Total No. of Printed Pages: 2

PRN No.	

PAPER CODE	U313-2103(RE)

December 2023 (REEXAM)

TY (SEMESTER - I)

COURSE NAME: OPERATING SYSTEMS AND SYSTEM PROGRAMMING COURSE CODE: ITUA31203

Branch: INFORMATION TECHNOLOGY

(PATTERN 2020)

Time: [2 Hrs] **[Max. Marks: 60]**

Instructions to candidates:

1) **Figures to the right indicate full marks.**
2) **Use of scientific calculator is allowed**
3) **Use suitable data wherever required**
4) **All questions are compulsory. Solve any two sub questions each from each Question 1 ,2, 3,4,5,and 6 respectively**

<table>
<tr><th>Q. No.</th><th>Question Description</th><th>Max. Marks</th><th>CO mapped</th><th>BT Level</th></tr>
<tr><td>Q1</td><td>a) Write a shell script to find given number is even or odd.</td><td>[5]</td><td>1</td><td>3</td></tr>
<tr><td></td><td>b) Compare and contrast the advantages and disadvantages of a layered operating system structure with another structural model such as monothetic or micro-kernel.</td><td>[5]</td><td>1</td><td>4</td></tr>
<tr><td></td><td>c) Context switching degrades performance of a system. Justify</td><td>[5]</td><td>1</td><td>3</td></tr>
<tr><td>Q2</td><td>a) Consider the set of 5 processes whose arrival time and burst time are given below
<table>
<tr><th>Process ID</th><th>Arrival Time</th><th>Burst Time</th></tr>
<tr><td>P1</td><td>0</td><td>5</td></tr>
<tr><td>P2</td><td>1</td><td>3</td></tr>
<tr><td>P3</td><td>2</td><td>1</td></tr>
<tr><td>P4</td><td>3</td><td>2</td></tr>
<tr><td>P5</td><td>4</td><td>3</td></tr>
</table>
If the CPU scheduling policy is Round Robin with time quantum = 2 unit, calculate the average waiting time and average turnaround time.</td><td>[5]</td><td>2</td><td>3</td></tr>
<tr><td></td><td>b) List any five reasons for process terminations.</td><td>[5]</td><td>2</td><td>4</td></tr>
<tr><td></td><td>c) Explain Process control block in detail.</td><td>[5]</td><td>2</td><td>2</td></tr>
<tr><td>Q3</td><td>a) Differentiate between Deadlock and Starvation.</td><td>[5]</td><td>3</td><td>4</td></tr>
<tr><td></td><td>b) Write an algorithm for reader writer problem using semaphore when reader is having priority.</td><td>[5]</td><td>3</td><td>4</td></tr>
<tr><td></td><td>c) Differentiate between Mutex and Semaphore.</td><td>[5]</td><td>3</td><td>2</td></tr>
<tr><td>Q4</td><td>a) Given Memory partition 100KB, 500KB, 200KB, 300KB and 600KB in order, How would each of the First-fit, Best- fit and Worst Fit algorithms take place the processes of 212KB,</td><td>[5]</td><td>4</td><td>3</td></tr>
</table>

	417KB, 112KB and 426KB in order? Which algorithm makes the most efficient use of memory?	[5]	4	3
	b) Illustrate Belady's Anomaly with example.	[5]	4	3
	c) Suppose a disk has 201 cylinders, numbered from 0 to 200. At some time the disk arm is at cylinder 100, and there is a queue of disk access requests for cylinders 30, 85, 90, 100, 105, 110, 135, and 145. Calculate the seek time using SCAN disk scheduling algorithm.			
Q5	a) Draw and explain flowchart of pass 2 of two pass assembler.	[5]	5	3
	b) Differentiate between literal and immediate operand. Analyze with example, how assembles handle them?	[5]	5	4
	c) Discuss forward reference with example. How it is handled in single pass assembler.	[5]	5	4
Q6	a) Illustrate the advantages of Macro facility. Also Compare Macros and Functions.	[5]	6	3
	b) Justify the statement "Programs with macros requires more space and less time at run time than programs with functions.	[5]	6	4
	c) Demonstrate the compile and go loader scheme with advantages and disadvantages using suitable diagram.	[5]	6	3

Note: [BT Level – 1. Remember 2. Understand 3. Apply 4. Analyze 5. Evaluate 6. Create]