

Time: 3Hours

Total Marks: 80

- N.B.** 1) Question no.1 is compulsory  
 2) Solve any Three questions from remaining five.  
 3) Assume suitable data and draw diagram wherever required.

Q1.	Attempt any four	Marks
a.	What are the various objectives and functions of Operating Systems?	5
b.	Differentiate between process and threads.	5
c.	Explain Race condition with example.	5
d.	What is Demand Paging? What are its advantages?	5
e.	What are features of Mobile and Real Time Operating Systems?	5
Q2.	a. Give the explanation of necessary conditions for deadlock. Explain how a resource allocation graph determines a deadlock.	10
	b. Consider the reference string 7,0,1,2,0,3,0,4,2,3,0,3,2,1,2,0,1,7,0,1 and four free frames which are empty initially. How many page faults would occur for replacement by 1. LRU 2. FIFO 3. Optimal page replacement algorithms.	10
Q3.	a. Explain RAID Level in Details	10
	b. What is Internal fragmentation? Explain static partitioned allocation with partition sizes 400,180, 100, 300, and 45. Assuming First fit and Best fit method indicate the memory status after memory request for sizes 95, 180, 285, 380, 30.	10
Q4.	a. Explain file allocation methods in detail with proper diagram.	10
	b. What is a thread? How multithreading is beneficial? Compare and contrast different multithreading models.	10
Q5.	a. Explain paging in detail. Describe how logical address is converted into physical address.	10
	b. What is semaphore and its types? How the classic synchronization problem -Dining philosopher is solved using semaphores?	10

- Q6. a. Consider the following set of processes with their burst times given below: 10

Process name	Burst Time(ms)	Arrival Time(ms)	Priority(smaller no=higher priority)
P1	24	0	5
P2	7	3	3
P3	6	5	2
P4	10	10	1

1. Draw the Gantt chart for FCFS, SJF, Priority(preemptive) , Round Robin(quantum=4)scheduling
2. Calculate average waiting time for each of the above algorithm.

- b. What is open-source operating system? What are the design issues of Mobile operating system and Real time operating system? 10

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