



NATIONAL INSTITUTE OF TECHNOLOGY TIRUCHIRAPPALLI
CYCLE TEST - II

DEPARTMENT : CSE
DATE & TIME OF EXAM : 22nd April 2021/ 10:00 AM-11:00 AM
SUB CODE : CSPC43 DURATION: 1 hour
FACULTY NAME : Dr. S. Jaya Nirmala

Answer all the questions

Max. Marks: 25

1. For the following set of processes check if the system is in the safe state. Suppose, a request from process P1 for (2 0 0 1) comes. Can the request be granted? Why or why not? [4]

| Process | Allocation | | | | Maximum | | | | Available | | | |
|---------|------------|---|---|---|---------|---|---|---|-----------|---|---|---|
| | A | B | C | D | A | B | C | D | A | B | C | D |
| P1 | 1 | 0 | 2 | 0 | 3 | 2 | 4 | 2 | 3 | 4 | 0 | 1 |
| P2 | 0 | 3 | 1 | 2 | 3 | 5 | 1 | 2 | | | | |
| P3 | 2 | 4 | 5 | 1 | 2 | 7 | 7 | 5 | | | | |
| P4 | 3 | 0 | 0 | 6 | 5 | 5 | 0 | 8 | | | | |
| P5 | 4 | 2 | 1 | 3 | 6 | 2 | 1 | 4 | | | | |

2. What is the need for paging the page tables? Explain its pros and cons. [3]
3. Suppose that the size of the page is a number that is a power of 2 and it is just greater than your *<last digit of your roll no.>* KB. What will be the page number and the page offset for the following logical addresses (given in hexadecimal)? Explain your answer. [3]
- i. 5263
ii. 256983
4. Write short notes on CoW page technique. [3]
5. Assume that we have a demand-paged memory. The page table is held in registers. It takes 15 milliseconds to service a page fault if an empty frame is available or if the replaced page is not modified and 25 milliseconds if the replaced page is modified. Memory-access time is 50 nanoseconds. Assume that the page to be replaced is modified 75% percent of the time. What is the maximum acceptable page-fault rate for an effective access time of no more than 200 nanoseconds? [3]
6. Consider the following system implementing **Paging**. A process can be executed only if all of its pages are brought into the memory. Find the AWT and ATT of the system with the following tasks. Assume that the available memory for the processes is 1000 KB, and the page size is 200KB. Draw snapshots of memory at various times. [5]

| Process-id | Arrival | Burst | Size(KB) |
|------------|---------|-------|----------|
| J1 | 0 | 20 | 500 |
| J2 | 0 | 30 | 300 |
| J3 | 10 | 20 | 400 |
| J4 | 20 | 10 | 700 |

7. Use the second-chance page replacement algorithm for the following memory reference string, and calculate the number of page faults. The reference string is the concatenation of the following: [4]

<sum of the nine digits of your roll no> <reversal of your roll no.> <roll no. >

Suppose the roll no. is 106119167, the memory ref. string is 3,2,7,6,1,9,1,1,6,0,1,1,0,6,1,1,9,1,6,7