B. C. S. E. 3rd year 1st Semester Supplementary Examination 2018

OPERATING SYSTEM

Time: 3 hours Full Marks: 100

Answer Question no.1 and any **four** from the rest

(All parts of the same question must be answered together)

1.

a. What is Belady's anomaly?

b. State any three necessary conditions of deadlock.

c. What are the advantages and disadvantages of Round Robin scheduling strategy?

d. What is semaphore?

e. How is memory allocated using static but variable sized partitions?

3+6+4+3+4=20

2.

a. What are the different states of a process?

b. Consider a system with four processes as shown below with corresponding arrival time and execution time:

Process	Arrival time	Execution time
P_0	0	8
P_1	5	4
P_2	7	9
P_3	12	5

Calculate waiting time and turnaround time of each process using First-Come First-Served (FCFS) scheduling policy. Show the scheduling decisions using Gantt chart.

c. How will Round Robin scheduling behave if the CPU time slice is very small?

d. What are the disadvantages of Multilevel scheduling?

4+10+3+3=20

3.

a. Consider the following page reference during a given time interval for a memory consisting of 4 frames : 1, 3, 1, 2, 0, 11,11, 2, 3, 2, 3, 0, 2, 11, 0, 11. Using both First-In First-Out (FIFO) and Least Recently Used (LRU) page replacement strategies show the contents of memory each time a page is referenced. Compare the number of page hits for both cases.

b. What are the advantages and disadvantages of Best Fit and Worst Fit strategies?

12+8=20

4.

a. Compare Contiguous File Allocation strategy with Linked File Allocation strategy.

b. What are the different free disk space management strategies? Explain any one of them with its advantages and disadvantages.

c. What are the effects of having a small file in a system with Indexed File Allocation strategy?

8+9+3=20

5.

a. What is seek time? What is rotational latency?

b. Disk requests come into the disk driver for cylinders 192, 153, 86, 111, 94, 175, 142, 66 in that order. A seek takes 2.5 msec per cylinder move. What is the total seek time to access the above requests for SCAN disk scheduling strategy? Disk arm is initially at cylinder 100. There are 0 – 199 cylinders.

c. Mention the advantages and disadvantages of First-Come First-Served (FCFS) disk scheduling strategy.

6+10+4=20

6.

Consider the following snapshot with 3 resource types (R1, R2, R3) in a system of 4 processes; P_0, P_1, P_2, P_3.

	Allocated			Maximum Requirement			Available		
	R1	R2	R3	R1	R2	R3	R1	R2	R3
P_0	0	2	0	3	2	0	6	8	5
P_1	1	2	1	2	4	2			
P_2	2	2	2	2	3	4			
P_3	2	0	2	4	2	3			

(i) What are the further requirements of each process?

(ii) Explain how you find out whether the system is *safe* or not.

(iii) Find out whether the system is in *safe* state or not. What is the safe sequence of processes, if any, in this case?

(iv) Suppose there is request from P_0 for 2 instances of R1. Show whether this request could be granted.

20

7.

a. Why is thread referred to as lightweight process? What are the different threading models?

b. Explain the transitions of the process state transition diagram.

c. How does *Demand paging* work? What are its advantages ?

6+7+7=20