



DEPARTMENT OF COMPUTER APPLICATIONS

National Institute of Technology Trichy

CYCLE TEST – II- QUESTION PAPER

Programme Name & Branch: **MCA-Computer Applications**

Course Name & Code: **Operating Systems & CA714**

Exam Duration: **60 Mins** Date & Time: **11-06-2021 & 11.30– 01.30 PM** Maximum Marks: **25**

ANSWER ALL QUESTIONS

PART – A (5 X 5 = 25 Marks)

S.No.

Question

1.

An operating system uses the Banker's algorithm for deadlock avoidance when managing the allocation of four resource types P, Q, R and S to five processes P_0 , P_1 , P_2 , P_3 and P_4 . The table given below presents the current system state. Here, the Allocation matrix shows the current number of resources of each type allocated to each process and the Max matrix shows the maximum number of resources of each type required by each process during its execution. [5]

	Allocation				Max			
	P	Q	R	S	P	Q	R	S
P_0	0	0	1	2	0	0	1	2
P_1	1	0	0	0	1	7	5	0
P_2	1	3	5	4	2	3	5	6
P_3	0	6	3	2	0	6	5	2
P_4	0	0	1	4	0	6	5	6

There are 1 unit of type P, 5 units of type Q, 2 units of type R and zero units of type S still available. Considering the above scenario, answer the following Questions

(a) Content of the matrix needed.

(b) Is the system is in safe state? If so, provide the sequence.

(c) Can request for P_1 arrives for (0, 4, 2, and 0) be granted immediately?

P.T.O.

2	<p>(i) Consider a paging system with the page table stored in memory.</p> <p>(a) If a memory reference takes 600 nanoseconds, how long does a paged memory reference take?</p> <p>(b) If we add associative registers, and 85 percent of all page-table references are found in the associative registers, what is the effective memory reference time? (Assume that finding a page-table entry in the associative registers takes zero time, if the entry is there). [2]</p> <p>(ii) Suppose x86 system uses two level hierarchical paging system. The size of the secondary memory is 4GB and page size is 4KB. Calculate the number of bits for inner page and outer page if both are equal. [3]</p>															
3.	<p>Consider a program consists of five partitions: $S_0 = 600$, $S_1 = 14$ KB, $S_2 = 100$ KB, $S_3 = 580$ KB, and $S_4 = 96$ KB. Assume at that time, the available free space partitions of memory are 1200–1805, 50 – 160, 220–234, and 2500–3180. [5]</p> <p>Find the following:</p> <p>a. Draw the partition scheme (i) Fixed size partition (ii) Variable size partition using First-fit, Worst-fit and Best fit.</p> <p>b. Calculate the external fragmentation and the internal fragmentation.</p>															
4.	<p>Suppose that a newly-created process has 3 page frames allocated to it, and then generates the page references indicated below 1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6. Compare the percentage of hit ratio and page fault ratio for LRU, FIFO and Optimal page replacement algorithm. [5]</p>															
5.	<p>On a system using simple segmentation, compute the physical address for each of the logical addresses, given the following segment table. If the address generates a segment fault, indicate so. [5]</p> <table><tr><th>Segment</th><th>Base</th><th>Length</th></tr><tr><td>0</td><td>330</td><td>124</td></tr><tr><td>1</td><td>876</td><td>211</td></tr><tr><td>2</td><td>111</td><td>99</td></tr><tr><td>3</td><td>498</td><td>302</td></tr></table> <p>(a) 0, 99 (b) 2, 78 (c) 1, 265 (d) 3, 222 (e) 0, 111</p>	Segment	Base	Length	0	330	124	1	876	211	2	111	99	3	498	302
Segment	Base	Length														
0	330	124														
1	876	211														
2	111	99														
3	498	302														

