NATIONAL INSTITUTE OF TECHNOLOGY TIRUCHIRAPPALLI
CYCLE TEST – 2: JAN. 2023 SESSION

DEPARTMENT	: CSE
DATE & TIME OF EXAM	: 12th April 2023/ 9:30 -10:30 PM
SUB CODE/ NAME	: CSPC43 / Operating Systems
DURATION	:1 hour

The course outcomes-2 and 3 of the course is tested in this assessment.

Answer all the questions

1. Why do you go for paging the page table? Give a simple example and explain. (3)

2. A machine has a 32-bit address space and a 16-KB page. The page table is entirely in hardware, with one 32-bit word per entry. When a process starts, the page table is copied to the hardware from memory, at one word every 100 nsec. If each process runs for 100 msec (including the time to load the page table), what fraction of the CPU time is devoted to loading the page tables? (3)

3. A computer has four-page frames. The time of loading, time of last access, and the R and M bits for each page are as shown below (the times are in clock ticks): (3)

Page	Loaded	Last ref.	R	M
0	126	280	1	0
1	230	265	0	1
2	140	270	0	0
3	110	285	1	1

(a) Which page will FIFO replace?
(b) Which page will LRU replace?
(c) Which page will modified second chance replace?
Explain your answer

4. What is an open-file table? Why is it needed? (2)

5. Explain briefly the logical address fields of the IA-32 architecture. (3)

6. What is a Stub? (2)

7. Illustrate with an example, why sharing of pages is not possible when the OS uses an inverted page table. (2)

8. Consider a page reference string for a process with a working set of M frames, initially all empty. The page reference string is of length P with N distinct page numbers in it. For any page replacement algorithm, what is a lower bound on the number of page faults? Explain your answer. (2)