Laxmi Singh Charitable Trust's (Regd.)
THAKUR COLLEGE OF ENGINEERING & TECHNOLOGY
Website : www.tcet
Estd.2001

IN-SEMESTER EXAMINATION-I
TE (Semester-V)
SUBJECT – Operating System

Date: 26/08/2024
Timing: 4:00 PM to 5:00 PM
Maximum Marks: 20

Branch: IT
Div.: IT
Duration: 60 Minutes
Instructions –
All questions are compulsory.
Assume suitable data wherever necessary and state the assumptions made.
Diagrams / sketches should be given wherever necessary.
Use of logarithmic table, drawing instruments and non-programmable calculators is permitted.
Figures to the right indicate full marks.

Q.1		**Answer any 5 of the following questions**	**Marks**	**Course Outcomes**	**Learning Levels**
	a.	Define virtual machine in OS.	2	1	R
	b.	What is the need for an operating system?	2	1	U
	c.	Define Spooling in OS.	2	1	R
	d.	Demonstrate that a short quantum will increase the number of context switches in the system in RR scheduling.	2	2	U
	e.	Explain Process States. A process is in execution state, If an interrupt occurs, point out the changes in the process state transition.	2	2	U
	f.	Describe is process synchronization. explain with example.	2	3	U
	g.	Define the Critical section Problem	2	3	R
Q.2	a.	<table><tr><th>Process</th><th>Burst Time</th><th>Arrival Time</th></tr><tr><td>P1</td><td>7</td><td>0</td></tr><tr><td>P2</td><td>3</td><td>1</td></tr><tr><td>P3</td><td>4</td><td>3</td></tr></table> Analyze and solve FCFS Algorithm and Calculate Turnaround time and average waiting time	5	2	AN
		OR			
	b.	<table><tr><th>Process Id</th><th>Arrival Time</th><th>Burst Time</th></tr><tr><td>P1</td><td>3</td><td>1</td></tr><tr><td>P2</td><td>1</td><td>4</td></tr><tr><td>P3</td><td>4</td><td>2</td></tr><tr><td>P4</td><td>0</td><td>6</td></tr><tr><td>P5</td><td>2</td><td>3</td></tr></table> Analyse and Solve the following algorithm using SJF (Preemptive Algorithm) and calculate the average waiting time and average turnaround time.	5	2	AN
Q.3	a.	Identify the conditions that are necessary to achieve deadlock .	5	3	U
		OR			
	b.	Propose the various solutions for Dining philosopher problem.	5	3	A

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Autonomous College Affiliated to University of Mumbai
Approved by All India Council for Technical Education(AICTE) and Government of Maharashtra(GoM)
Confirmed Autonomous Status by University Grants Commission (UGC) for 10 years w.e.f. A.Y. 2019-20
Amongst Top 200 Colleges in the Country, Ranked 151st in NIRF India Ranking 2019 in Engineering College category
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• Institute Accredited by National Assessment and Accreditation Council (NAAC), Bangalore

Estd. 2001

IN-SEMESTER EXAMINATION-II

T.E. (Semester-V)

SUBJECT – OPERATING SYSTEM

Branch: IT
Div.: ALL
Duration: 60 Minutes

Date: 17/10/2024
Timing: 04:00 PM to 05:00 PM
Maximum Marks: 20

Instructions –

1. All questions are compulsory.
2. Assume suitable data wherever necessary and state the assumptions made.
3. Diagrams / sketches should be given wherever necessary.
4. Use of logarithmic table, drawing instruments and non-programmable calculators is permitted.
5. Figures to the right indicate full marks.

Q.1		Answer any 5 of the following questions	Marks	Course Outcomes	Learning Levels
	a.	Analyze the function of the Page Table Base Register (PTBR) in the paging mechanism of an operating system.	2	4	U
	b.	Point out the reasons for using Memory management.	2	4	U
	c.	Which file allocation method is appropriate for a long file that is accessed sequentially?	2	5	A
	d.	Analyze the purpose of file encryption for protecting sensitive data.	2	5	U
	e.	List out different type of RAID Levels.	2	6	R
	f.	Write about Input/Output Devices.	2	6	R
	g.	Define seek time in disk scheduling	2	6	R
Q.2	a.	Differentiate between internal and external fragmentation in terms of their impact on memory usage.	5	4	AN
		OR			
	b.	Given free memory partitions of 150 K, 400 K, 250 K, 350 K, and 700 K (in order), how would each of the First-fit, Best-fit, and Worst-fit algorithms place processes of 175 K, 300 K, 125 K, and 500 K (in order)?	5	4	A
Q.3	a.	Assess the efficiency of different file indexing methods in large-scale databases.	5	5	A
		OR			
	b.	Analyze the relationship between file systems and disk management.	5	5	A

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END SEMESTER EXAMINATION, DEC 2024
T.E. SEMESTER V (CBCGS-HME 2023)

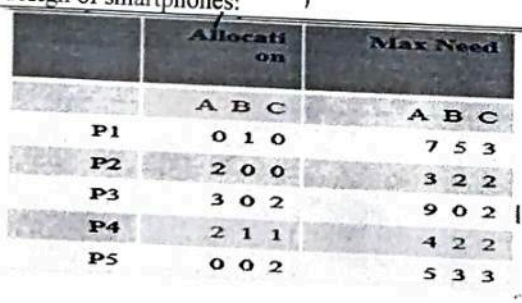
Branch:	**IT**	**Q.P. Code:**	**ED245ITR6S2-2**
Subject:	**Operating System**	**Duration:**	**2 hours**
Subject Code:	**PCC-IT-501**	**Max. Marks:**	**60**

Instructions:
1. **All sections are compulsory**
2. **Figures to the right indicate full marks.**
3. **Assume suitable data if necessary and state the assumptions clearly.**

Section-I **Short Answer Questions (Answer any 05 questions out of 06) (Fundamental, Core Types)** **(10 Marks)**

Q. No.		Marks	CO	RBT Level	PI
1	Apply the concept of virtual memory to a modern desktop OS.	2	1	R	1.7.1
2	Why do we need scheduling? Write down objective of process scheduling algorithm.	2	2	A	2.5.2
3	Define the Critical section Problem	2	3	R	1.7.1
4	Explain how locality of reference impacts memory performance.	2	4	AN	2.6.5
5	Apply access control mechanisms to manage file sharing among multiple users.	2	5	AN	2.6.4
6	Describe SCAN Disk Scheduling Algorithm.	2	6	U	1.7.1

Section-II **Descriptive Answer Questions (Answer any 04 out of 06) (Descriptive, Comprehension Types)** **(20 Marks)**



1	Explain the relationship between hardware and operating systems.	5	1	U	1.6.1
2	Explore the features of operating system being used in recent design of smartphones:	5	2	AN	2.5.2
3	<table><tr><th></th><th>Allocation</th><th>Max Need</th></tr><tr><th></th><th>A B C</th><th>A B C</th></tr><tr><td>P1</td><td>0 1 0</td><td>7 5 3</td></tr><tr><td>P2</td><td>2 0 0</td><td>3 2 2</td></tr><tr><td>P3</td><td>3 0 2</td><td>9 0 2</td></tr><tr><td>P4</td><td>2 1 1</td><td>4 2 2</td></tr><tr><td>P5</td><td>0 0 2</td><td>5 3 3</td></tr></table> Total Resources available: A=10, B=5, C=7. Analyze the safe sequence of processes to be executed?	5	3	AN	2.5.3, 1.2.1
4	Consider a reference string: 4, 7, 6, 1, 7, 6, 1, 2, 7, 2. The number of frames in the memory is 3. Analyze the number of page faults respective to: 1. Optimal Page Replacement Algorithm 2. FIFO Page Replacement Algorithm	5	4	AN	2.5.3
5	Write the short not on Inode structure.	5	5	U	1.7.1

6	Describe the structure of a magnetic disk.	5	6	U	1.7.1
Section-III	**Long Answer Question (Answer any 03 out of 05) (Application, Analytical, Evaluation, Design Type)**				**(30 Marks)**
1	Process Id / Arrival Time / Burst Time P1 / 0 / 5 P2 / 1 / 4 P3 / 2 / 2 P4 / 4 / 1 Analyze and Solve the following algorithm using Round Robin (Preemptive Algorithm) and calculate the average waiting time and average turnaround time. Use time quantum=2.	10	2	AN	2.5.3
2	Explain how a Resource Allocation Graph (RAG) is used to detect deadlock in an operating system	10	3	A	1.7.1
3	Differentiate between contiguous and non-contiguous memory allocation with examples.	10	4	A	2.6.4
4	Describe the process of file system mounting and unmounting in operating systems.	10	5	A	1.6.1
5	Suppose the order of request is- 82,170,43,140,24,16,190 And current position of Read/Write head is: 50 moving in the direction of decreasing number of cylinders (ie. 0 to 199) Formulate seek time and show with diagram the disk head movement by applying SSTF and SCAN disk scheduling algorithm along with advantages and disadvantages of both.	10	6	A	2.5.3