R22 Regulation *Subject code:4E5GB*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

B.Tech V Semester Supplementary Examinations, April 2026

OPERATING SYSTEMS

(CSE(AI&ML))

Maximum Marks: 60 Date:17.04.2026 Duration: 3 hours

Note: **1.This question paper contains two parts A and B.**
2. Part A is compulsory which carries 10 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (10X1M=10 Marks)		Marks	CO	BTL
1.a)	Name the main components of computer system architecture.	1M	1	BL1
b)	Mention two types of system calls.	1M	1	BL2
c)	State the different process states	1M	2	BL1
d)	List four operations that can be performed on a process	1M	2	BL2
e)	Define Critical section.	1M	3	BL1
f)	What are the three necessary conditions for a deadlock to occur?	1M	3	BL2
g)	List out the Page Replacement algorithms.	1M	4	BL1
h)	Define Segmentation.	1M	4	BL1
i)	List common file allocation methods.	1M	5	BL1
j)	What is the significance of seek system call?	1M	5	BL2

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
2	Discuss user view vs system view. Use a diagram to illustrate their differences.	10M	1	BL3
	OR			
3	Explain operating system services with suitable examples.	10M	1	BL2
4	Explain the functions of important process management system calls such as fork(), exit(), wait(), waitpid(), and exec().	10M	2	BL2
	OR			
5	Consider the following processes and schedule the process using priority scheduling algorithm.	10M	2	BL3

	<table><tr><th>Process</th><th>Arrival Time</th><th>Burst Time</th><th>Priority</th></tr><tr><td>P1</td><td>0</td><td>11</td><td>2</td></tr><tr><td>P2</td><td>5</td><td>28</td><td>0</td></tr><tr><td>P3</td><td>12</td><td>2</td><td>3</td></tr><tr><td>P4</td><td>2</td><td>10</td><td>1</td></tr><tr><td>P5</td><td>9</td><td>16</td><td>4</td></tr></table>			
6	Define semaphore. Explain the method of application of semaphore for process synchronization.	10M	3	BL3
	OR			
7	Given the following resource allocation and maximum need matrices with available resources, determine whether the system is in a safe state. If yes, find a safe sequence. Process Allocation (A,B,C) Max Need (A,B,C) P0 (0, 1, 0) (7, 5, 3) P1 (2, 0, 0) (3, 2, 2) P2 (3, 0, 2) (9, 0, 2) Available Resources: (3, 3, 2)	10M	3	BL4
8	Describe the process of swapping and its significance in memory management.	10M	4	BL3
	OR			
9	Consider the page reference string 7,0,1,2,0,3,0,4,2,3,0,3,2,3 with 4 page frames. Determine the total number of page faults using the Optimal page replacement algorithm.	10M	4	BL3
10	Explain the role of system calls such as open(), read(), write(), close(), seek(), and unlink() with examples.	10M	5	BL2
	OR			
11	Compare different file allocation methods: contiguous, linked, and indexed allocation.	10M	5	BL3