	Utech
<i>Name</i> :	4
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CS/B. Tech (EE) /SEM-5/CS-513/2011-12

2011 SYSTEM PROGRAMMING AND OPERATING SYSTEM

Time Allotted: 3 Hours Full Marks: 70

The figures in the margin indicate full marks.

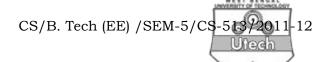
Candidates are required to give their answers in their own words as far as practicable.

GROUP - A (Multiple Choice Type Questions)

				_	•		
1.	Cho	ose t	he correct alternatives	for th	e following: $10 \times 1 = 10$		
	i)	Wh	ich of the following t	transla	ator programs converts		
		asse	embly language progra	m to o	bject program ?		
		a)	Assembler	b)	Loader		
		c)	Compiler	d)	Linker.		
	ii)	In absolute loading scheme, loader function					
		acc	omplished by an assem	ıbler.			
		a)	relocation	b)	allocation		
		c)	linking	d)	loading.		
	iii)	i) Wait-for graph is used for					
		a)	deadlock prevention	b)	deadlock avoidance		
		c)	deadlock detection	d)	all of these.		
540	4				[Turn over		

CS/B. Tech (EE) /SEM-5/CS-513/2011-12

iv)	Elev	ator	algorithm	is	also	known	as 👶
	algo	rithm	l .				In Photogram (5' Executively) 2nd Excellent
	a)	FCF	S		b)	SSTF	
	c)	C-SC	CAN		d)	SCAN.	
v)	'Allo	cate	the smalles	t ho	le that	is big	enough', defines
	memory allocation scheme.						
	a)	first	fit		b)	best fit	
	c)	wors	st fit		d)	partitic	oning.
vi)	Compaction is required to get rid of						
	a)	pagi	ng				
	b) internal fragmentation						
	c)	segn	nentation				
	d)	exte	rnal fragme	ntati	on.		
vii)	vii) Which one of the following is not a program threat?				am threat ?		
	a)	Viru	s		b)	Worm	
	c)	Troja	an horse		d)	None o	f these.
viii)	i) The scheduler selects the jobs from the poo				os from the pool		
	of jobs and loads them to the ready queue.					ie.	
	a)	long	term		b)	mediur	n term
	c)	shor	t term		d)	none o	f these.
ix)	Whe	en a 1	running pro	cess	s is int	errupted	, it switches its
	state to state.						
	a)	term	inated				
	b)	read	y				
	c)	wait	ing				
	d)	eithe	er ready or v	vaiti	ng.		



- If the time quantum is very large, then Round Robin x) scheduling algorithm approaches to scheduling algorithm.
 - **SJF** a)

Priority b)

c) SRTF d) None of these.

GROUP - B

(Short Answer Type Questions)

Answer any three of the following.

 $3 \times 5 = 15$

- 2. What is the advantage of two-pass assembler over a a) single-pass assembler?
 - What are absolute loader and relocating loader? 2 + 3b)
- 3. Write down the advantages of assembly languages. a)
 - What is LC processing? b)

3 + 2

Explain the interrupt driven I/O cycle. 4.

5

- 5. Explain the conditions of deadlock. a)
 - What is starvation and rollback? b)

3 + 2

- What is a semaphore? 6. a)
 - Explain semaphore with a classical synchronization b) 2 + 3problem.

5404

3

[Turn over

GROUP - C

(Long Answer Type Questions)

Answer any *three* of the following.

 $3 \times 15 = 45$

- 7. a) What do you mean by forward referencing?
 - b) Discuss about various data structures and passes of a two pass assembler.
 - c) What is nested macro call?
 - d) What are the function of a compiler? 2 + 8 + 2 + 3
- 8. a) Define waiting time and turn around time and preemptive scheduling algorithm.
 - b) Explain how the performance of Round Robin scheduling algorithm depends on the size of time quantum with respect to context switch.
 - c) Briefly explain critical section problem
 - d) Consider the following set of processes, with the length of CPU burst given in milliseconds.

5404

4

CS/B. Tech (EE) /SEM-5/CS-513/2011-12

Process	Arrival time	Burst time	Priority
P1	0	5	2
P2	1	2	2
Р3	1	4	1
P4	2	2	3
P5	3	3	4

Draw the Gantt chart for the execution of these processes using the following scheduling algorithms and determine the average waiting time for each process.

- i) SJF
- ii) Priority
- iii) Roun Robin (time quantum = 3) 3 + 3 + 3 + 6
- 9. a) Explain paging technique paging technique with TLB in brief.
 - b) Discuss demand paging.
 - c) What is Belady's anomaly?
 - d) Consider the following page reference string: 1, 2, 3, 4,2, 1, 5, 6, 2, 1,2, 3, 6, 3, 2, 1.

How many page faults would occur for LRU & Optimal replacement algorithms, (assuming four frames are free)? 4 + 3 + 2 + 6

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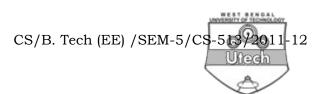
- 10. a) What is bootstrap program? Define seek time and rotational latency.
 - b) Consider a disk drive with 2000 cylinders, numbered 0 to 1999. The disk head is at cylinder 105 while it was servicing the request and moving towards cylinder 0. The disk requests are pending for service according to the following order.

125, 525, 925, 325, 1125, 1725, 1425, 625, 225, 825.

Starting from the current position, what is the total distances (in cylinders) that the disk arm moves for each of the disk-scheduling algorithms?

- i) SSTF
- ii) SCAN
- iii) C- SCAN
- c) Write do you mean by synchronous I/O and asynchronous I/O? 2 + 3 + 6 + 4

5404 6



- 11. Write short notes on any three of the following:
 - a) Distributed Operating System
 - b) Thread
 - c) Operating system services
 - d) Macro
 - e) Editors and debuggers.

5404 7