Exam. Code: 0916
Sub. Code: 33430

2056

B.E. (Computer Science and Engineering)

Fourth Semester

CS-403: Operating System

Time allowed: 3 Hours Max. Marks: 50

NOTE: *Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Unit.*

x-x-x

I. Write the short note on the following:-

a) Explain Context switching in brief with diagram.

b) Define critical section in process synchronization.

c) Differentiate between Paging and Segmentation.

d) What is software trap and how is it used in operating system design?

e) What is difference between preemptive and non-preemptive scheduling?

f) Describe terms long-term, medium-term and short-term thread scheduling.

g) Describe the terms: internal and external fragmentation.

h) What are consequences of choosing large page sizes, and what of small page sizes?

i) What is page replacement? List all page replacement policies you know.

j) What is disk formatting and what basic information is stored with each disk sector.

(10x1)

UNIT - I

II. Five processes arrive at time 0 with the following burst times:

Process	P1	P2	P3	P4	P5
Burst Time	6	8	7	3	4

a) Draw the Gantt chart using FCFS scheduling.

b) Calculate average waiting time and average turnaround time.

c) Repeat the calculations using SJF (non-preemptive) scheduling. (3,3,4)

III. a) Provide the solution for Reader/Writer problem using semaphores with no busy waiting.

b) Describe bit map approach in free space management. Use block diagrams. List advantages and disadvantages?

c) Discuss the problems of starvation and aging in CPU scheduling. (3,3,4)

IV. a) Given memory partition of 100K, 500K, 200K, 300K and 600K (in order), how would each of the first-fit, best-fit and worst-fit algorithms place processes of 212K, 417K, 112K and 426K (in order). Which algorithm makes the most efficient use of memory?

(3)

Contd.....P/2

b) Consider the following resource allocation:

Process	Allocation (A,B)	Maximum (A,B)
P1	(1,2)	(3,3)
P2	(2,0)	(2,2)
P3	(1,1)	(3,2)

Available resources = (2,1)

(i) Using Banker's Algorithm, determine whether the system is in a safe state. (4)

(ii) List any three methods of deadlock prevention. (3)

UNIT - II

V. A disk queue has the following requests:

95, 180, 34, 119, 11, 123, 62, 64

Initial head position = 50

(i) Calculate the total head movement using FCFS.

(ii) Calculate the total head movement using SSTF.

(iii) Which algorithm performs better in this case? Justify. (10)

VI. a) What causes a process/thread to change the state?

i) From running to ready?

ii) From ready to running?

iii) From running to blocked?

iv) From blocked to ready?

b) Describe dynamic partitioning. What is the main problem in dynamic partitioning? How is it solved?

c) For the reference string:

7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3

Number of frames = 3

i) Determine the number of page faults using FIFO algorithm.

ii) Determine the number of page faults using LRU algorithm. (4,2,4)

VII. a) Consider a system consisting of m resources of the same type, being shared by n processes. Resources can be requested and released by processes only one at a time. Show that the system is deadlock-free if the following two conditions hold:

i) The maximum need of each process is between 1 and m resources

ii) The sum of all maximum needs is less than $m + n$.

b) Explain the file allocation methods: contiguous, linked, and indexed allocation. (2x5)

x-x-x