Seat No: _____ Enrollment No: _____

PARUL UNIVERSITY

FACULTY OF ENGINEERING & TECHNOLOGY

B.Tech/Int. Btech Summer 2022 - 23 Examination

Semester: 4/8 **Date: 20/03/2023**
Subject Code: 203105213 **Time: 02:00 pm to 04:30 pm**
Subject Name: Operating System **Total Marks: 60**

Instructions:
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 Objective Type Questions - (Each of one mark) **(15)**

1. In Operating Systems, which of the following is/are CPU scheduling algorithms?
   a) Priority b) Round Robin c) Shortest Job First d) All of the mentioned
2. To access the services of the operating system, the interface is provided by the _____
   a) Library b) System calls c) Assembly instructions d) API
3. Which of the following condition is required for a deadlock to be possible?
   a) mutual exclusion
   b) a process may hold allocated resources while awaiting assignment of other resources
   c) no resource can be forcibly removed from a process holding it
   d) all of the mentioned
4. Out of these page replacement algorithms, which one suffers from Belady's anomaly?
   a) LRU b) FIFO c) Both LRU and FIFO d) Optimal Page Replacement
5. Concurrent access to shared data may result in _____
   a) data consistency b) data insecurity
   c) data inconsistency d) none of the mentioned
6. Physical memory is broken into fixed-sized blocks called _____
   a) frames b) pages c) backing store d) none of the mentioned
7. A system is in the safe state if _____
   a) the system can allocate resources to each process in some order and still avoid a deadlock
   b) there exist a safe sequence
   c) all of the mentioned
   d) none of the mentioned
8. Which of the following conditions must be satisfied to solve the critical section problem?
   a) Mutual Exclusion b) Progress c) Bounded Waiting d) All of the mentioned
9. Operating system
   a) Enables the programmer to draw a flow chart b) Links a program with subroutine it references
   c) Provides a layer, user friendly interface d) All of these
10. The code that changes the value of the semaphore is _____
    a) remainder section code b) non – critical section code
    c) critical section code d) none of the mentioned
11. Multiprocessor is used because
    a) Distributed capability b) They increase reliability
    c) It saves money compared to multiple single systems d) All of these
12. Which one of the following is the deadlock avoidance algorithm?
    a) banker's algorithm b) round-robin algorithm c) elevator algorithm d) karn's algorithm
13. The Virtual memory is:
    a) An illusion of a large main memory b) A large main memory
    c) A large secondary memory d) None of the above
14. Semaphore is a/an _____ to solve the critical section problem.
    a) hardware for a system b) special program for a system
    c) integer variable d) none of the mentioned
15. A critical section is a program segment
    a) Which must be enclosed by a pair of semaphore operations, P and V
    b) Where shared resources are accessed
    c) Which avoids deadlocks
    d) Which should run in a certain specified amount of time

Q.2 Answer the following questions. (Attempt any three) **(15)**

A) What are the differences between multiprocessing and multiprogramming OS?

B) Explain physical structure of hard disk with neat and clean diagram.

C) What are the different disk space allocation methods?

D) Consider the string: 1, 3, 2, 4, 2, 1, 5, 1, 3, 2, 6, 7, 5, 4, 3, 2, 4, 2, 3, 1, 4 Find the page faults for 3 frames using FIFO and LRU page replacement algorithms.

Q.3 A) Consider the following table of arrival time and burst time for five processes P1, P2, P3, P4 and P5. **(07)**
Apply Preemptive Shortest Job First CPU Scheduling Algorithm on given data.
calculate average waiting time and turn around time:

Process	Burst Time	Arrival Time
P1	6 ms	2 ms
P2	2 ms	5 ms
P3	8 ms	1 ms
P4	3 ms	0 ms
P5	4 ms	4 ms

B) Draw the process state transition diagram and explain the transitions of following state. **(08)**
i) running to ready ii) waiting to ready iii) running to waiting
iv) blocked to ready v) running to terminated

OR

B) Consider a system with Five Processes P0 through P4 and three resources A, B and C. Resource type A, B and C. Suppose at time T0 the following snapshot of the system has been taken. **(08)**
A) Find need matrix.
B) Also find whether the system is in safe state or not?
C) If system is in safe state then find out the safe sequence.
D) Find out the total amount of resources.

Processes	Allocation A B C	Max A B C	Available A B C
P0	1 1 2	4 3 3	2 1 0
P1	2 1 2	3 2 2	
P2	4 0 1	9 0 2	
P3	0 2 0	7 5 3	
P4	1 1 2	1 1 2	

Q.4 A) Explain IPC problem-Dinning Philosopher's problem with Algorithm. **(07)**

OR

A) Write Difference Between Paging and Segmentation in OS. **(07)**

B) I) Suppose Disk drive has 200 cylinders (0-199). The current position of head is 50. The queue of pending request is 176, 79, 34, 60, 11, 41, 114.The Head pointer is at 50. Calculate head movement for the SCAN (Elevator) Disk Scheduling Algorithm. (Direction = left from current Head pointer). **(08)**

II) Write advantages and Disadvantages of SCAN algorithm.