UNIT - IV

7. (a) Mention the different file attributes and types. 2+2=4

   (b) Explain the best fit, first fit and worst fit algorithms?5

   (c) Explain the acyclic graph directory structure with the help of diagram. 5

8. (a) Explain the file system architecture. 5

   (b) What do you mean by garbage collection in graph directory structure? 2

   (c) Explain different types of Indexed file organization. 5

   (d) What is file mounting? 2

UNIT - V

9. (a) What is producer-consumer problem? Explain the solution of producer-consumer problem with the help of bounded buffer. 1+5=6

   (b) What are the necessary conditions for the occurrence of deadlock? 2

   (c) Explain the banker's algorithm to avoid the occurrences of deadlock. 6

10. (a) What is resource allocation graph? Describe a resource allocation graph with a cycle but no deadlock. 1+3=4

    (b) What are semaphores? Explain how it can be used to implement mutual exclusion. 3+4=7

    (c) State the solutions of Dining Philosophers problem. 3

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UG/PG ODD SEMESTER EXAMINATION, 2022

COMPUTER SCIENCE

5th Semester

Course No. : MCSC-503

(Operating Sytem & Architecture)

Full Marks : 70

Pass Marks : 28

Time : 3 hours

The figures in the margin indicate full marks for the questions

(Answer any five questions, taking one from each unit)

UNIT- I

1. (a) What is process? Explain the different states of a process with suitable diagram. 1+4=5

   (b) What are the functions of operating system? 3

   (c) Calculate the waiting time for process P1,P2,P3,P4 and P5 applying FCFS and SJF(preemptive) algorithm for the following data 2X3=6

Process	Arrival Time	Burst Time
P1	0	4
P2	1	2
P3	2	5
P4	3	4
P5	5	3

2. (a) What are the advantages of layered approach of system design? 2

(b) Distinguish between: 2x2=4

i) Preemptive scheduling and non-preemptive scheduling.

ii) I/O bound process and CPU bound process.

(c) Calculate the waiting time for process P1, P2, P3, P4 and P5 applying SJF (non-preemptive), Priority(preemptive) and Round Robin (Time slice= 1) algorithm for the following data 4+4=9

Process	Arrival Time	Burst Time
P1	5	5
P2	3	4
P3	8	3
P4	2	1
P5	1	2

(Note: smaller priority value signifies higher priority)

2X3=6

UNIT - II

3. (a) What is page table? Explain the working principle of hierarchical page table. 1+4=5

(b) What is external fragmentation? What are the causes of external fragmentation? 1+2=3

(c) Calculate the page fault occur by applying FIFO and LRU page replacement policy (3 frames) on the following page reference string

0, 1, 2, 0, 3, 5, 0, 4, 3, 2, 5, 3, 2, 1, 6, 3, 2, 6, 2, 1

2x3=6

4. (a) What is paging? Explain paging hardware. 1+2=3

(b) What is thrashing? Discuss the working set principle to avoid thrashing 1+4=5

(c) Calculate the page fault occur by applying LRU page replacement policy (3 frames) and optimal replacement policy (4 frames) on the following page reference string

1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6

2x3=6

UNIT-III

5. (a) What is a cylinder in magnetic disk? What is the difference between constant linear velocity and constant angular velocity in disk architecture? 1+3=4

(b) What is interrupt? Distinguish between maskable and non-maskable interrupt. 1+2=3

(c) Explain the concept of direct memory access (DMA) in detail? 7

6. (a) Discuss the role of interrupt handler when a process makes a system call to communicate with a device? 4

(b) Suppose the head of a moving- head disk with 200 tracks, numbered 0 to 199, is currently serving a request at track 143 and has just finished a request at track 125. If the queue of requests is kept in FIFO order: 86, 147, 40, 140, 36, 72, 91, 177, 94, 150, 102, 175, 130. What is the total head movement to satisfy these requests for the following Disk scheduling algorithms?

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

5x2=10