BE IT 3RD YEAR 1ST SEM
OPERATING SYSTEMS
CT1 SET-A

Time: 1 hour **Full marks: 30**

1. a) Consider the following set of processes with their arrival time and burst time given in milliseconds. Their priorities are also listed in the last column. Assume lower priority number indicates higher priority.

Process	Arrival Time	Burst Time	Priority
A	0	3	3
B	1	6	5
C	2	1	2
D	3	4	1
E	4	0.5	4

Draw separate GNATT charts and calculate the average waiting time and turnaround time for the above set of processes using Pre-emptive SJF and Pre-emptive priority scheduling algorithms.

b) Discuss the process life cycle. Use clear diagram to show the transition among the various states in the cycle.

c) **Define each of the following terms**: Dispatch Latency, Turn-around time, Waiting time, Response time.

[(3+3)+(3+2)+4=15]

2. a) What do you mean by cooperating processes? Show where the mutual exclusion property needs to be ensured in a Reader's-Writer's problem and how it is achieved.

b) **Distinguish between each of the following pairs (Any 2):** Program and process, Pre-emptive scheduling and Non pre-emptive scheduling, Binary semaphore and Counting semaphore.

c) What do you mean by a safe state? Distinguish between safe state and unsafe state.

[(1+5)+(3+3)+(1+2)=15]

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Time: 1 hour **CT1 SET-B** **Full marks: 30**

1. a) Consider the following snapshot of a system having 5 processes (*P0 to P4*) and 4 resources (*A, B, C, D*):

	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P0	0	0	1	2	0	0	1	2	1	5	2	0
P1	1	0	0	0	1	7	5	0				
P2	1	3	5	4	2	3	5	6				
P3	0	6	3	2	0	6	5	2				
P4	0	0	1	4	0	6	5	6				

i) Is the system in a safe state? If it is, then find the safe sequence.
ii) If a request from process P1 arrives for (0, 4, 2, 0), can the request be granted immediately?
b) **Distinguish between each of the following pairs (Any 2):** Deadlock and starvation, Dispatch latency and Context switch time, Multi-level queue scheduling and Multi-level feedback queue scheduling.
c) What is spinlock? Discuss advantageous and disadvantageous.

[(3+3)+(3+3)+3=15]

2. a) What do you mean by the progress property of critical section? Does Peterson solution ensure this property? If yes, explain how. If no, explain why.

b) **Define/Discuss each of the following:**
Throughput, Long term scheduler, Short term scheduler, CPU Burst, Semaphore.
c) Discuss the functionality of ready queue. State how a ready queue is implemented.

[(2+5)+5+3=15]

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OPERATING SYSTEMS
CT2 SET-A

ime: 1 hour **Full marks: 30**

a) What are the possible memory allocation schemes for contiguous memory allocation? Explain the main drawback contiguous memory allocation scheme.

Consider in a memory management system, there are 2048 entries in the conventional page table with each entry consisting of 16 bits. If each ıge size is 4KB, calculate the size of the logical and physical address space in MB. If one eighth of the total number of entries in the page table present in the TLB, calculate the amount of memory accessible by the TLB in MB. Also calculate the number of entries in the inverted page ble. How an inverted page table is searched?

[(3+2)+(2+2+2+2+2)=15]

a) Consider the following string of page reference. *String:* 7,1,2,0,3,4,2,3,0,1,3,2,4,1,7,1,0,4,3,2,0.
ow calculate the percentage of page fault for the above string of page requests using LRU algorithm assuming there are initially 3 free frames in e physical memory.

Discuss Belady's Anomaly. Calculate the number of page faults for the above page reference string considering 4 ɜe frames in the physical memory using that algorithm which causes Belady's anomaly.

Discuss the steps of handling page fault.

[4+(3+4)+4=15]

BE IT 3RD YEAR 1ST SEM

OPERATING SYSTEMS

CT2 SET-B

rime: 1 hour

Full marks: 30

1. a) Consider a swapping system in which the main memory consists of the following hole sizes in the order specified as given: 14K, 12K, 8K, 10K, 19K, 12K, 7K and 15K. Show how these holes will be allocated for the successive memory requests of processes of size 8K, 11K, 19K, 13K and 6K using first fit, best fit and worst fit algorithms. Hence calculate the amount of wasted memory for each of the 3 allocation algorithms. Show with the help of diagrams.

) Suppose in a paging system, each page in the logical memory is of size 1KB. The size of the logical and physical address space are of sizes 64 B and 512MB respectively. Calculate the number of entries in the conventional and in the inverted page tables. If 1 extra valid/invalid bit is red in the conventional page table for the purpose of memory protection, calculate the amount of memory (in MB) needed to store the ventional page table in the memory.

[(2+2+2+3)+(2+2+2)=15]

Consider a memory system with 4 physical memory frames (initially empty) and the following reference string over the given pages (come e order as specified): 1,2,3,4,2,1,5,6,2,1,2,3,7,6,2. What will be the final contents of the physical memory if LRU and OPT page replacement thms are used separately? Hence calculate the percentage of page faults for both.

y the page size is set to be equal to the frame size in paging scheme? State the purpose of page table and segment table clearly using diagrams. any inverted page tables are there in the system and why?

[(4+4)+(2+4+1)=15