

Code No: **R22A0509****MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY**

(Autonomous Institution – UGC, Govt. of India)

II B.Tech I Semester Supplementary Examinations, June/July 2024**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.

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PART-A (10 Marks)**Write all answers of this part at one place**

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|----------|---|--|-------------|
| 1 | A | Define operating system? | [1M] |
| | B | Write the syntax of mkdir command and give an example for it. | [1M] |
| | C | Sketch process state diagram. | [1M] |
| | D | Differentiate between preemptive and non-preemptive scheduling algorithms. | [1M] |
| | E | List the various methods for handling deadlocks in a system. | [1M] |
| | F | What is a semaphore? | [1M] |
| | G | Compare shared memory and message passing systems for IPC. | [1M] |
| | H | Define Logical Address | [1M] |
| | I | Identify the various approaches for accessing a file. | [1M] |
| | J | What are the operations performed on a file. | [1M] |

PART-B**SECTION-I**

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|----------|---|--|-------------|
| 2 | A | Describe the characteristics of the following operating systems
i) Multi Programming Systems
ii) Real Time Systems | [5M] |
| | B | What is Linux? How do Linux operating system differ from Unix?
Explain the advantages of it. | [5M] |

OR

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|----------|---|--|-------------|
| 3 | A | Explain the following services of operating system.
i) User Interface
ii) Communication
iii) Accounting | [5M] |
| | B | What is a Time Sharing System? Outline the characteristics of it. | [5M] |

SECTION-II

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|----------|---|---|-------------|
| 4 | A | Why do we need to program using shell? Write a shell program to find the reverse of a given number. | [3M] |
| | B | Consider the following 4 processes with the length of the CPU burst given in nsec. | [7M] |

Process	Burst Time
P1	8
P2	4
P3	4
P4	5

Find the average waiting time and average turnaround time using Round Robin Scheduling with a time quantum of 2 nsec.

OR

- 5 A What is a process? Explain the operations on processes. [5M]
 B Why do operating system uses a PCB? Describe the various fields of PCB. [5M]

SECTION-III

- 6 A What is the purpose of resource allocation graph? [3M]
 B Explain the solution for Dining Philosopher's using semaphores and write the pseudo code for it. [7M]

OR

- 7 A Consider the following snapshot of a system: [7M]

	<u>Allocation</u>	<u>Max</u>
	<u>A B C D</u>	<u>A B C D</u>
P_0	3 0 1 4	5 1 1 7
P_1	2 2 1 0	3 2 1 1
P_2	3 1 2 1	3 3 2 1
P_3	0 5 1 0	4 6 1 2
P_4	4 2 1 2	6 3 2 5

If available resources are (0,3,0,1). Using Banker's Algorithm

- i) What is the content of need matrix?
 ii) Is the System in Safe state or not?
 iii) What is the safe sequence?
 B What is critical section problem? Describe the conditions a critical section problem has to satisfy. [3M]

SECTION-IV

- 8 A What is Pipe? Compare ordinary pipes and message queue. [3M]
 B Consider a main memory with the following sequence of page references: 0, 1, 2, 3, 0, 1, 4, 0, 1, 2, 3, 4. How many page faults does occur using 3 page frames and 4 page frames using FIFO page replacement? [7M]

OR

- 9 A Why do we need demand paging system? Demonstrate with a neat sketch how page fault is handled. [5M]
 B Given six memory partitions of 300 KB, 600 KB, 350 KB, 200 KB, 750 KB and 125 KB (in order), how would the first-fit and best-fit algorithms place processes of size 115 KB, 500 KB, 358 KB, 200 KB, and 375 KB (in order)? Rank the algorithms in terms of how efficiently they use memory. [5M]

SECTION-V

- 10 A Explain any three forms of directory structures organization. [5M]
 B Explain various forms of the file allocation methods [5M]

OR

- 11** **A** Describe with a neat diagram following approaches **[3M]**
 i) Linked File Allocation

- ii) Indexed File Allocation
- B** Suppose that a disk drive has 2000 cylinders, numbered 0 to 1999. The drive is currently serving a request at cylinder 143, and the previous request was at cylinder 105. The queue of pending requests in FIFO order is: 86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130. Starting from the current head position, what is the total distance that the disk arm moves to satisfy all the pending requests for FCFS and SCAN scheduling. **[7M]**
