	ii.	Discuss the design issues related to multiprocessor operating systems. What are some common challenges faced in their development?	**6**	3	3	4
OR	iii.	Describe the methods used for distributed deadlock detection. How do these methods differ from deadlock detection in centralized systems?	**6**	2	3	4

Q.6   Attempt any two:

	i.	Explain the concept of transparency in distributed file systems. What types of transparency are important, and how are they achieved?	**5**	2	2	2
	ii.	Describe the algorithms used for distributed scheduling. How do they differ from traditional scheduling algorithms?	**5**	2	8	5
	iii.	Explain the concept of task migration in distributed systems. What are its benefits and potential drawbacks?	**5**	2	2	4

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Enrollment No.....................................

Faculty of Engineering
End Sem Examination Dec 2024
CA5CO35 Modern Operating System

Programme: MCA / BCA-MCA (Integrated)   Branch/Specialisation: Computer Application

Duration: 3 Hrs.   **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

			Marks	BL	PO	CO	PSO
Q.1	i.	In a distributed system, the interaction between processes is generally facilitated by: (a) Shared memory (b) Message passing (c) File systems (d) Network interfaces	**1**	1	2	2	
	ii.	Which operating system significantly contributed to the development of contemporary UNIX-like systems? (a) MS-DOS (b) Windows NT (c) BSD (d) CP/M	**1**	1	2	3	
	iii.	Which types of information are commonly included in a Process Control Block (PCB)? (a) Just the process ID (b) Process state, program counter, CPU registers, and memory management details (c) The complete program code (d) User credentials	**1**	2	2	1	
	iv.	Which scheduling algorithm selects the process with the shortest execution time to run next? (a) Round Robin (b) First-Come, First-Served (c) Shortest Job Next (d) Priority Scheduling	**1**	1	2	1	

v. What is Interprocess communication? **1** 1 2 1
   (a) Allows processes to communicate and synchronize their actions when using the same address space
   (b) Allows processes to communicate and synchronize their actions
   (c) Allows the processes to only synchronize their actions without communication
   (d) None of these

vi. Semaphore is a/an _____ to solve the critical section problem. **1** 2 2 1
   (a) Hardware for a system
   (b) Special program for a system
   (c) Integer variable
   (d) None of these

vii. If one site fails in distributed system then _____. **1** 1 1 2
   (a) The remaining sites can continue operating
   (b) All the sites will stop working
   (c) Directly connected sites will stop working
   (d) None of these

viii. Which routing technique is used in a distributed system? **1** 2 2
   (a) Fixed routing
   (b) Virtual routing
   (c) Dynamic routing
   (d) All of these

ix. What is not a characteristic of a DFS? **1** 1 3 2
   (a) Fault tolerance
   (b) Scalability
   (c) Heterogeneity of the system
   (d) Upgradation

x. DSM stands for- **1** 2 2 2
   (a) Direct shared memory
   (b) Direct system memory
   (c) Distributed shared memory
   (d) Distributed system memory

Q.2 i. What are the goals of an operating system? Explain. **2** 1 1

ii. Discuss the difficulties involved in creating distributed operating systems. **3** 2 2

iii. Describe the different types of operating system structures. What are the pros and cons of each? **5** 2 1 1

OR iv. How does the operating system handle system calls? Explain the process in detail. **5** 1 2 5

Q.3 i. What is the difference between a process and a program? **2** 2 2 1

ii. What are threads, and how do they differ from processes? Discuss the advantages of using threads in an operating system. **8** 2 2 5

OR iii. Consider the following set of processes. **8** 3 2 5

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

Develop a Gantt-chart and calculate the average waiting time using:
(a) FCFS   (b) SJF
(c) Round Robin (q = 1)

Q.4 i. Explain the concept of process synchronization. Why is it necessary in a multi-process system? **3** 2 8 1

ii. Define the terms mutex and monitor. How do they differ from one another in terms of application, functionality and use cases? **7** 4 2 1

OR iii. What do you mean by Semaphore? Explain its uses and its implementation. **7** 2 2 1

Q.5 i. Discuss the common failures in distributed systems. **4** 3 2 2

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Marking Scheme

CA5CO35 (T) Modern Operating System (T)

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Q.1	i)	**B) Message passing**	1
	ii)	**C) BSD**	1
	iii)	**B) Process state, program counter, CPU registers, and memory management details**	1
	iv)	**C) Shortest Job Next**	1
	v)	**B) allows processes to communicate and synchronize their actions**	1
	vi)	**C) integer variable**	1
	vii)	**A) the remaining sites can continue operating**	1
	viii)	**D) All of the mentioned**	1
	ix)	**D) Upgradation**	1
	x)	**C) Distributed shared memory**	1

Q.2	i.	Two Goals of an Operating System.	**2 Marks**	2
	ii.	Identification of Key Difficulties in creating distributed operating systems.	**3 Marks**	3
	iii.	Types of operating system structures.	**2 Marks**	5
		pros and cons of Each Operating System.	**3 Marks**	
OR	iv.	Define System Calls .	**1 Mark**	5
		Exaplin operating system handle system calls.	**2 Marks**	
		Explain the process in detail.	**2 Marks**	

Q.3	i.	Key Differences Identified between a process and a program.	**2 Marks**	2
			2 Marks	
	ii.	Threads Definition	**2 Marks**	8
		Write the Diffrent with processes .	**3 Marks**	
		Advantages of using threads in an operating system.	3 **Marks**	

OR	iii.	calculate the average waiting time using:		8
		i) FCFS	**2 Marks**	
		ii) SJF	**3 Marks**	
		iii) Round Robin (q = 1)	**3 Marks**	

Q.4	i.	Define Process synchronization.	**1 Mark**	3
		Write necessary in a multi-process system.	**2 Marks**	
	ii.	Define the terms mutex and monitor.	**3 Marks**	7
		How do they differ from one another in terms of application, functionality and use cases?	**4 Marks**	
OR	iii.	Defination of Semaphore.	**3 Marks**	7
		Uses of Semaphore	**2 Marks**	
		Implementation of Semaphore.	**2 Marks**	

Q.5	i.	Discuss the common failures in distributed systems.	**4 Marks**	4
	ii.	Design issues related to multiprocessor operating systems.		6
			2 Marks	
		challenges faced in their development.	**3 Mark**	
OR	iii.	Methods used for distributed deadlock detection.	**3 Marks**	6
		How do these methods differ from deadlock detection in centralized systems?	**3 Marks**	

Q.6		Attempt any two:		
	i.	Explain the concept of transparency in distributed file systems.		5
			2 Marks	
		What types of transparency are important, and how are they achieved?	**3 Marks**	
	ii.	Describe the algorithms used for distributed scheduling.		5
			2 Marks	
		How do they differ from traditional scheduling algorithms?	**3 Marks**	
	iii.	Explain the concept of task migration in distributed systems.		5
			2 Marks	
		What are its benefits and potential drawbacks?	**3 Marks**	

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