No. of Printed Pages : 05

Following Paper ID and Roll No. to be filled in your Answer Book.

PAPER ID : 33216   Roll No. [ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]

B. Tech. Examination 2021-22

(Even Semester)

OPERATING SYSTEM

Time : Three Hours]   **[Maximum Marks : 60**

Note :– Attempt all questions.

SECTION – A

1. Attempt all parts of the following : $8 \times 1 = 8$

   (a) Define context switching.

   (b) What is the relationship between multi-programming and throughput of a system?

   (c) Define the term critical section.

   (d) What are the necessary conditions for deadlock?

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(e) Which component is responsible for mapping vertual address to physical address?

(f) Define the terms frames and pages.

(g) Give a difference of sequential and direct method of file access.

(h) Give one advantage of linked file allocation method.

SECTION – B

2. Attempt any two parts of the following : 2×6=12

(a) Four jobs to be executed on a single processor system at time 0^+ in the order A, B, C, D. Their burst CPU time requirements are 4, 1, 8, 1 time units respectively. What will be the completion time of "A" under Round Robin scheduling with time slice of one unit?

(b) Define the critical section problem. How critical section problem can be handled by using semaphore?

(c) What is address bending during processing of a user program? Describe different types of address binding.

(d) Suppose that a disk drive has 5,000 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 bending request, in FIFO order is : 86, 1470, 913, 1774, 948, 1509, 1022, 1750 ,130. Starting from the current head position. What is total distance that the disk aim to satisfy all the pending request using disk scheduling algorithm : FLFS and SCAN.

SECTION – C

Note :– Attempt all questions from this section.

$$10 \times 4 = 40$$

3. Attempt any two parts of the following :

(a) Define process. What are the different states of a process, through process state diagram describe state transition?

(b) What is a Process Control Block (PCB). Describe different information contained by PCB and use of those informations.

(c) List and explain the services of an operating system.

4. Attempt any two parts of the following :

(a) The operating system contain 3 resources. The number of instance of each resource type are 7, 7, 10. The current resource allocation state is shown below :

Process	Allocation			Maximum Need		
	R_1	R_2	R_3	R_1	R_2	R_3
P_1	2	2	3	3	6	8
P_2	2	0	3	4	3	3
P_3	1	2	4	3	4	4

Is the current allocation in a safe state? Can the request made by process P_2 (1, 1, 0) be granted?

(b) Explain the resource allocation graph. How resource allocation graph is useful in deadlock problem?

(c) Explain the producer consumer problem of synchronization.

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5. Attempt any two parts of the following :

(a) Explain concept of swapping. Why is it required?

(b) Describe the following memory allocation scheme :

    (i) First fit

    (ii) Best fit

    (iii) Worst fit

(c) Give the advantages and disadvantages of paging system.

6. Attempt any two parts of the following :

(a) Describe any two of the file accessing method.

(b) Describe any one of the disk free space management scheme.

(c) Define the following :

    (i) Seek time

    (ii) Access time

    (iii) Rotation intcacy

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