No. of Printed Pages : **2**

Sl. No.

B3.4 - R4/C0-R4.B2 : OPERATING SYSTEMS

NOTE :

1. Answer question 1 and any FOUR from questions 2 to 7.

2. Parts of the same question should be answered together and in the same sequence.

Time : 3 Hours **Total Marks : 100**

1. (a) What is Operating System ? Which are the functionalities of Operating System ?

(b) What is Process and Thread ? Differentiate Process and Thread.

(c) Give reasons for Building Distributed Systems.

(d) Why do you need a Virtual Private Network ?

(e) Define Thrashing. Which are the reasons for Thrashing ?

(f) What is kernel mode and user mode ?

(g) What is Internal and External Fragmentation ? Give suitable example of each. **(7x4)**

2. (a) Suppose a disk has 200 cylinders, numbered 0 to 199. The current head position is 103. The queue of pending requests, in first in first out order is : 32, 79, 130, 40, 178 and 190. Starting from the current head position, what is the total head movement (in cylinders) that the disk arm moves to satisfy all the pending requests for the following algorithms ? Show the head movements for each algorithm.

I. FCFS

II. SCAN

III. LOOK

(b) Consider the following set of processes are to be executed on uniprocessor system, with the length of the CPU burst time given in seconds. The processes are assumed to arrive in the order P, Q, R, S and T at time 0. Calculate average waiting time and turn-around time using given scheduling algorithm. Draw Gantt Chart for Scheduling algorithms.

Process ID	CPU Burst Time
P	4
Q	3
R	8
S	1
T	2

I. FCFS

II. SJF

III. RR (Quantum = 2 seconds) **(9+9)**

3. (a) How many page faults would occur for the following three replacement algorithms, assuming three physical frames ? Consider the following page reference string : 1, 3, 4, 2, 1, 5, 2, 1, 6, 2, 5, 6, 3, 1, 3, 6, 1, 2, 4, 3. Repeat the exercise for four frames. Assume pure demand paging means all frames are initially empty, so your first unique pages will all cost one fault each.

I. FIFO replacement

II. LRU replacement

III. Optimal replacement

(b) What is Program Threat ? Define any four well-known program threats. **(12+6)**

4. (a) Explain the segmentation in brief. What are the Physical address for the logical address given below ? Use Following segment table.

Segment Number	Base Address	Length
0	400	200
1	700	300
2	1300	150
3	2000	500
4	3000	300

(I) 0, 400 (II) 1, 50 (III) 2, 130 (IV) 3, 299

(b) What is Distributed Operating System ? List the advantages and disadvantages of Distributed Operating System. List any four Distributed Operating System. **(10+8)**

5. (a) What is Server Operating System ? Give some example of it. List the notable features of Windows NT Server.

(b) Write a short note on Virtual Machine.

(c) What is Access Matrix ? Explain in detail. **(6+6+6)**

6. (a) Illustrate Synchronous and Asynchronous I/O.

(b) Explain Network Operating System. List the advantages and disadvantages of it. **(9+9)**

7. (a) Explain the architecture of a Linux Operating System with proper diagram.

(b) Explain Reader-Writer problem and discuss the solution of it using semaphore.

(c) Define System Call. List any six system call and what it does. **(6+8+4)**

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