

OPERATING SYSTEM

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP - A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for the following :

10 × 1 = 10

- i) The technique of temporarily removing inactive programs from the memory of a computer system is
- | | |
|--------------|-------------------|
| a) switching | b) swapping |
| c) paging | d) none of these. |
- ii) The time required for read-write head to travel to target cylinder is called
- | | |
|------------------|-------------------|
| a) latency time | b) seek time |
| c) transfer time | d) none of these. |
- iii) The technique of relocating all occupied areas of storage to one end is called
- | | |
|---------------|------------------|
| a) sharing | b) relocation |
| c) compaction | d) distribution. |

- iv) Which of the following statements is false ?
- a) Implicit task is a system-defined task
 - b) A process is an instance of a program execution
 - c) Buffering is a sophisticated form of spooling
 - d) Time-sharing system follows Round-robin algorithm.
- v) The coincidence of high page traffic and low CPU utilization is
- a) Belady's Anomaly
 - b) Mutual Exclusion
 - c) Deadlock
 - d) Thrashing.
- vi) Which scheduling algorithm is inherently preemptive ?
- a) FCFS
 - b) SJF
 - c) RR
 - d) Priority scheduling.
- vii) The optimal scheduling algorithm is
- a) FCFS
 - b) SJF
 - c) RR
 - d) None of these.
- viii) Thrashing
- a) reduces page I/O
 - b) decreases the degree of multiprogramming
 - c) implies excessive page I/O
 - d) improves the system performance.
- ix) Fork is
- a) the creation of a new job
 - b) the dispatching of a task
 - c) increasing the priority of a task
 - d) the creation of new task.
- x) RMI stands for
- a) Remote Method Interface
 - b) Remote Message Interface
 - c) Remote Method Invocation
 - d) None of these.

GROUP - B**(Short Answer Type Questions)**

Answer any *three* of the following. $3 \times 5 = 15$

2. Consider the following resource allocation state involving processes P0, P1, P2, P3 and P4 and resources R0, R1, R2, R3 and R4 :

Resources Assigned					Resources Still Needed				
Processes	Resources				Processes	Resources			
	R1	R2	R3	R4		R1	R2	R3	R4
A	3	0	1	1	A	1	1	0	0
B	0	1	0	0	B	0	1	1	2
C	1	1	1	0	C	3	1	0	0
D	1	1	0	1	D	0	0	1	0
E	0	0	0	0	E	2	1	1	0

Available resources = 1 0 2 0

Determine whether the system is in a safe state or not.

3. Explain with examples the difference between preemptive and non-preemptive priority scheduling.
4. Distinguish between 'starvation' and 'deadlock'.
5. Explain PCB with a neat diagram.
6. What is thread ? Compare it with process. $2 + 3$

GROUP - C**(Long Answer Type Questions)**

Answer any *three* of the following. $3 \times 15 = 45$

7. a) Explain the following file access methods : 3×3
- Direct
 - Sequential
 - Indexed Sequential.
- b) What is Memory Compaction ? What is its use ? $3 + 3$

8. a) What is swapping ? What is its purpose ?
b) Consider the following sequence of memory references generated by a single program in a pure paging system :

10, 11, 104, 170, 173, 177, 309, 245, 246, 247, 458, 364.

Determine the number of page faults for each of the following page replacement policies assuming three (3) page frames are available and all are initially empty.

The size of a page is 100 words :

- i) LRU
ii) FIFO
iii) Optimal page replacement. $3 + 4 + 4 + 4$
9. a) Describe a system model for deadlock.
b) Explain the combined approach to deadlock handling.
c) Differentiate process switching and context switching. $5 + 5 + 5$
10. a) Explain Mutual exclusion.
b) Write the first algorithm of mutual exclusion algorithm.
c) What are its problems ? $5 + 7 + 3$
11. Write short notes on any *three* of the following : 3×5
- a) Round Robin Scheduling
b) Thrashing
c) Virtual memory
d) Paging and Segmentation.

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