

## (REVISED COURSE)

(3 Hours)

[Total Marks : 100]

- N.B. :** (1) Question 1 is compulsory.  
 (2) Attempt any **Four** out of remaining **six** Questions.  
 (3) Assumptions should be made whenever **required** and should be **clearly** stated.  
 (4) Answers to questions should be **grouped** and written **together**.  
 (5) **Draw the diagrams** whenever required.

1. (a) For the processes listed below the table, draw Gantt chart and calculate average 12 waiting time and average turn around time using :—
- FCFS (First come first serve)
  - SJF (Shortest job First) in both condition -preemptive and non-preemptive
  - Round-robin (quantum = 2)

Processes	Arrival Time(ms)	Burst Time(ms)
P1	0	9
P2	1	5
P3	2	7
P4	3	3

- (b) Explain clock hardware and software in I/O System. 8
2. (a) What are external and internal fragmentations ? Discuss the techniques to overcome 10 fragmentations.
- (b) What are the criteria of CPU scheduling? What are the contents of PCB 10 (Process Control Block) ?
3. (a) Consider following snapshot of a system :— 10

Processes	Allocation			Max			Available		
	R1	R2	R3	R1	R2	R3	R1	R2	R3
P0	0	1	0	7	5	3	3	3	2
P1	2	0	0	3	2	2			
P2	3	0	2	9	0	2			
P3	2	1	1	2	2	2			
P4	0	0	2	4	3	3			

Using banker's algorithm answers the following :—

- What is the context of matrix need ?
  - Is the system in safe state ? Give the sequence.
  - If a request from process P1 arrives for (1, 0, 2) can the request be granted immediately ?
- (b) What is virtual memory ? Explain paging technique in virtual memory. On a simple 10 paging system with  $2^{24}$  bytes of physical memory, 256 pages of logical address space, and a page size of  $2^{10}$  bytes, how many bits are in logical address ?

[TURN OVER]

4. (a) Discuss different methods of file access and also explain which one is the best access method. 10  
(b) What is deadlock ? What are the necessary conditions for occurrence of deadlock ? Also mention the methods of handling deadlock. 10
- 5 (a) What is O.S. ? What are the services provided by O.S. ? Write differences between DOS and Unix OS. 10  
(b) What is thread ? Explain different kinds of threads. 10
- 6 (a) Suppose a disk drive has 400 cylinders, numbered 0 to 399. The driver is currently serving a request at cylinder 143 and previous request was at cylinder 125. The queue of pending request in FIFO order is :—  
86, 147, 312, 91, 177, 48, 309, 222, 175, 130  
Starting from the current head position, what is the total distance in cylinders that the disk arm moves to satisfy all pending request for each of the following disk scheduling algorithms ?  
(i) SSTF (ii) SCAN (iii) C-SCAN  
(b) Which different types of shells are available in UNIX ? Explain any five salient features of UNIX in brief. 8
7. Write short notes on any **four** :— 20  
(a) Spooling  
(b) DMA  
(c) Process states  
(d) Semaphore  
(e) Context-switching  
(f) Buffering.