B.E. Sixth Semester (Information Technology) (C.B.S.)

Operating Systems

P. Pages : 3 **NKT/KS/17/7412**

Time : Three Hours * 0 3 3 6 * 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) What is operating system ? Explain distributed and time sharing operating system. **6**

b) Write a short note on spooling. **3**

c) What is user and system view of OS. **4**

OR

2. a) Differentiate between multiprogramming and multiprocessing. **6**

b) Explain with neat diagram, the concept of system calls. List pointwise functions of various system calls used. **7**

3. a) List and explain the advantages and disadvantages of each of the following file access methods. **8**
i) Sequential Access Method.
ii) Indexed Access Method.
iii) Random Access Method.

b) Explain various operations associated with files. **6**

OR

4. a) Describe various scheme that are used for implementing logical structuring of directories. **5**

b) Suppose the head of moving disk with 200 cylinders and is currently at track 60. If the queue of a request is kept in order as 65, 170, 35, 120, 10, 140. What are the total head movements to satisfy the request for the scheme ? **9**
i) SSTF ii) C-SCAN
iii) FCFS iv) SCAN
v) LOOK

5. a) Draw state transition diagram of a process. What do you mean by a process control block? Explain it with neat diagram. **8**

b) What are the different types of schedulers present in the system ? Bring out the relevance of each of them. **5**

OR

6. a) Define thread. Explain various multithreading models. **5**

b) Consider the following set of processes. **8**

Process	CPU Burst Time	Arrival Time	Priority
P_1	3 ms	0	3
P_2	5 ms	1	1
P_3	2 ms	2	2
P_4	5 ms	3	5
P_5	5 ms	4	4

Calculate the average waiting time and Turn around time for each.

i) FCFS ii) SJF

iii) Priority iv) RR (time slice = 2)

7. a) Describe the following - **9**

i) Swapping

ii) Internal and external fragmentation.

iii) Paging.

b) What is page fault ? Explain different steps to handle page fault. **5**

OR

8. a) With neat diagram explain the concept of demand paging. **4**

b) Explain optimal page replacement algorithm with an example. **5**

c) Consider following page reference string 4 3 2 1 4 3 5 4 3 1 5. Assume frame size = 3. How many page fault would occur for **5**
(i) FIFO page replacement (ii) Optimal page replacement.

9. a) What is critical section problem ? Explain the three condition that a solution to the critical section problem must satisfy. **7**

b) Explain semaphores and its limitations. **6**

OR

10. Explain Dining - Philosopher problem and Reader - Writers problem with solution. **13**

11. a) What is an Access Matrix ? Describe various methods to implement an Access matrix. **7**

b) Explain the various methods to detect a deadlock and recover it. **6**

OR

12. a) Solve the following using Banker's algorithm and find out whether resultant system state is safe or not. **8**

Process	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			

i) Find out if system state is safe. If safe find safe sequence.

ii) If P_1 makes a request - P_1 (1, 0, 2) is resulting state safe ?

iii) If P_4 makes a request - P_4 (3, 3, 0) can it be granted ? Solve.

b) What are the various condition for deadlock prevention ? **5**

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