

PG
MCA Semester- II Examination, 2025
MASTER OF COMPUTER APPLICATIONS
PAPER: MCA 202
(ADVANCED OPERATING SYSTEM)

**Full Marks: 100****Time: 3 Hours**

The figures in the right-hand margin indicate full marks.

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

Group-AAnswer any **FIVE** of the following questions:**2×5=10**

1. What is real time operating system?
2. Write down the between process and thread.
3. What is the difference between spooling and buffering?
4. What is system call?
5. What is TLB?
6. What is demand paging?
7. What do you mean by thrashing?
8. What is the size of the physical address space in a paging system which has a page table containing 64 entries of 11 bits each (including valid/invalid bit) and a page size of 512 bytes?

Group-BAnswer any **FOUR** of the following questions:**15×4=60**

9. What is the difference between fixed partition and variable partition in multiprogramming? Define seek time and latency time. Consider a request queue (0-199) of tracks 82,170,43,140,24,16,190 and head pointer at 50. Find the total number of tracks movements in FCFS, SSTF, SCAN and CLOOK.

3+2+ (2.5×4)

10. Consider the 5 process whose arrival time and burst time are given below.

Process	Arrival time	Burst time
P1	0	5
P2	1	3
P3	2	1
P4	3	2
P5	4	3

(P.T.O)

(2)

If the CPU scheduling policy is Round Robin with time quantum 2 Units, calculate the Average Turnaround Time and Waiting Time. What is semaphore? Explain how producer consumer problem can be solved using semaphore. 7+2+6

11. What is paging? Design the hardware mapping from logical memory address to physical memory address using a paging scheme with explanation. What are the demerits of paging? Consider a paging system, it takes 10 ns to search the Translation Look-aside Buffer (TLB) and 80 ns to access main memory. If the TLB hit ratio is 80%, then find the effective memory access time. 3+6+2+4

12. What is Belady's Anomaly? Explain with an Example. What is buddy allocation? Consider the page reference 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 3. With 4-page frames. Find the number of page fault using FIFO, LRU and Optimal page replacement algorithm. 4+2+(3×3)

13. Write a short note on PCB. What is the difference between multi-programming and multi-tasking OS? Consider six memory partitions of size 200 KB, 400 KB, 600 KB, 500 KB, 300 KB and 250 KB. These partitions need to be allocated to four processes of sizes 357 KB, 210 KB, 468 KB and 491 KB in that order. Perform the allocation of processes using first fit, best fit and worst fit algorithm. 4+2+(3×3)

14. What is the difference between preemptive and non-preemptive scheduling? What do you mean by multithreading? What is starvation? Consider the set of 4 processes whose arrival time and burst time are given below:

Process	Arrival time	Burst time
P1	0	6
P2	1	4
P3	2	2
P4	3	3

If the CPU scheduling policy is Shortest Remaining Time Next, calculate the average waiting time and average turnaround time. 4+3+3+5

(3)

15. What is deadlock? Describe the conditions which are necessary to occur deadlock. What is safe state and unsafe state? Consider the following snapshot of a system:

Process	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P1	0	0	1	2	0	0	1	2	2	1	0	0
P2	2	0	0	0	2	7	5	0				
P3	0	0	3	4	6	6	5	6				
P4	2	3	5	4	4	3	5	6				
P5	0	3	3	2	0	6	5	2				

Using the Banker's Algorithm, answer the following:

(i) Calculate the Need matrix.

(ii) Is the system in a safe state or not? Justify.

16. Write a short note on (any three)

- (a) Process State
- (b) Segmentation
- (c) File Protection and Security
- (d) Distributed Operating System
- (e) Critical Section Problem

(Internal Assessment: 30 Marks)



(P.T.O.)

<<<<<<>>>>>

