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## School of Computing Science and Engineering

Bachelor of Technology in Computer Science and Engineering

Semester End Examination - Jun 2024

Duration : 180 Minutes

Max Marks : 100

**Sem IV - R1UC403B - E2UC401B - BTCS2400**

**Operating System**

General Instructions

*Answer to the specific question asked*

*Draw neat, labelled diagrams wherever necessary*

*Approved data hand books are allowed subject to verification by the Invigilator*

- 1) Define Operating system K1 (2)
- 2) Compare contiguous allocation with linked allocation method K2 (4)
- 3) Distinguish among following operating systems: (i) Multiprogramming systems ii) Multitasking Systems iii) Multiprocessor systems K2 (6)
  
- 4) Consider a system with 5 processes (P1, P2, P3, P4, P5) and 3 resource types (A, B, C). The initial allocation and maximum needs are as follows: K3 (9)

Allocation:

	A	B	C
P1	2	1	0
P2	3	0	2
P3	2	1	1
P4	0	0	2
P5	0	1	4

Maximum Need:

	A	B	C
P1	3	2	2
P2	4	1	4
P3	4	2	2
P4	1	1	4
P5	2	1	5

Available resources: (3, 1, 2)

Using the Banker's algorithm and a resource allocation graph, determine whether the system is in a safe state and the sequence of processes to be executed to avoid deadlock.

- 5) Given memory partitions of 500 KB, 100 KB, 300 KB, 200 KB and 600 KB in order, how would each of the first-fit, best-fit, and worst-fit algorithms place processes of size 418 KB, 202 KB, 506 KB, 112 KB, and 95 KB (in order)? Which the algorithms make the most efficient use of memory? K3 (9)
- 6) Explain the concept of address translation in virtual memory systems using page tables. K5 (10)
- 7) Discuss various types of CPU schedulers in details. K4 (12)
- 8) Explain various Preemptive and non Preemptive cpu scheduling algorithms with a suitable example. K5 (15)
- 9) Consider the following set of processes with the length of the CPU-burst time in given milliseconds: K5 (15)

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

Draw four Gantt charts illustrating the execution of these processes using SJF, SRTF and RR (Time quantum=2) scheduling. Also calculate waiting time and turnaround time for each scheduling algorithms.

- 10) Consider that a disk drive has 5,000 cylinders, numbered 0 to 4,999. The drive is currently serving request at cylinder 143, and the previous request was at cylinder 125. The queue of pending requests, in FIFO order, is: 86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130 Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all pending requests for each of the following disk scheduling algorithms? (1)FCFS (2)SSTF (3) SCAN (4)C-SCAN (5)LOOK (6)C-LOOK. K6 (18)