

(3 Hours)

[Total Marks : 80]

- N.B. (1) Question No. 1 is compulsory  
(2) Assume suitable data if necessary  
(3) Attempt any three questions from remaining questions

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- (a) Draw and explain process state transition diagram. (5)  
(b) What is kernel of an Operating System? Explain different types of kernels. (5)  
(c) Explain the concept of segmentation. (5)  
(d) What are the characteristics of a Real Time OS? (5)

- 2 (a) Consider the following set of processes with CPU burst time given in milliseconds. (10)

Process	Burst time	Arrival time
P1	10	1
P2	4	2
P3	5	3
P4	3	4

Draw Gantt chart for FCFS and Shortest Remaining Time First (SRTF) and calculate average waiting time and average turnaround time.

- (b) Explain how logical address is translated into physical address using paging mechanism with the help of a diagram. (10)

- 3 (a) Explain Buddy algorithm in LINUX memory management. (10)

- (b) Consider the following snapshot (10)

Process	Allocation			Max			Available		
	A	B	C	A	B	C	A	B	C
P0	1	3	5	0	6	5	1	3	5
P1	1	0	0	2	1	3			
P2	2	0	1	3	4	6			
P3	4	1	1	1	5	7			
P4	5	4	3	0	0	1			

Answer the following using Banker's algorithm.

- (i) What is the content of matrix Need?  
(ii) Is the system in the safe state?  
(iii) If the request from process P1 arrives for (0, 4, 2, 0) can request be granted immediately?

- 4 (a) Explain the working of EDF and RMA real time scheduling algorithms. (10)  
(b) Calculate page hit and page miss for the following string using page replacement policies FIFO and LRU. Page frame size is 3. (10)  
1,2,3,2,1,5,2,1,6,2,5,6,3,1,3,6,1,2,4,3
- 5 (a) Explain Disk Arm Scheduling algorithms. (10)  
(b) What is semaphore? Give an implementation of bounded buffer producer consumer problem using semaphore. (10)
- 6 (a) What are system calls? Explain any five system calls. (10)  
(b) Explain how UNIX performs file management using I-nodes. (10)