



Printed Pages : 4

MCA311

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 7308

Roll No.

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M.C.A

**(SEM III) ODD SEMESTER THEORY EXAMINATION 2009-10
OPERATING SYSTEMS**

Time : 3 Hours]

[Total Marks : 100

Note : Attempt all questions.

1 Attempt any four parts :

5×4=20

- (a) What is an operating system? Describe the role of an operating system as a resource manager.
- (b) What is the motivation for multiprogramming?
- (c) What is an interrupt? How does an operating system handle an interrupt? - Discuss.
- (d) Distinguish between multithreading and multiprocessing.
- (e) What is a virtual machine? Briefly explain the main components of virtual machine.
- (f) Explain the following :
 - (i) System calls
 - (ii) Real-time systems.



2 Attempt any two parts :

10×2=20

- (a) (i) Define the difference between preemptive and non-preemptive scheduling.
- (ii) Show how multilevel feedback queues accomplish each of the following scheduling goals :
- (1) favour short jobs
 - (2) favour I/O bound jobs to get good I/O device utilization.
- (b) What are the performance criteria of a CPU scheduling algorithm? - Discuss.
- (c) (i) Consider the following shape shot of processes and compute average turn around time and waiting time of processes for FCFS, SJF algorithms.

Process	Arrival time (ms)	Next Burst time (ms)
P ₁	0.0	6
P ₂	0.5	4
P ₃	1.0	2

- (ii) Compare the following scheduling algorithm, highlighting the strengths and limitations of each algorithm :
- (a) FCFS
 - (b) SJF
 - (c) Preemptive Priority.



- (a) Explain the producer consumer problem. Give a solution to the problem using semaphores.
- (b) (i) What is a deadlock? Discuss the necessary conditions for deadlock with examples.
- (ii) Consider the following snapshot of a system :

	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P ₀	0	0	1	2	0	0	1	2	1	5	2	0
P ₁	1	0	0	0	1	7	5	0				
P ₂	1	3	5	4	2	3	5	6				
P ₃	0	6	3	2	0	6	5	2				
P ₄	0	0	1	4	0	6	5	6				

Answer the following questions using Banker's algorithm :

- (i) What is the content of the matrix need?
- (ii) Is the system in a safe state?
- (c) Discuss the following :
- (i) Deadlock prevention
- (ii) Semaphores and monitors.



4 Attempt any **two** parts :

10×2=20

(a) Consider the following page reference string

7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3

How many page faults would occur for the following replacement algorithm, assuming three frames? (remember that all frames are initially empty)

- (i) FIFO replacement
- (ii) LRU replacement
- (iii) Optimal replacement.

(b) (i) Describe why SSTF (Shortest-Seek-Time-First) scheduling tends to favour mid range tracks at the expense of innermost and outermost tracks.

(ii) Discuss the page placement strategies with examples.

(c) Explain the following :

- (i) Demand Paging
- (ii) Thrashing.

5 Write short notes on any **four** parts :

5×4=20

- (a) Encryption
- (b) Windows-NT
- (c) Access Matrix
- (d) File System in LINUX system
- (e) Interprocess communication
- (f) System Threats.

