

PRN No.	
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PAPER	U314-2103 (ESE)
CODE	

(AY:2024-25) December 2024 (ENDSEM) EXAM
TY (SEMESTER - I)

COURSE NAME: OPERATING SYSTEMS AND SYSTEM PROGRAMMING **Branch: I.T** **COURSE CODE: ITUA31203**

(T.Y PATTERN 2020)

Time: [1Hr 30 Min]

[Max. Marks: 40]

(*) Instructions to candidates:

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

Q. No.	Question Description	Max. Marks	CO mapped	BT Level												
Q.1	a) Write a Bash script that uses if, if-else, and if-elif-else statements to determine if a user-inputted number is positive, negative, or zero	[4]	[1]	[3]												
	b) Discuss function of operating system.	[4]	[1]	[2]												
	c) Compare and contrast the advantages and disadvantages of a layered operating system structure with another structural model such as monolithic or micro-kernel.	[4]	[1]	[3]												
Q2	a) Consider the set of 3 processes whose arrival time and burst time are given below: <table border="1" style="margin: 10px auto;"> <thead> <tr> <th>Process ID</th> <th>Arrival Time</th> <th>Burst time</th> </tr> </thead> <tbody> <tr> <td>P1</td> <td>0</td> <td>9</td> </tr> <tr> <td>P2</td> <td>1</td> <td>4</td> </tr> <tr> <td>P3</td> <td>2</td> <td>9</td> </tr> </tbody> </table> <p>If the CPU scheduling policy is SRTF, calculate the average waiting time and average turn around time.</p>	Process ID	Arrival Time	Burst time	P1	0	9	P2	1	4	P3	2	9	[4]	[2]	[3]
	Process ID	Arrival Time	Burst time													
	P1	0	9													
P2	1	4														
P3	2	9														
b) A uniprocessor computer system has three processes, which alternate 20ms CPU bursts with 80ms I/O bursts. All the processes were created at nearly the same time. The I/O of all the processes can proceed in parallel. What will be the CPU utilization (over a long period of time) using FCFS for this system.	[4]	[2]	[3]													
c) Write a Program to create Thread Using Pthreads	[4]	[2]	[3]													

Q3	a) Differentiate between Deadlock and Starvation.	[2]	[3]	[2]
	OR			
	b) Explain hardware approach for mutual Exclusion with its advantages & disadvantages	[2]	[3]	[2]
	c) Pipes are used For Inter-Process Communication, Sharing Information in One Way From Parent process to Child Process. Write a program in C to implement this scenario	[4]	[3]	[3]
Q4	a) Explain internal fragmentation with suitable diagram / example.	[2]	[4]	[2]
	OR			
	b) Compare Paging and segmentation.	[2]	[4]	[2]
	c) Assume the disk with 200 tracks and disk request queue has random requests in it as follows:55,58,39,18,90,160,150,38,184 Find the number of tracks traversed and average seek length if following strategies are used. 1) SSTF 2) SCAN	[4]	[4]	[3]
Q.5	a) Discuss forward reference with example.	[2]	[5]	[2]
	OR			
	b) Describe the practical arrangement of Language processors.	[2]	[5]	[2]
	c) Draw and explain the pass structure of assembler to design two pass assembler.	[4]	[5]	[3]
Q.6	a) Illustrate the advantages of Macro facility.	[2]	[6]	[2]
	OR			
	a) Explain the working of compile and go loader.	[2]	[6]	[2]
	c) Design a micro for addition of two numbers. Comment on how to call a micro and how the macro is expanded during execution.	[4]	[6]	[3]

Note: [BT level- 1: Remember 2: Understand 3: Apply 4: Analyze 5: Evaluate 6: Create]