

Code No: R22A0509

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech I Semester Supplementary Examinations, June 2025**Operating Systems****(CS&IT, CSE-CS, CSE-AIML, CSE-DS, CSE-IOT & B.Tech-AIML)**

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Time: 3 hours**Max. Marks: 60****Note:** This question paper contains two parts A and B

Part A is compulsory which carries 10 marks and Answer all questions.

Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

PART-A (10 Marks)			BCLL	CO(s)	Marks
(Write all answers of this part at one place)					
1	A	List any four OS services.	L2	CO-I	[1M]
	B	List the Interprocess Communication (IPC) and File system Related Linux System Calls.	L1	CO-I	[1M]
	C	What are the steps to be followed for process management when an interrupt comes to a running process?	L1	CO-II	[1M]
	D	What are the differences between Korn Shell and Bash shell in Linux.	L2	CO-II	[1M]
	E	What are concurrent processes? What are the problems associated with them?	L2	CO-III	[1M]
	F	What is the necessary and sufficient condition for occurrence of a deadlock?	L2	CO-III	[1M]
	G	Compare the Synchronous and Asynchronous Message Passing in Linux.	L2	CO-IV	[1M]
	H	How does the paging concept increase memory accesses?	L2	CO-IV	[1M]
	I	Which file allocation method is appropriate for a long file that is accessed randomly?	L1	CO-V	[1M]
	J	Define seek time, rotational latency, transfer time, response time, and variance of response time.	L1	CO-V	[1M]

PART-B (50 Marks)**SECTION-I**

2	A	Multi-programming is inherent in multiuser and multitasking systems. Explain how?	L2	CO-I	[5M]
	B	Explain all types of system calls using some examples. What are the differences between a system call and system program?	L2	CO-I	[5M]

OR

3	A	Illustrate the list of Linux Kernel Modules.	L2	CO-I	[5M]
	B	Describe the Linux VServer Architecture with a net illustration.	L2	CO-I	[5M]

SECTION-II

4	A	What advantage is there in having different time-quantum sizes at different levels of a multilevel queueing system?	L2	CO-II	[5M]
	B	Consider the following set of processes, with the length of the CPU burst time given in milliseconds:	L4	CO-II	[5M]

<u>Process</u>	<u>Burst Time</u>	<u>Priority</u>
P_1	2	2
P_2	1	1
P_3	8	4
P_4	4	2
P_5	5	3

The processes are assumed to have arrived in the order P1, P2, P3, P4, P5, all at time 0.

- [1]. Draw four Gantt charts that illustrate the execution of these processes using the following scheduling algorithms: SJF and RR (quantum = 2).
 [2]. What is the waiting time, turnaround time of each process for each of the scheduling algorithms.
 [3]. Which of the algorithms results in the minimum average waiting time?

OR

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|---|---|--|----|-------|------|
| 5 | A | What is a Linux Shell? Explain the different Types of Shells in Linux. | L3 | CO-II | [5M] |
| | B | Write a Shell Script to List all Hidden Files in Current Directory. | L3 | CO-II | [5M] |

SECTION-III

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|---|---|--|----|--------|------|
| 6 | A | What is a semaphore? Explain its initial implementation. | L2 | CO-III | [5M] |
| | B | What is the difference between symmetric and asymmetric solution of dining-philosopher problem using semaphore? Explain. | L2 | CO-III | [5M] |

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|---|---|--|----|--------|------|
| 7 | A | Prove that circular wait condition may be produced, if all the other three necessary conditions of a deadlock are present in a system. | L3 | CO-III | [5M] |
| | B | Explain all the steps in the banker's algorithm. | L2 | CO-III | [5M] |

SECTION-IV

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|---|---|---|----|-------|------|
| 8 | A | Explain the message passing system for process communication. What types of system is suitable for this method? | L2 | CO-IV | [5M] |
| | B | Explain how the Interprocess Communication (IPC) is implemented with Shared Memory. | L2 | CO-IV | [5M] |

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|---|---|--|----|-------|------|
| 9 | A | How do unequal-sized fixed partitions improve the performance of memory allocation? Explain with an example. | L2 | CO-IV | [5M] |
| | B | Show the stack implementation of LRU on the following string: 0 1 0 0 2 0 3 3 2 1 1 2 2 3 2 1 3 | L4 | CO-IV | [5M] |

SECTION-V

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|----|---|---|----|------|------|
| 10 | A | A file system uses indexed allocation of disk space; however, it permits a sequential file to contain partially full disk blocks. What are the advantages and disadvantages of this scheme? | L3 | CO-V | [5M] |
| | B | Explain various in-memory data structures while writing a file. | L2 | CO-V | [5M] |

OR

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|----|---|--|----|------|------|
| 11 | A | What will be the criteria or situations to choose seek-optimization-based and rotational-optimization-based disk-scheduling algorithms? Explain. | L2 | CO-V | [5M] |
| | B | Consider a disk queue with I/O requests on the following cylinders in their arriving order:
67, 12, 15, 45, 48, 50, 109, 89, 56, 59, 34, 88, 130, 24, 109, 22
The disk head is assumed to be at Cylinder 80 and moving in the direction of increasing number of cylinders. The disk consists of total 150 cylinders. Calculate and show with diagram the disk head movement using FCFS and CSCAN disk scheduling algorithms. | L4 | CO-V | [5M] |
