(d) Suppose the moving head disk with 200 tracks is currently serving a request for track 143 and just finished a request for track 125. If the queue of request is kept in FIFO order : 86, 147, 91, 177, 94, 150; what is the total head movement for the following scheduling schemes :

(i) FCFS

(ii) SSTF

(iii) C-SCAN

322456(22)

B. E. (Fourth Semester) Examination Nov.-Dec. 2019

(New Scheme)

(CSE Branch)

OPERATING SYSTEM

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

*Note : Attempt all questions. Part (a) of each question is compulsory and carries 2 marks. Attempt any **two** parts from (b), (c) and (d) which carry 7 marks each. Draw neat and clean diagram wherever necessary. Assume suitable data wherever necessary.*

Unit - I

1. (a) What do you mean by operating system?

(b) What are the functions of an operating system? Explain in brief.

(c) Explain layered approach of operating system.

(d) Explain system call, batch operating system and real time operating system.

Unit - II

2. (a) What is Process Control Block?

(b) Describe the process life cycle in detail.

(c) Explain Mutual Exclusion and Semaphore.

(d) Consider the following four process, with the length of the CPU burst time in milli seconds :

Process	Arrival Time	Burst Time
P_1	0	8
P_2	1	4
P_3	2	9
P_4	3	5

(i) Using Shortest Remaining Time First (SRT), preemptive scheduling, obtain a Gantt chart

and compute average waiting time.

(ii) Using SJF scheduling obtain a Gantt chart and compute average waiting time.

Unit - III

3. (a) What is resource allocation graph?

(b) Explain how the deadlock can be prevented?

(c) Prove that for deadlock, all the processes will be in unsafe state.

(d) Consider a system with 5 processes P_0 through P_4 and three resource types A, B and C resource. Type A has 7 instance, B has 2 instances, C had 6 instances. Suppose at t_0 time we have the following state :

Process	Allocation			Request			Available		
	A	B	C	A	B	C	A	B	C
P_0	0	1	0	0	0	0	0	0	0
P_1	2	0	0	2	0	2			
P_2	3	0	3	0	0	0			
P_3	2	1	1	1	0	0			
P_4	0	0	2	0	0	2			

PTO

and compute average waiting time.

(i) Is the given system in deadlock?

(ii) Suppose P_2 makes an additional request $(0, 0, 1)$.

What will be the effect of this request to the system?

Unit - IV

4. (a) What is Cache memory?

(b) Explain the address translation from logical to physical address using Paging technique.

(c) If the contents of reference using is : 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3 and there are three frames available in the memory, then compare the performance of given algorithm in terms of page fault :

(i) First Come First Serve (FCFS)

(ii) Optimal Page Replacement

(iii) Least Recently used (LRU)

(d) Consider the following segment table :

Segment	Base	Limit
0	219	600
1	2300	14
2	100	100
3	1500	580
4	1000	96

What are the physical addresses for the following logical address?

(i) 0430

(ii) 110

(iii) 2500

(iv) 3400

(v) 4112

Unit - V

5. (a) Define the structure of Input/Output system.

(b) Differentiate between program driven and interrupt driven input/output.

(c) What do you mean by Directory Organization of files?