Name of the Course: B. Tech.　　　　　　　　Paper code: 3122612302
Semester: III　　　　　　　　　　　　　　　Time : 03 Hrs.
Paper Title: Operating Systems　　　　　　　Maximum　Marks:　90
Instructions:

1. Candidates are advised to read the question paper carefully.
2. Candidates are required to attempt SIX questions in all, Question 1 is COMPULSORY.
3. Question 1 is of 20 Marks, Questions 2 - 8 carries equal marks (14-Marks).
4. If a question is in divided into parts, then all parts carry equal marks.

1　Answer the following questions:-　　　　　　　　　　　　　　[5*4]

　　(i)　What is TLBR? What are its core functions?
　　(ii)　What is effective access time in paging? Explain with a suitable example.
　　(iii)　Explain deadlock detection and prevention mechanism.
　　(iv)　Explain use of *mkdir, rm, tail* and *cd* Linux commands.
　　(v)　Explain Amdahl's law. Explain the functions of user and Kernel threads.

2　A resource constraint system is required to operate for a critical infrastructure [14] monitoring. You are required to propose an operating system for the same. State essential properties of the OS with respect to :

　　i)　Main memory type
　　ii)　Secondary memory type
　　iii)　Process secluding criteria
　　iv)　User and Kernel threads

3　What is a resource allocation graph? Explain its utility with example.　　[14]

4　Following is the sequence of page requests: 1, 2, 3, 2, 2, 3, 3, 4, 5, 6, 1, 1, 2, 3, [14] 2, 1, 4. Assume that there are **three** frames. How many page faults will occur with Least Recently Used (LRU) and Optimal algorithms? Illustrate the solution.

5　For the following processes and processing time :　　　　　　　　[14]

Processes	Processing Time
P1	2
P2	1
P3	4
P4	3

Draw the Gantt charts to show the execution of processes for RR ($c = 1$) and SJF methods. Also calculate the average waiting time, waiting time and turnaround time for the processes.

6 Consider the following process and their resource allocation and availability [14] status.

Process	Max	Allocation	Available
	A, B, C, D	A, B, C, D	A, B, C, D
P0	6 0 1 2	4 0 0 1	3 2 1 1
P1	2 7 5 0	1 1 0 0	
P2	2 3 5 6	1 2 5 4	
P3	1 6 5 3	0 6 3 3	
P4	1 6 5 6	0 2 1 2	

Using Banker's algorithm, answer the following questions:-

i)   How many resources of type A, B, C, D are there?
ii)   Find if the system is in safe state? If it is, find the safe sequence.

7 What is a critical section? Explain the role of critical section in various [14] problems like dining philosopher's problem and producer consumer problem.

8 Write short notes on any **four** of the following:-   [14]

(a) Bèlády's Anomaly
(b) Power On Self-Test
(c) Disk Scheduling Algorithm
(d) Reader Writers Problem
(e) Process Scheduling