Hall Ticket No.: | | | | | | | | | | |

Set-1

Course Code: **23MCA1T03**

MALINENI LAKSHMAIAH WOMEN'S ENGINEERING COLLEGE

(AUTONOMOUS)

I-MCA I-Semester (MR23) Regular Examinations, March - 2024

Computer Organization & Operating Systems

Time: 3 hours Max. Marks: 70

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*Answer **ALL** the questions*

Q. No.		Question	Marks	CO	BL
1	a	Explain in detail the functions of the main hardware components of a computer system.	(7M)	CO1	L2
	b	What is a Bus in Computer system? With a neat sketch, explain the Bus system connecting the main components of a computer system.	(7M)	CO1	L2
		(OR)			
2	a	Explain about different types of addressing modes in microprocessor.	(7M)	CO1	L2
	b	Describe the basic operations of Stacks and Queues. And also explain the role of Stacks and Queues in computer system.	(7M)	CO1	L1
3	a	Show a possible control sequence for implementing the arithmetic instruction MUL R1, R2.	(7M)	CO2	L3
	b	Explain in details about micro instruction sequencing and execution.	7M)	CO2	L2
		(OR)			
4	a	Depict the sequence of register transfers involved in the execution of an instruction.	(7M)	CO2	L2
	b	With a neat sketch, demonstrate the general configuration of a micro programmed control unit.	(7M)	CO2	L2
5	a	Discuss the services provided by operating system for efficient system operation.	(7M)	CO3	L2
	b	Explain various fields of Process Control Block.	(7M)	CO3	L2
		(OR)			
6	a	Explain the various categories of system calls provided by an operating system.	(7M)	CO3	L3

	b	Consider a set of 5 processes whose arrival and burst times are given below. Process Arriva Time Burst Time P1 0 3 P2 2 6 P3 4 5 P4 6 4 P5 8 2 Draw the Grant Chart illustrating the execution of these jobs using Round Robin CPU scheduling algorithm (Assume time quantum = 1 unit) and also calculate the average waiting time and average turnaround time.	(7M)	CO3	L2

7	a	Show that, if the wait and signal operations are not executed automatically, then mutual exclusion may be violated.	(7M)	CO4	L3
	b	A system is having 3 user processes P1, P2 and P3 where P1 requires 21 units of resource R, P2 requires 31 units of resource R, P3 requires 41 units of resource R. Calculate the minimum number of units of R that ensures no deadlock.	(7M)	CO4	L2
(OR)					
8	a	State the critical section problem. Illustrate the software based solution to the Critical section problem.	(7M)	CO4	L3
	b	Discuss the necessary conditions that cause deadlock situation to occur.	(7M)	CO4	L3

9	a	Consider the following page reference string. 1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6 How many page faults would occur for the optimal page replacement algorithm, assuming 3 frames and all frames are initially empty.	(7M)	CO5	L1
	b	Explain and compare the FCFS and SSTF disk scheduling algorithm.	(7M)	CO5	L3
(OR)					
10	a	What is meant by Demand Paging? Explain the process of converting logical address to physical address using the page table.	(5M)	CO5	L4
	b	Given free memory partitions of 100K, 500K, 200K, 300K, 600K (in order), how would each of the First-fit, Best-fit and Worst-fit algorithms place processes of 212K,417K,112K and426K (in order).	(5M)	CO5	L3

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