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DECEMBER 2023 (ENDSEM) EXAM
T.Y. (INFORMATION TECHNOLOGY) (SEMESTER - I)
COURSE NAME: OPERATING SYSTEMS AND SYSTEM PROGRAMMING
COURSE CODE: ITUA31203
(PATTERN 2020)

Time: [1Hr. 30 Min]

[Max. Marks: 40]

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 one sub question from Question 3 and any two sub questions each from Questions 4,5 and 6 respectively.

Q. No.	Question Description	Max. Marks	CO mapped	BT Level												
Q.1	a) Write a simple bash script to access array elements	[2]	1	3												
Q2	a) Draw a Gantt chart for the following processes using Shortest Remaining Time First scheduling policy. <table border="1"><thead><tr><th>Process</th><th>Burst Time</th><th>Arrival Time</th></tr></thead><tbody><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></tbody></table>	Process	Burst Time	Arrival Time	P1	7	0	P2	3	1	P3	4	3	[2]	2	3
Process	Burst Time	Arrival Time														
P1	7	0														
P2	3	1														
P3	4	3														
Q3.	a) Provide a solution to avoid deadlock in Dining Philosopher's problem using semaphore.	[6]	3	3												
	b) 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.	[6]	3	3												
Q.4	a) Construct a Buddy system allocator for the following scenario – Given : Memory size = 256k A request 32k B request 64k C request 28k Release B Release A	[5]	4	3												
	b) Consider the following disk request sequence for a disk with 100 tracks and Head at 50 45, 21, 67, 90, 4, 50, 89, 52, 61, 87, 25. Calculate the seek	[5]	4	3												

	time using First Come First Serve (FCFS) disk scheduling algorithm.			
	c) Compare Paging and segmentation. Also comment on logical to physical address calculation in Paging scheme.	[5]	4	4
Q.5	a) With neat sketch, describe the practical arrangement of Language processors.	[5]	5	3
	b) Draw and explain the pass structure of assembler to design two pass assembler.	[5]	5	3
	c) Generate symbol table, literal table, pool table for the given assembler program. Assume a hypothetical instruction set with every instruction of length. START 100 A DS 05 LOAD A ADD AREG, = '5' MULT BREG, = '10' TRANS L L2 PRINT L1 LTORG L ADD AREG, = '5' SUB BREG, = '15' ADD B B EQU L + 10 ORIGIN L2+20 L1 DS 5 C DC 10 STOP END	[5]	5	3
Q.6)	a) Design a micro for the addition of two numbers. Comment on how to call a micro and how the macro is expanded during execution.	[5]	6	4
	b) Explain relocation and linking concept in detail.	[5]	6	2
	c) Design an absolute loader scheme. Draw flowchart for absolute loader design.	[5]	6	5

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