JIS UNIVERSITY

Roll Number | | | | | | | | | | | | |

JIS University

End Semester Examinations - Odd 2023

YCS5001 - Operating Systems

Time: 2 Hrs **Maximum Marks: 50**

Instructions to the candidate:

Figures to the right indicate full marks.
Draw neat sketches and diagram wherever is necessary.
Candidates are required to give their answers in their own words as far as practicable

Part A
Answer any Ten (10x1=10 Marks)

1. What is the primary aim of process scheduling? (1) CO1 BL1
a) To keep the CPU idle
b) To maximize response time for all programs
c) To keep the CPU busy and minimize response time
d) To minimize throughput

2. Which process state indicates that the process is executing on the CPU? (1) CO3 BL1
a) Start
b) Running
c) Ready
d) Terminated

3. Which of the following scheduling criteria represents the amount of time taken to execute a process? (1) CO2 BL1
a) CPU utilization
b) Turnaround time
c) Waiting time
d) Throughput

4. Which scheduling criterion represents the total number of processes completed per unit time? (1) CO2 BL1
a) Throughput
b) Turnaround time
c) Waiting time
d) Response time

5. Which type of scheduling is responsible for deciding which program must enter the job queue? (1) CO2 BL1
a) Short-term scheduling
b) Long-term scheduling
c) Medium-term scheduling
d) Priority-based scheduling

6. What is the primary goal of CPU scheduling? (1) CO2 BL1

a) To minimize CPU utilization
b) To ensure fair process execution
c) To make the system efficient, fast, and fair
d) To maximize turnaround time

7. What is the purpose of a Process Control Block (PCB)? (1) CO2 BL1
a) To manage device queues
b) To store CPU registers
c) To track memory usage
d) To maintain process information

8. What is the main function of the Short Term Scheduler? (1) CO2 BL1
a) To assign CPU time to processes
b) To load processes into memory
c) To maintain a good degree of multiprogramming
d) To allocate resources to processes

9. What is the term for a process that runs in the background to handle specific tasks? (1) CO2 BL1
a) Foreground process
b) Daemon process
c) System process
d) Priority process

10. Which of the following is NOT one of the necessary conditions for a deadlock to occur? (1) CO4 BL2
a) Mutual Exclusion
b) Hold and Wait
c) No Preemption
d) Equal Resource Allocation

11. What is a process hierarchy in UNIX called? (1) CO2 BL1
a) Process tree
b) Process group
c) Job queue
d) Thread hierarchy

12. Which of the following is NOT a method for handling deadlocks? (1) CO4 BL2
a) Deadlock Avoidance
b) Deadlock Detection and Recovery
c) Deadlock Ignorance
d) Deadlock Prevention

Part B
Answer any Two (2x5=10 Marks)

13. Define Paging and its purpose in memory management. (5) CO4 BL1

14. Contrast segmentation with paging in memory organization. (5) CO4 BL3

15	Using the Banker's Algorithm, analyze a system with three resource types and five processes to determine if it's in a safe state and find a safe sequence if applicable.	(5)	CO5	BL3
16.	Differentiate between long-term, short-term, and medium-term schedulers and explain their responsibilities.	(5)	CO2	BL1

Part C

Answer any Three (3x10=30 Marks)

17.	Describe in detail the working of the LRU page replacement algorithm with an example. Utilize a sequence of page references and a given number of page frames to demonstrate the step-by-step process of page replacement using the LRU algorithm.	(10)	CO4	BL3
18.	Compare the turnaround time between RR and FCFS for processes with burst times 7, 4, 2, and 5 units arriving in the order P1, P2, P3, P4 respectively. Use time quantum = 3 for RR and evaluate both scheduling methods.	(10)	CO2	BL3
19.	Compute the average turnaround time for a set of processes scheduled using the SRTF algorithm with burst times 3, 6, 1, and 4 units arriving in the order P1, P2, P3, P4 respectively.	(10)	CO2	BL3
20.	Consider a system with 5 frames and the following reference string: 1, 2, 3, 4, 1, 2, 5, 1, 2, 3, 4, 5. Apply the FCFS page replacement algorithm and calculate the total number of page faults.	(10)	CO2	BL3
21.	Given a sequence of page references: 4, 3, 2, 1, 4, 3, 5, 4, 3, 2, 1, 5. With 4-page frames, demonstrate the sequence of page faults and replacement steps using the FCFS page replacement algorithm.	(10)	CO4	BL3