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**Operating System**

P. Pages : 3

Time : Three Hours

**NJR/KS/18/4435**

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) Distinguish between multi-tasking, multi-programming and multi-processor system. **6**
- b) What is system call? Discuss various types of system calls. **7**

**OR**

2. a) Discuss the various services provided by operating system. Justify your answer by giving real life example. **7**
- b) Write notes on **any three**. **6**
- i) Distributed system.
  - ii) Real time system.
  - iii) Batch system
  - iv) Hand held system
3. a) Discuss various access methods for file with its advantages. **6**
- b) Explain linked allocation and indexed allocation strategies. **7**

**OR**

4. a) None of the disk scheduling disciplines, except FCFS, is truly fair (saturation may occur) **6**
- i) Explain why this assertion is true.
  - ii) Explain why fairness is an important goal in a time sharing system.
- b) Suppose a disk drive has 400 cylinders, numbered from 0 to 399. The drive is currently serving a request at cylinder 142, and the previous request was at cylinder 124. **1+2+2+2**
- The queue of pending request in FIFO order is,  
84, 147, 99, 176, 94, 150, 102 175, 130  
starting from the current head position. What is the total distance that the disk arm moves to satisfy all the pending requests for the following algorithm.
- i) FCFS
  - ii) SSTF
  - iii) SCAN
  - iv) LOOK

5. a) What is context switch ? Give any one example where context switch occurs. 3
- b) Explain schedulers, with appropriate diagram of scheduling queues and describe it with all cases possible. 6
- c) Give the benefits of using thread. Why multithreading model is more useful ? Justify your answer with example. 5

OR

6. a) Calculate average waiting time, average turn around time and average response time for a given situation. Assume time quantum of 2ms for Round Robin algorithm 10

Process	Arrival Time	Burst Time	Priority
P <sub>0</sub>	0	10	4
P <sub>1</sub>	1	9	3
P <sub>2</sub>	2	5	2
P <sub>3</sub>	5	2	1

Apply following cpu scheduling algorithms on it.

- i) FCFS ii) SJF (with  $\alpha$  without preemption)
- iii) Priority iv) Round Robin.

- b) Explain Linux threads in brief. 4
7. a) Explain the concept of address binding with diag. Also explain dynamic loading. 4
- b) What is backing store? Swapping is an important concept used in case backing store ! Are you agree with the statement? Justify your answer. 5
- c) Discuss the basic method used for implementing paging with example. 5

OR

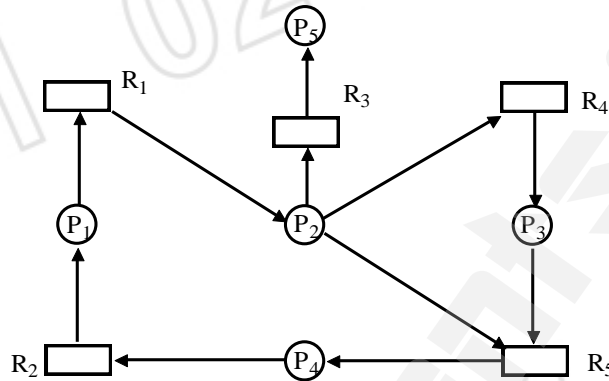
8. a) Explain how segmentation is achieved using hardware? 4
- b) What is Thrashing ? Give an example where thrashing is occurred, while using operating system. 4
- c) Calculate how many page faults will occur for the following algorithms applied on given reference string with three page frames. 6
- 1, 2, 3, 4, 5, 3, 4, 1, 6, 7, 8, 7, 8, 9, 7, 8, 9
- i) FIFO
- ii) Optimal Page Replacement
- iii) LRU page replacement.
9. a) What is critical section problem ? Also explain solutions to the critical section problem. 7
- b) Discuss semaphores with its usage and implementation. 6

OR

10. a) Discuss Bonded-Builder problem and Readers-Writers problem in brief. 3+4
- b) Write note on monitors with its usage. 6
11. a) Deadlocks can be described more precisely in terms of a directed graph. Justify your answer with example. 6
- b) Explain how deadlock can be prevented. 7

OR

12. a) Convert the following resource allocation graph into wait for graph. 5



- b) Consider the following situation of system

Process	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P <sub>0</sub>	0	0	1	2	0	0	1	2	1	4	2	0
P <sub>1</sub>	1	0	0	0	1	7	5	0				
P <sub>2</sub>	1	3	5	4	2	3	5	6				
P <sub>3</sub>	0	6	3	2	0	6	5	2				
P <sub>4</sub>	0	0	1	4	0	6	5	6				

Answer the following questions using Banker's algorithm.

- i) What is the content of need matrix. 2
- ii) Is the system in safe state ? Give the safe sequence. 3
- iii) If the request from process P<sub>1</sub> arrives for (0, 4, 2, 0) can it be granted immediately ? 3

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~ Walt Disney

