

THE KAVERY ENGINEERING COLLEGE
(An Autonomous Institution)

MCA DEGREE END SEMESTER THEORY EXAMINATIONS, NOV /DEC 2024

Second Semester

Master of Computer Applications

BX4003 - Introduction to Computer Organization and Operating Systems

Regulations - 2021

Duration : 3 Hrs

Maximum : 100 Marks

PART - A (ANSWER ALL QUESTIONS) (Marks 10*2=20)

<i>Q.No</i>	<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
1.	Identify the basic functional units in computer systems.	RE	1	2
2.	Point out the handling of operations, operands, and addressing in MIPS instruction representation.	UN	1	2
3.	List out the key components of a basic MIPS implementation.	RE	2	2
4.	Examine the mechanisms employed by the MIPS architecture to manage data hazards, control hazards, and exceptions within a pipelined datapath.	AP	2	2
5.	Mention the role of cache memory and virtual memory in the memory hierarchy, along with methods for measuring and improving cache performance.	UN	3	2
6.	Differentiate the communication between I/O devices and the CPU, focusing on the roles of interrupts.	AN	3	2
7.	Give the main objectives and functions of an operating system, along with its evolution over time.	UN	4	2
8.	What are the support provided by system calls and Inter-Process Communication (IPC) for process management functions within an operating system.	RE	4	2
9.	List out the key scheduling criteria and common scheduling algorithms used for CPU scheduling, including approaches for multiple-processor scheduling.	RE	5	2
10.	Evaluate the role of threads and synchronization mechanisms, such as semaphores, in addressing the critical-section problem and other classical synchronization challenges.	AP	5	2

PART - B (ANSWER ALL QUESTIONS) (Marks 5*13 = 65)

<i>Q.No</i>	<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
11. a	Explain the different functional units in a computer system and describe their roles in executing basic operational concepts.	UN	1	13
Or				
b	Describe how logical operations and decision-making processes are handled within computer instructions and provide examples.	AP	1	13

12.	a	Evaluate the control implementation scheme in MIPS architecture, focusing on its role in managing instruction execution and control flow.	AN	2	13
Or					
	b	Discuss how control is implemented in a pipelined MIPS datapath and the challenges associated with managing pipeline control.	AN	2	13
13.	a	Illustrate virtual memory and how it allows efficient memory management by providing a larger addressable space than physically available, including the role of paging.	AP	3	13
Or					
	b	Evaluate the function of interrupts in managing I/O requests and analyze how they enhance system responsiveness.	AN	3	13
14.	a	Analyze the impact of developments such as time-sharing, virtual memory, and distributed computing on the design of operating systems.	AN	4	13
Or					
	b	Explain the importance of inter-process communication (IPC) and the various IPC mechanisms, such as message passing and shared memory.	AN	4	13
15.	a	Outline the concept of common CPU scheduling algorithms, including First-Come, First-Served (FCFS), Shortest Job Next (SJN), Priority Scheduling and Round Robin.	UN	5	13
Or					
	b	Evaluate the strategies for load balancing in multi-processor and multi-core environments, and analyze how these strategies impact overall system performance.	AN	5	13

*PART - C (Marks 1*15 = 15)*

<i>Q.No</i>		<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
16	a	Evaluate how a basic MIPS implementation integrates the design and construction of a datapath with a control implementation scheme to achieve efficient instruction execution through pipelining.	AN	2	15
Or					
	b	Discuss the key developments in operating system design and their impact on efficiency, multitasking and system reliability.	AP	4	15