PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING
<u>**END TERM EXAMINATION - JAN 2023**</u>

Semester : Semester V - 2020   **Date :** 9-JAN-2023
Course Code : CSE2010   **Time :** 9.30AM - 12.30PM
Course Name : Sem V - CSE2010 - Operating Systems   **Max Marks :** 100
Program : B.Tech. - CSE / CAI / COM   **Weightage :** 50%

Instructions:
(i) Read all questions carefully and answer accordingly.
(ii) Question paper consists of 3 parts.
(iii) Scientific and non-programmable calculator are permitted.

PART A

ANSWER ALL THE TEN QUESTIONS   **10 X 2 = 20M**

1. What is Operating system?

(CO1) [Knowledge]

2. Mention any four different Operating Systems?

(CO1) [Knowledge]

3. Define cascading termination ?

(CO2) [Knowledge]

4. Give any two senarios where the context switching occur?

(CO2) [Knowledge]

5. Write the solution to the critical section problem using Mutex locks.?

(CO3) [Knowledge]

6. What is rollback in deadlock recovery?

(CO3) [Knowledge]

7. What is semaphore? List out the types.

(CO3) [Knowledge]

8. What is page number(p) and page offset(d) in logical address?

(CO4) [Knowledge]

9. Define Deadlock.

(CO4) [Knowledge]

10. Compare contiguous allocation with non-contiguous allocation

(CO4) [Knowledge]

PART B

ANSWER ALL THE FIVE QUESTIONS   **5 X 10 = 50M**

11. Analyse the various generation of computers.

(CO1) [Comprehension]

12. Elaborate the actions taken by the kernel to context-switch between processes. Draw a neat diagram which depicts context switching.

(CO2) [Comprehension]

13. Consider the following snapshot of a system:
Allocation Max Available

	ABCD	ABCD	ABCD
P0	0012	0012	1520
P1	1000	1750	
P2	1354	2356	
P3	0632	0652	
P4	0014	0656	

Answer the following questions using the banker's algorithm:
a. What is the content of the matrix Need?
b. Is the system in a safe state?
c. If a request from process P1 arrives for (0,4,2,0), can the request be granted immediately?

(CO3) [Comprehension]

14. Consider the following set of processes with the length of the CPU burst time given in milliseconds.

Process	Burst Time	Priority	Arrival Time
P0	15	4	0.0
P1	40	2	2.0
P2	10	5	3.0
P3	12	1	5.0
P4	8	3	8.0

The processes are assumed to have arrived in the order P0, P1, P2, P3, and P4.

a. Draw a Gantt charts illustrating the execution of these processes using FCFS, Shortest Job Remaining First (SJRF), Non-preemptive Priority (a smaller number implies a higher priority) and Round Robin (Quantum=5ms) scheduling algorithms.
b. Calculate the Throughput, Average Waiting time and Average Turn around time of each process for each of the scheduling algorithms using Gantt chart and mention which scheduling algorithm has least Average Waiting time.

(CO4) [Comprehension]

15. Compare and contrast the user level threads with kernel level threads and elaborate the various types of multi threading models with neat sketches.

(CO2) [Comprehension]

ANSWER ALL THE TWO QUESTIONS   **2 X 15 = 30M**

16. Consider the following snapshot of the system:

P0 – P4 are 5 processes present and A, B, C, D are the resources. The maximum need of a process and the allocated resources details are given in table.

	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P0	0	0	1	2	0	0	1	2	1	5	2	0
P1	1	0	0	0	1	7	5	0				
P2	1	3	5	4	2	3	5	6				
P3	0	6	3	2	0	6	5	2				
P4	0	0	1	4	0	6	5	6				

Answer the following based on Banker's algorithm,

   a. What is the content of NEED matrix?
   b. Is the system in safe state?
   c. Which Processes may cause deadlock if the system is not in safe state?

                                                                        (CO3) [Application]

17. 7 0 1 2 0 3 0 4 2 3 0 3 0 3 2 1 2 0
     Assuming 3 frames, find out the number of page faults for the following:

   a. FIFO   [5M]
   b. Optimal   [5M]
   c. LRU   [5M]

                                                                        (CO4) [Application]

*****