R22 Regulation *Subject code:4E4FC*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech IV Semester Regular/Supplementary Examinations, June 2026

OPERATING SYSTEMS

(IT)

Maximum Marks: 60 Date:15.06.2026 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)	Define system software.	1M	1	L1
b)	What are the various Components of OS?	1M	1	L1
c)	List the information stored in a PCB.	1M	2	L1
d)	What is deadlock?	1M	2	L1
e)	Differentiate between internal and external fragmentation.	1M	3	L1
f)	What is the purpose of a page table?	1M	3	L1
g)	What are the attributes of a file?	1M	4	L1
h)	What is seek () system call?	1M	4	L1
i)	Why Banker's algorithm is called a deadlock avoidance algorithm?	1M	5	L1
j)	Define access matrix.	1M	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
2	a) What are the different types of operating systems? Discuss them in detail. b) Explain Operating system structure.	5M 5M	1 1	L2 L2
	OR			
3	a) Elaborate the various services provided by an Operating System. b) Describe about the dual mode operation in OS with a neat block diagram.	5M 5M	1 1	L2 L3
4	a) Differentiate between binary semaphore and counting semaphore with examples. b) Demonstrate Peterson's solution for two processes entering the critical section simultaneously.	5M 5M	2 2	L2 L2
	OR			
.5	Following is the snapshot of a CPU Process CPU Burst Arrival Time P1 10 0 P2 1 1 P3 2 2 P4 1 3 P5 5 4 Draw the Gantt chart and calculate the waiting time and turnaround time for	10M	2	L3

	the following scheduling algorithms. i. First Come First Served ii. Shortest Job First iii. Round Robin with time quantum 5			
6	a) Describe demand paging and explain page fault handling mechanism. b) Explain segmentation with neat diagram and address translation process.	5M 5M	3 3	L3 L2
	OR			
7	Consider the following page reference string: 1, 2, 3, 4, 5, 3, 4, 1, 6, 7, 8, 7, 8, 9, 7, 8, 9, 5, 4, 5, 4, 2 Assume that the system has four page frames, all initially empty. Determine the number of page faults that occur using: i. FIFO Page Replacement Algorithm ii. Optimal Page Replacement Algorithm also, identify which algorithm is more efficient for the given reference string.	10M	3	L3
8	a) Elaborate the concept of file sharing. What are the criteria to be followed in systems which implement file sharing? b) A file grows dynamically during execution. Which allocation method is most suitable? Justify your answer.	5M 5M	4 4	L2 L2
	OR			
9	a) Describe the working of free-space management with suitable examples. b) Illustrate how system calls are used by writing a simple program to copy data from one file to another file.	5M 5M	4 4	L3 L2
10	Consider the following snapshot of a system *Allocation* / *Max* / *Available* A B C / A B C / A B C P_0 0 1 0 / 7 5 3 / 3 3 2 P_1 2 0 0 / 3 2 2 P_2 3 0 2 / 9 0 2 P_3 2 1 1 / 2 2 2 P_4 0 0 2 / 4 3 3 Answer the following questions using the banker's algorithm: i. Is the system in a safe state? ii. If a request from process P1 arrives for (1,0,2). Can the request be granted immediately?	10M	5	L3
	OR			
11	a) Discuss system protection and explain the goals of protection in Operating Systems. b) List and explain the necessary conditions for deadlock occurrence with suitable examples.	5M 5M	5 5	L2 L2