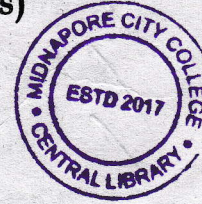


2023

3rd Semester Examination  
COMPUTER SCIENCE (Honours)

Paper : C 6-T  
[Operating Systems]  
[CBCS]



Full Marks : 40

Time : Two Hours

*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**Answer any *five* questions :  $2 \times 5 = 10$ 

1. What hit ratio is required to reduce the effective memory access time, from 200 ns to 140 ns, if the cache access time is 20 ns?
2. Match List-I with List-II selected the correct answer using the codes given below the list :

List-I		List-II	
A.	Disk scheduling	1.	Round Robin
B.	Batch Processing	2.	SCAN
C.	Time sharing	3.	LIFO
D.	Interrupt Processing	4.	FIFO

P.T.O.

( 2 )

3. Compare shared memory system and message passing system in process communication model.
4. Compare Paging and Segmentation.
5. What is process?
6. What do you mean by multi programming system?
7. What is system call?
8. What is semaphore?

**Group - B**

Answer any *four* questions :  $5 \times 4 = 20$

9. (i) In which page replacement policies, Belady's anomaly may occur? Explain Belady's anomaly with example. (1+3)+1
- (ii) What is dirty bit in OS? (1+2)+1
10. (i) Why there is no external fragmentation with paging? When paging also suffers from internal fragmentation? (1+2)+2
- (ii) What is Convoy effect in OS? (1+2)+2
11. (i) Consider the following table of arrival time and burst time for three processes P0, P1 and P2.

Process	Arrival time	Burst time
P0	0 ms	9 ms
P1	1 ms	4 ms
P2	2 ms	9 ms

( 3 )

The preemptive shortest job first scheduling algorithm is used. Scheduling is carried out only at arrival or completion of processes. What is the average waiting time for the three processes?

- (ii) Consider a system with 3 processes that share 4 instances of the same resource type. Each process can request a maximum of K instances. Resources can be requested and released only one at a time. Find value of K that will always avoid deadlock. 3+2

12. (i) Write drawback of multilevel queue scheduling.

- (ii) Compare process and thread.

- (iii) Write short note on job scheduler. 1+2+2

13. Briefly describe the basic principle of paging. How starvation problem is resolved? 2+3

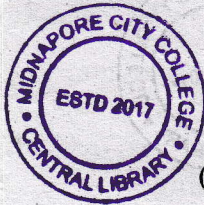
14. Explain the concept of open-source software. What is a shell in the context of a Linux system?  $2\frac{1}{2} + 2\frac{1}{2}$

**Group - C**

Answer any *one* question :  $10 \times 1 = 10$

- (i) Why multilevel paging is required in OS?
- (ii) What is context switch?

P.T.O.



(iii) Given memory partitions of 100K, 500K, 200K, 300K and 600K (in order), how would each of the algorithm (first-fit, best-fit, worst-fit) in parts a, b and c place processes of 212K, 417K, 112K and 426K (in order)? Which algorithm makes the best use of memory?

(iv) What is Zombie process in OS?

(v) Consider a logical address space of eight pages of 1024 words each, mapped onto a physical memory of 32 frames. How many bits are there in the logical address and in the physical address? 2+2+3+1+2

16. (i) What role do process states play in the management of processes within an operating system? Discuss about different process states. 2+3

(ii) What is the significance of Process Control Blocks (PCBs) in the context of process management? 2

(iii) How does the operating system handle Inter-Process Communication (IPC)? 3

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