

Basavarajeswari Group of Institutions
BALLARI INSTITUTE OF TECHNOLOGY & MANAGEMENT
 (Autonomous Institute under Visvesvaraya Technological University, Belagavi)

USN									
-----	--	--	--	--	--	--	--	--	--

Course Code **22CS/AI/CA/CD/33**

Third Semester B.E. Degree Examinations, March/April 2024

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. Define an Operating System. Identify and explain the two viewpoints of OS.	06	(3 : 1 : 1.7.1)
	b. Distinguish between symmetric and asymmetric multiprocessor systems and explain in detail the advantages of multiprocessor system.	06	(3 : 1 : 1.7.1)
	c. What is dual mode operation? With a neat diagram illustrate the working of dual mode operation of operating system. What are the advantages of using dual mode of operation?	08	(3 : 1 : 1.7.1)
(OR)			
2.	a. List and explain the services provided by operating system.	06	(3 : 1 : 1.7.1)
	b. Explain the layered approach of designing an operating system with detailed diagram. Discuss about the advantages and disadvantages of layered approach?	06	(3 : 1 : 1.7.1)
	c. Define system call. List and explain different types of system calls.	08	(3 : 1 : 1.7.1)
<u>Module-2</u>			
3.	a. Define the following: (i) Process (ii) Thread (iii) Context Switch (iv) Degree of Multiprogramming (v) Scheduler (vi) Dispatch latency	06	(3 : 2 : 1.7.1)
	b. Discuss process control block with a neat diagram and process state diagram in detail.	06	(3 : 2 : 1.7.1)
	c. Why a thread is called a LWP? Explain threading models with diagram, example, advantages and disadvantages.	08	(3 : 2 : 1.7.1)
(OR)			
4.	a. What is CPU scheduling? Explain in detail with all scheduling criteria.	06	(3 : 2 : 1.7.1)
	b. What is multiple processor scheduling? Write a short note on processor affinity and load balancing.	06	(3 : 2 : 1.7.1)
	c. Describe the implementation of IPC using shared memory and message passing with diagram.	08	(3 : 2 : 1.7.1)
<u>Module-3</u>			
5.	a. What are the necessary and sufficient conditions for deadlock? Briefly explain.	06	(3 : 3 : 1.7.1)
	b. Describe a resource allocation graph. Illustrate RAG with a proper example (i) with a deadlock (ii) with a cycle but no deadlock.	06	(3 : 3 : 1.7.1)

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

- c. Consider the following snapshot of resource-allocation at time t1: **08** (3 :3 : 1.7.1)

Using Banker's algorithm:

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				

(i) What is the content of the NEED matrix? (ii) Is the system in a safe state?

(OR)

6. a. Differentiate between internal and external fragmentations? How are they overcome? **06** (3 :3 : 1.7.1)
- b. Illustrate the concept of paging using TLB with neat diagram. Explain TLB Hit and TLB miss concept also. **06** (3 :3 : 1.7.1)
- c. Demonstrate the concept of Segmentation using neat diagram. **08** (3 :3 : 1.7.1)

Module-4

7. a. What is virtual memory? How can it be implemented? What are its benefits? **06** (3 :4 : 1.7.1)
- b. Demonstrate the steps involved in handling a page fault with a figure. **06** (3 :4 : 1.7.1)
- c. What is thrashing? What is the cause of thrashing? How can it be controlled? **08** (3 :4 : 1.7.1)

(OR)

8. a. Consider the following page reference stream: **06** (3 :4 : 1.7.1)
0, 1, 2, 3, 0, 1, 4, 0, 1, 2, 3, 4
Calculate the number of page faults when no. of frames is equal to 3 and 4 using FIFO and LRU algorithms.
- b. What is a file? Describe the different access methods on files. **06** (3 :4 : 1.7.1)
- c. Explain the different types of directory structures with examples and mention their advantages and Disadvantages. **08** (3 :4 : 1.7.1)

Module-5

9. a. What is **boot block** and **bad block**? Explain the techniques used for handling bad blocks. **06** (3 :5 : 1.7.1)
- b. Define the following terms with respect to disk scheduling: **06** (3 :5 : 1.7.1)
(i) Constant Linear Velocity (**CLV**) (ii) Seek time
(iii) Constant Angular Velocity (**CAV**) (iv) Rotational Latency
- c. Suppose the position of cylinder is at 53. The disk drive has cylinders numbered from 0-199. The queue of pending requests in FIFO order is: 98, 183, 37, 122, 14, 124, 65, 67. Starting from the current head position, what is the total distance travelled (in cylinders) by the disk arm to satisfy the requests using algorithms FCFS, SSTF, SCAN and LOOK. Illustrate with figures in each case. **08** (3 :5 : 1.7.1)
- (OR)**
- 10 a. Describe about the swap space management in storage structure **06** (3 :5 : 1.7.1)
- b. Explain the design principles of Linux Operating system. **06** (3 :5 : 1.7.1)
- c. With diagram, explain components of Linux system. **08** (3 :5 : 1.7.1)

*** ** *