

**Operating Systems**

P. Pages : 2

Time : Three Hours



TKN/KS/16/7499

Max. Marks : 80

- Notes :
1. All questions carry marks as indicated.
  2. Solve Questions 1 OR Questions No. 2.
  3. Solve Questions 3 OR Questions No. 4.
  4. Solve Questions 5 OR Questions No. 6.
  5. Solve Questions 7 OR Questions No. 8.
  6. Solve Questions 9 OR Questions No. 10.
  7. Solve Questions 11 OR Questions No. 12.
  8. Due credit will be given to neatness and adequate dimensions.
  9. Assume suitable data whenever necessary.
  10. Illustrate your answers whenever necessary with the help of neat sketches.

1. a) Give essential properties of following types of operating system. 8
    - i) Real time
    - ii) Multiprocessor.
    - iii) Web based
    - iv) Distributed.
  - b) What is operating system? OS is called resource manager. Explain. 6
- OR**
2. a) List and explain various services provided by operating system. 6
  - b) What is spooling? Why is spooling necessary for multi programmed batch system. 4
  - c) What are the different user view and system view of OS? 4
3. a) Suppose that a disk has 5,000 cylinder numbered 0 to 4.999, is currently serving a request at track 143 and previous request was at track 125. The queue of pending request in FIFO order is 86, 1470, 913, 1174, 948, 1509, 1022, 1750, 130 starting from current head position, what is the total distance that the disk arm move to satisfy all pending request for each of the following disk-scheduling algorithm. 10
    - i) FCRS
    - ii) SSTF
    - iii) SCAN
    - iv) C-SCAN
    - v) Look
    - vi) C-Look
  - b) What are the different file operations? 3
- OR**
4. a) Discuss with neat diagram various file allocation method's. 7
  - b) What are the different file access techniques? 6
5. a) Write a detail description of process control block and its attributes. 6
  - b) State and explain in brief the various scheduling criteria used for comparing CPU scheduling algorithms. 7
- OR**
6. a) Differentiate between preemptive and non-preemptive scheduling. State why strict non-preemptive scheduling is unlikely to be used in computer system. 5

- b) Consider the following set of processes with the length of the CPU-burst time given in milliseconds. 8

Process	Burst time	Priority
P <sub>1</sub>	10	3
P <sub>2</sub>	1	1
P <sub>3</sub>	2	4
P <sub>4</sub>	1	3
P <sub>5</sub>	5	2

The processes are assumed to have arrived in order P<sub>1</sub>, P<sub>2</sub>, P<sub>3</sub>, P<sub>4</sub>, P<sub>5</sub> at time 0 ms. Draw Gantt chart and calculate average waiting time and average turnaround time for the following algorithms.

- i) FCFS      ii) SJF      iii) Priority      iv) RR (time quantum = 2 ms)

7. a) Discuss the paging technique for mapping the virtual address with physical address with neat sketch and example. 7

- b) Define the following terms. 6

- a) Thrashing      b) Overlays.

**OR**

8. a) Consider the page reference string. 7

1, 2, 3, 4, 5, 3, 4, 1, 6, 7, 8, 7, 8, 7, 8, 9, 7, 8, 9, 5, 4, 5, 9.

Assume page frame size = 3 Find out the algorithms having minimum page fault rate.

- i) FIFO      ii) LRU      iii) Optimal

- b) Discuss the disk space management concept. 6

9. a) Discuss the following. 6

- i) Race condition.      ii) Critical section problem

- b) Software solution to mutual exclusion problem in curs bring waiting. Explain. 7

**OR**

10. Explain **any two** classical problems of synchronization. 13

11. a) Explain resource allocation graph. 5

- b) Explain the following. 9

- i) Access matrix.      ii) Capability list.      iii) Language based protection.

**OR**

12. a) Consider the following snapshot of a system. 10

Process	Allocation			Max			Available		
	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>
P <sub>1</sub>	2	2	3	3	6	8	7	7	10
P <sub>2</sub>	2	0	3	4	3	3			
P <sub>3</sub>	1	2	4	3	4	4			

- i) Find the need matrix.      ii) Is the system safe?

- iii) Would the following request be granted in the current state?

P<sub>1</sub> requests (1,1,0).

- b) Explain deadlock recovery. 4

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