c) Suppose a hard disk of 1000 tracks from 0 to 999 with track 0 being the inner most. Currently the device is serving request on 583 no. track while the device completed a previous request on track 543. Calculate the total distance required to travel by the disk head to complete. 5x2=10

605, 117, 572, 518, 850, 967, 480, 565, 645

disk request for the disk scheduling algorithm.

(i) FCFS (ii) SSTF (iii) SCAN (iv) C-SCAN (v) LOOK

6. a) In which factors transfer rate of hard disk depends. 2

b) What is the necessity of masking some interrupt? 1

c) What do you mean by system calls? Explain with suitable example. 3

d) Consider a hard disk consists of 1000 cylinders, numbered 0 to 999. The drive is currently serving a request at cylinder 705 and the previous request was at cylinder 537. The queue of pending request in F1F0 order is 2x4=8

86, 147, 913, 774, 948, 150, 122, 175, 430

Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all the pending requests for each of the following disk scheduling algorithm?

(i) FCFS (ii) SSTF (iii) SCAN (iv) C-LOOK

PG/INTEGRATED ODD SEMESTER (CBCS) EXAM., FEBRUARY 2021

COMPUTER SCIENCE
5th Semester

COURSE NO. MCSCC - 503
(Operating System and Architecture)

Full Marks : 70
Pass Marks : 28

Time : 3 hours

The figures in the margin indicate full marks for the questions

(Answer any five)

UNIT - I

1. a) What is the main advantage of the layered approach to sytem design? In what ways is the modular kernal aproach similar to the layered approach. 3+3=6

b) Consider the following set of process with the length of the CPU burst given in millisecond 4x2=8

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

Calculate the waiting time by drawing Gantt chart for the algorithms (i) SJF (preemptive) (ii) priority (preemptive)

2. a) Discuss the role of process control block in the execution of context switch. 3

b) Match the following: 3

i) Short term scheduler	a) Swapping
ii) Medium Term Scheduler	b) Degree of multiprogramming
iii) Long term scheduler	c) Context switch

c) Consider the following system of processes with burst time given in millisecond: 4x2=8

Process	Arrival Time	Burst Time
P_1	0	3
P_2	1	6
P_3	3	5
P_4	5	4

Calculate the turn around time and response time by drawing Gantt chart for the scheduling algorithm (i) SJF (non-preemptive) (ii) Round Robin (Time slice= 2 millisecond)

UNIT - II

3. a) Discuss the different strategies of contiguous allocation of memory. Mention the limitation of all the strategies. 3+2=5

b) Explain the address tranlation mechanism in paging with suitable example. 5

c) Consider the following page reference string to calculate the page fault number generated by LRU replacement algorithm with 3 frames: 3

0, 1, 2, 3, 2, 1, 5, 1, 3, 5, 6, 1, 3, 0, 6, 3

d) What is thrashing. 1

4. a) What is TLB? Discuss the working principle of TLB in paging. 1+4=5

b) What is the purpose of paging the page tables. 3

c) Calculate the page fault cases by the page replacement algorithm F1F0 with 3 frames and 4 frames seperably for the following reference string. 2x3=6

0, 1, 2, 3, 0, 2, 1, 3, 4, 0, 1, 5, 3, 4

UNIT - III

5. a) Why is the interupt is called necessary evil in operating system? 3

b) What is the difference between constant linear velocity and contant angular velocity in case of disk rotation. 1

UNIT - IV

7. a) Explain the tree-like directory structure. 6

   b) What are the advantages of contiguous allocation of disk space for files. 2

   c) What are the different index block structure used to implement indexed allocation of disk space? Mention the limitation of each structure. 6

8. a) What do you mean by absolute path and relative path in directory structure? Explain with suitable diagram. 1+2=3

   b) What do you mean by symbolic link in acyclic graph directory structure? What is the limitation of using symbolic link? 1+1=2

   c) What are the advantages of using linked allocation method for disk space allocation. 2

   d) Explain the purpose of open ( ) and close ( ) operations. 4

   e) Explain file mounting. 3

UNIT - V

9. a) What do you mean by race condition? Explain with suitable example. 1+3=4

   b) Write and explain the algorithm to implement mutual exclusion with semaphore. 5

   c) Explain the solution of Readers-Writers synchronization problem. 5

10. a) Explain the different ways to prevent deadlock. 7

    b) What are limitations of co-operating process. 2

    c) Explain the mechanism to detect deadlock with the help of 'wait-for' graph. Draw the suitable diagram. 5