Basavarajeswari Group of Institutions

2024 SCHEME

BALLARI INSTITUTE OF TECHNOLOGY & MANAGEMENT

(Autonomous Institute under Visvesvaraya Technological University, Belagavi)

USN | | | | | | | | | | |

Course Code | M | M | C | 1 | 0 | 4 |

First Semester MCA Degree Examinations, April 2025

OPERATING SYSTEM

Duration: 3 hrs **Max. Marks: 100**

Note: ***1. Answer any* FIVE *full questions, choosing* ONE *full question from each module.***
2. Missing data, if any, may be suitably assumed

Q. No		*Question*	*Marks*	*(RBTL:CO: PI)*
		MODULE – 1		
1.	**a.**	What is an operating system? Explain briefly about computer system organization.	**10**	**(2:1:1.2.1)**
	b.	List and explain the services provided by OS for the user and efficient operation of system**.**	**10**	**(2:1:1.2.1)**
		(OR)		
2.	**a.**	Explain with a neat diagram of layered and microkernel structures of an operating system.	**10**	**(2:1:2.2.1)**
	b.	What are virtual machines? Explain in detail about the implementation, benefits and one example of virtual machines.	**10**	**(2:1: 1.2.1)**
		MODULE – 2		
3.	**a.**	Explain the concept of threads and thread scheduling.	**10**	**(2:2:3.2.1)**
	b.	Consider the following set of processes with given length of CPU Burst. Draw the Gantt chart for FCFS and Priority scheduling. Find the average waiting time and average turnaround time for each scheduling algorithm.	**10**	**(2:2: 2.2.1)**

Process	**P1**	**P2**	**P3**	**P4**	**P5**
Burst Time(ms)	**8**	**2**	**2**	**3**	**5**
Priority	**4**	**1**	**3**	**5**	**2**

Note: Consider least value as highest priority.

		(OR)			
4.	**a.**	Explain the concept of synchronization using producer- consumer problem.	**10**	**(2:2: 1.2.1)**
	b	Write short note on: (i) Inter-process communication (ii) Scheduling criteria	**10**	**(2:2: 2.2.1)**
		MODULE – 3		
5.	**a.**	What is a deadlock? With a neat diagram, explain resource allocation graph.	**10**	**(2:3: 1.2.1)**
	b.	Explain Banker's algorithm with example.	**10**	**(2:3: 1.2.1)**
		(OR)		
6.	**a.**	Illustrate and explain the concept of deadlock prevention with example.	**10**	**(2:3: 3.2.1)**
	b.	Write short note on: (i) Resource-Request algorithm (ii) Deadlock recovery.	**10**	**(2:3: 1.2.1)**

Note: (**RBTL - Revised Bloom's Taxonomy Level: CO - Course Outcome: PI - Performance Indicator)**

MODULE – 4

7.	**a.**	Explain basic hardware structure of memory management with necessary diagrams.	**10**	**(2:4: 1.2.1)**
	b.	Explain contiguous memory allocation along with different types of fragmentation.	**10**	**(2:4: 3.2.1)**

(OR)

8.	**a.**	Explain the different techniques for structuring page table with diagram.	**10**	**(2:4: 2.2.1)**
	b.	Explain the concept of Page replacement with diagram.	**10**	**(2:4: 1.2.1)**

MODULE – 5

9.	**a.**	Explain the systematic view of virtual file system with diagram.	**10**	**(2:5: 3.2.1)**
	b.	Can you describe the different types of allocation methods in file system?	**10**	**(2:5: 1.2.1)**

(OR)

10.	**a.**	Mention and describe free space management in file system.	**10**	**(2:5: 2.2.1)**
	b.	**Case study** XYZ Tech, a mid-sized software company, is facing several challenges in managing its UNIX-based file system. Employees save files in unorganized locations, leading to difficulty in retrieval and duplication of files. Additionally, unauthorized users sometimes access or modify critical project files, causing security concerns. The company also lacks a proper backup system, resulting in data loss due to accidental deletions. As an IT administrator, how would you address these issues using UNIX file system management techniques?	**10**	**(2:5: 3.2.1)**

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Note: (**RBTL - Revised Bloom's Taxonomy Level: CO - Course Outcome: PI - Performance Indicator)**