B.E. (Computer Engineering) Seventh Semester (C.B.S.)

Operating Systems

P. Pages : 3 **NRT/KS/19/3593**

Time : Three Hours * 0 2 8 2 * Max. Marks : 80

Notes :
1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
3. Solve Question 3 OR Questions No. 4.
4. Solve Question 5 OR Questions No. 6.
5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Solve Question 11 OR Questions No. 12.
8. Assume suitable data whenever necessary.
9. Illustrate your answers whenever necessary with the help of neat sketches.

1. a) Compare Multitasking, Multiprocessing and Multiprogramming operating system. **6**

b) Discuss various allocation methods and state how free space management operation is carried out? **7**

OR

2. a) Can you justify the importance of system calls in operating system? Give types of system calls with some example. **6**

b) Explain Directory Structure with types and support your answer with appropriate diagrams. **7**

3. a) Illustrate the reasons behind an environment that allows process cooperation by an operating system. Also explain various methods through which Inter process communication is achieved. **8**

b) Discuss in brief multi – level queue scheduling and multi – level feedback Queue scheduling. **6**

OR

4. a) Outline how thread is better than process. What are the multithreading models available? Explain them with diagram. **6**

b) Calculate Average waiting time Average time & average response time for the below given CPU scheduling algorithms when the scheduling request scenario is as shown below. **8**

Process	Arrival Time	Burst Time	Priority
P_1	0	6	1
P_2	1	8	2
P_3	2	5	3
P_4	3	9	4
P_5	5	2	5

a) First Come First Serve.
b) Shortest – Remaining – time – first
c) Priority
d) Round Robin (Quantum = 2 ms)

5. a) What is critical – section problem? and Elaborate the three requirements that the critical section problem must satisfy. **7**

b) Can you explain classic problems of synchronization. **6**

OR

6. a) 'Semaphore is a Synchronization tool used to solve critical – section problem' – Are you agree with the statement? Justify your answer. **7**

b) Explain Peterson's solution in brief. **6**

7. a) What is the utility of Resource Allocation Graph in case of Deadlock characterization. Draw a Resource Allocation Graph showing how deadlock occurs? **7**

b) Suppose that a disk drive has 500 cylinders numbers from 0 to 499. The drive is currently serving a request at 142 cylinder. The queue of pending request in FIFO manner is as given below. **7**
86, 147, 91, 177, 98, 150, 102, 170, 130
starting from the current head position, what is the total distance that the disk arm moves to satisfy all pending request. Apply below given scheduling algorithm for disks.

a) FCFS
b) SSTF
c) SCAN
d) LOOK
e) C – LOOK
f) C – SCAN

OR

8. a) Apply Banker's Algorithm and give is to the safe sequence the process should follow. Calculate the Need matrix when snapshot of system is as given below : **7**

	Allocation			Max			Available		
	A	B	C	A	B	C	A	B	C
P_0	0	1	0	7	5	3	3	3	2
P_1	2	0	0	3	2	2			
P_2	3	0	2	9	0	2			
P_3	2	1	1	2	2	2			
P_4	0	0	2	4	3	3			

b) Discuss Disk – Attachment concept in brief by explaining Host – Attached storage, Network – Attached Storage and storage – Area Network. **7**

9. a) 'Swapping pages an important role in maintaining backing store' – Are you agree with the statement? Justify your answer. **4**

b) Discuss paging with paging hardware diagram in brief. **4**

c) What is page fault? What are the steps involved in handling page – fault? Explain with appropriate diagram. **5**

OR

10. a) Describe various common techniques used for structuring the page table (explain any three) in brief. **6**

b) Why there is a need of page replacement strategies? Apply page replacement algorithms on given sequence of string. **7**

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

a) FIFO

b) Optimal Page Replacement and

c) LRU (assume frame size – 3)

d) What is Belady's Anomaly in this regard? Suggest whether it is occurring or not?

11. a) Explain Goals, principles and Domain of system protection. **6**

b) 'Today system security is considered as one of major issue' – comment on the statement in the direction of security attacks. **7**

OR

12. a) Discuss Access Matrix in detail with appropriate example. **6**

b) Explain how Language – Based protection can be implemented in order to achieve system security in better manner. **7**

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