(i) **Printed Pages: 7** **Roll No. .....**

(ii) **Questions : 9** **Sub. Code : 0572**

Exam. Code : 0006

B.A./B.Sc. (General) 6th Semester

1048

COMPUTER APPLICATIONS

Paper—B : Operation System

Time Allowed : Three Hours] **[Maximum Marks : 65**

Note :— Attempt **five** questions in all, including Question No. **IX** (Unit-V) which is compulsory and selecting **one** question each from Unit I-IV.

UNIT—I

I. (a) Explain the evolution of Operating System. 6

(b) Given memory partitions 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 ? 7

II. (a) Consider 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.

How many page faults would occur for the following replacement algorithms, assuming one, two, three, four, five, six or seven frames ? Remember all frames are initially empty, so your first unique pages will all cost one fault each :

- LRU replacement
- FIFO replacement
- Optimal replacement. 8

(b) Under what circumstances would a user be better off using a time-sharing system, rather than a personal computer or single-user workstation ? 5

UNIT—II

III. Suppose that the following processes arrive for execution at the times indicated. Each process will run the listed amount of time. In answering the question, use non preemptive scheduling and base all decisions on the information you have at the time the decision must be made :

Process	Arrival Time	Burst Time
P1	0.0	8
P2	0.4	4
P3	1.0	1

(a) What is the average time for these processes with the FCFS scheduling algorithm ?

(b) What is the average turnaround time for these processes with the SJF scheduling algorithm ?

(c) The SJF algorithm is supposed to improve performance, but notice that we choose to run process P1 at time 0 because we did not know that two shorter processes would arrive soon. Compute what the average turnaround time will be if the CPU is left idle for the first 1 unit and then SJF scheduling is used. Remember that processes P1 and P2 are waiting during this idle time, so their waiting time may increase. This algorithm could be known as future-knowledge scheduling. 13

IV. Consider the following snapshot of a system (A, B, C and D are the resources) :

Process	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P0	0	0	1	2	0	0	1	2	1	5	2	0
P1	1	0	0	0	1	7	5	0				
P2	1	3	5	4	2	3	5	6				
P3	0	6	3	2	0	6	5	2				
P4	0	0	1	4	0	6	5	6				

Answer the following questions using the Banker's algorithm :

(i) What is the content of the matrix *Need* ?

(ii) Is the system in a safe state ?

(iii) If a request from process P1 arrives for (0,4,2,0), can the request be granted immediately ? 13

UNIT—III

V. (a) Consider a file currently consisting of 100 blocks. Assume that the file control block (and the index block, in the case of indexed allocation) is already in memory. Calculate how many disk I/O operations are required for contiguous, linked and indexed (single-level) allocation strategies, if, for one block, the following conditions hold. In the contiguous allocation case, assume that there is no room to grow in the beginning, but there is room to grow in the end. Assume that the block information to be added is stored in memory :

(i) The block is added at the beginning.

(ii) The block is added at the middle.

(iii) The block is added at the end.

(iv) The block is removed from the beginning.

(v) The block is removed from the middle.

(vi) The block is removed from the end. 6

(b) Differentiate interrupt driver and poll driven data transfers. 7

VI. (a) Suppose that a disk drive has 5000 cylinders, numbered 0 to 4999. The drive is currently serving a request at cylinder 143 and the previous request was at cylinder 125. The queue of pending requests, in FIFO order, is :

86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130.

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 algorithms ?

(i) FCFS

(ii) SSTF

(iii) SCAN

(iv) LOOK

(v) C-SCAN. 10

(b) Explain Hash Table Directory implementation with example. 3

UNIT—IV

VII. (a) What is Performance Tuning ? How is it performed in Linux ? 3

(b) How jobs are managed in Linux ? Explain with example. 10

VIII. (a) Why Linux is prefered over M.S. Windows ? Give five reasons. 3

(b) What are the various types of Linux files ? Perform the following actions in Linux files :

(i) Comparing files

(ii) Printing files

(iii) Display all file names in the system that contains "Linux" word

(iv) Translating file characters

(v) Filtering file contents. 10

UNIT—V

IX. Answer the following questions in brief :

(a) What is the "degree of multiprogramming" ?

(b) What is "aging" ?

(c) Give examples of non-sharable resources.

(d) What is a "hole" in contiguous allocation method ?

(e) Can linked allocation have external fragmentation ? Internal fragmentation ?

(f) What is seek time ?

(g) How do I/O-bound and CPU-bound programs differ ?

(h) What is a real-time system ?

(i) What is an interrupt vector ?

(j) What does the short-term scheduler do ?

(k) Does rm * remove hidden files ?

(l) Which command is used to schedule a job for the whole year ?

(m) Which command is used to remove a non-empty directory ? 13