be handled by OS ?
- (c) Describe different Memory Management Techniques with suitable examples.
[hint : First fit, Best fit and worst fit.]
- (d) Write short notes on :-
 - (i) Monitors
 - (ii) Message Passing.

4. Attempt any **two** :-

12

- (a) Explain any 2 disk scheduling algorithm with suitable example.
- (b) Discuss free space management techniques in file management.
- (c) Write a short note on virus. List and describe types of virus in brief.
- (d) Explain following with respect to a file :-
 - (i) Definition and its need
 - (ii) Types of format
 - (iii) Types of attributes.

5. Attempt any **two** :-

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- (a) Define following :-
 - (i) Interrupts
 - (ii) Seek time
 - (iii) Waiting time
 - (iv) Firewall
 - (v) Fragmentation
 - (vi) Rotational Latency.
- (b) Explain different types of data structures used in Bankers algorithm.
- (c) Write short notes on :-
 - (i) DMA
 - (ii) Polling.
- (d) Explain why the process needs to be killed by OS.
