End Term Assessment– May 2021
Semester –IV
(B.Tech. - Common for 2017, 2018, 2019 batches)

Subject Code: CS 2006 **Subject Name: Operating Systems**
Duration: 2 hours (including time for uploading)
(10 Minutes Max Grace time) **Max. Marks: 50**

Instructions

- **Write name and registration number, page number, on all the pages, convert into one PDF, tag it with your registration number_Name_subjectcode_subject title**

- **The Assessment consists of 2 sections**
  - **Part A contains 10questions of 2marks each and all questions are compulsory.**
  - **Part B consists of 4 questions of 10 marks each, out of which 3 questions to be attempted.**
- **Hand written responses to be submitted/uploaded as scanned pages of answer sheets (max. 5 pages) within the mentioned duration. 6th page and onwards won't be evaluated**

PART – A
2 * 10 =20 Marks (Each answer- Word Limit- 50 Words)

PART A:(10*2)

1. How does I/O module helped in implementing multi-programming?
2. What do you call the set of commands through which user applications request resources from OS? Give one example and its usage?
3. Why the process does not move from waiting state to running state in process state diagram?
4. An OS is using certain process scheduling algorithm, but one of the process is not getting chance to execute due to the way this scheduling algorithm works. Can any algorithm rectify this problem and how?
5. Steps for safety algorithm, used in Banker's algorithm for deadlock avoidance, are given below. Explain what is happening in step number 2?

   1. Let ***Work*** and ***Finish*** be vectors of length *m* and *n*, respectively.
      Initialize:
      Work* = *Available
      ***Finish* [*i*] = *false* for *i* = 0, 1, …, *n*- 1**
   2. Find an ***i*** such that both:
      (a) ***Finish* [*i*] = *false***
      (b) $Need_i \leq Work$
      If no such ***i*** exists, go to step 4
   3. $Work = Work + Allocation_i$
      $Finish[i] = true$
      go to step 2
   4. If ***Finish* [*i*] == *true*** for all ***i***, then the system is in a safe state
6. What do you understand by "race condition" among dependent processes?

7. Why, practically, optimal page replacement algorithm cannot be implemented in an Operating System?
8. A virtual memory of size 1 MB contains 256 pages. How many frames will be there in such a system if the size of physical memory is 512 KB?
9. What is the difference between "seek time" and "rotational delay" in disk scheduling?
10. What is the benefit of using double buffer system for managing the I/O requests?

PART – B

10 * 3 = 30 Mark (Each answer- Word limit- 250 words)

11. Prepare Gantt chart and find the average turnaround time using round-robin scheduling, with time quantum 3 seconds (sec), on the tabular data given below, for a multiprogramming system. (10)

Process	CPU Burst Time(sec)	Arrival Time(sec)
P0	13	0
P1	4	2
P2	7	6
P3	9	8
P4	11	12
P5	3	47

12. Explain the SSTF disk scheduling scheme and use it to find the average distance in terms of number of tracks traversed for the following sequence of tracks accessed: 275, 265, 233, 230, 214, 213, 193, 325, 335, 359
13. Draw and explain the steps involved in handling a page fault.
14. The table below contains details of the instances of three resource types A, B, and C to be used by processes <P0 , P1 , P2 , P3 , P4 > using the banker's law for deadlock avoidance. Use the data of various matrices to answer the following questions.

Processes	Allocation			Maximum Demand			Available		
	A	B	C	A	B	C	A	B	C
P0	1	3	0	8	7	3	2	3	4
P1	1	0	2	2	2	4			
P2	1	2	2	7	2	2			
P3	2	1	2	2	2	7			
P4	1	1	3	5	4	4			

- How to calculate the "need matrix" using banker's algorithm? Write the content of need matrix for all the processes given above. (2)
- In what sequence these processes should be allocated the resources so that the system never goes into unsafe state. Show your calculations to support your answer. (4)
- Write the steps for request-resource algorithm used in banker's algorithm (4)