

BALLARI INSTITUTE OF TECHNOLOGY & MANAGEMENT

(Autonomous Institute under Visvesvaraya Technological University, Belagavi)

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Course Code

22CS/AI/CA/CD/33

Third Semester B.E. Degree Examinations, January 2025

OPERATING SYSTEM

(Common to CSE, AIML, CSE- AI, CSE- DS)

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

<u>Q. No</u>	<u>Question</u>	<u>Marks</u>	<u>(RBTL:CO:PI)</u>
<u>Module-1</u>			
1.	a. Demonstrate the layered approach of OS with a neat diagram.	07	(2 :1: 1.7.1)
	b. Demonstrate the dual mode operation in OS with neat block diagram.	07	(2 :1: 1.7.1)
	c. Discuss the following: (i) Distributed systems (ii) Special purpose systems	06	(2 :1: 1.7.1)

(OR)

2.	a. List and explain different types of system calls commonly used in operating systems.	07	(2 :1: 1.7.1)
	b. List and explain the services provided by OS for the user and efficient operation of system.	07	(2 :1: 1.7.1)
	c. Compare multiprogramming and multitasking systems.	06	(2 :1: 1.7.1)

Module-2

3.	a. What is a process? With the help of state transition diagram, explain the various states of a process.	08	(1 :2: 1.7.1)
	b. Develop a C program for Shortest Remaining Time First (SRTF) scheduling with suitable output.	12	(3 :2: 1.7.1)

(OR)

4.	a. Define thread. Explain 3 models of multithreaded programming.	08	(1 :2: 1.7.1)
	b. Calculate the average waiting time and average turnaround time by drawing Gantt chart for FCFS, SRTF, RR algorithms [q = 2 ms].	12	(3 :2: 1.7.1)

Process	Arrival time	Burst Time
P1	0	9
P2	1	4
P3	2	9
P4	3	5

Module-3

5.	a. What are the necessary and sufficient conditions for deadlock? Briefly explain.	07	(1 :3: 1.7.1)
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- b. What is wait-for graph? Explain how it is useful for detection of deadlock. **07** (2 :3: 1.7.1)
- c. Describe a resource allocation graph. **06** (2 :3: 1.7.1)
- (i) With a deadlock (ii) With a cycle but no deadlock.

(OR)

6. a. Consider the following snap shot of resource-allocation at time t1: **12** (3 :3: 1.7.1)

Processes	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P0	0	0	1	2	0	0	1	2	1	5	2	0
P1	1	0	0	0	1	7	5	0				
P2	1	3	5	4	2	3	5	6				
P3	0	6	3	2	0	6	5	2				
P4	0	0	1	4	0	6	5	6				

Using Banker's algorithm:

- (i) What is the content of the NEED matrix?
- (ii) Is the system in a safe state?
- (iii) If P1 requests for (0, 3, 1, 0) can the request be granted immediately?
- b. Illustrate segmentation in detail with diagram and example. **08** (2 :3: 1.7.1)

Module-4

7. a. What is virtual memory? How can it be implemented? What are its benefits? **08** (2 :4: 1.7.1)
- b. Consider the following page reference string. **12** (3 :4: 1.7.1)
- 7,0,1,2,0,3,0,4,2,3,0,3,2,1,2,0,1,7,0,1
- How many page faults would occur in the case of
- (i) LRU (ii) FIFO (iii) Optimal algorithms
- Assuming 3-frames. (Initially all frames are empty)

(OR)

8. a. What is a file? Explain different allocation methods with a neat diagram. **10** (1 :4: 1.7.1)
- b. Mention different file types, file attributes and the various operations performed on files. **10** (2 :4: 1.7.1)

Module-5

9. a. Discuss in brief about process management and process scheduling in Linux. **07** (2 :5: 1.7.1)
- b. Explain in detail about disk management in storage structure. **07** (2 :5: 1.7.1)
- c. With diagram, explain components of Linux system. **06** (2 :5: 1.7.1)

(OR)

10. a. Demonstrate the working of various disk scheduling algorithms with suitable examples. **08** (2 :5: 1.7.1)
- b. Define the following terms: **12** (2 :5: 1.7.1)
- (i) File Systems (ii) Inter process communication
- (iii) Network structure (iv) Security

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