2019

BCA

4th Semester Examination

OPERATING SYSTEM

Paper – 2202

Full Marks – 70

Time : 3 Hours

The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable.
*Answer question No. **1** and any **four** from the rest.*

1. Answer any **five** questions : 2×5

   (a) What is Segmentation ?

   (b) What is the purpose of system calls ?

   (c) Differentiate between Paging and demand paging.

   (d) What is thrashing ?

   (e) What is a Thread ?

(f) List the difference between multiprogramming and multiprocessing.

(g) What is aging ?

2. (a) (i) Differentiate between paging and segmentation.

(ii) Explain the address translation mechanism in paging in details. 3+3

(b) Differentiate between internal fragmentation and external fragmentation. 2

(c) What is process control block ? Discuss the various process states with a diagram. 5

(d) What do you mean by inode ? 2

3. (a) What is Belady's anomaly ? Discuss a page replacement algorithm which does not follow Belady's anomaly. 2+4

(b) Consider the following reference string :

1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6

Apply : i) FIFO, ii) LRU, iii) OPTIMAL page replacement algorithms and compare. 4

(c) Consider a set of 5 processes whose arrival time, CPU time needed and the priority are given below : 5

Process priority	Arrival Time	CPU Time (in ms)	Priority
P_1	0	10	5
P_2	0	5	2
P_3	2	3	1
P_4	5	20	4
P_5	10	2	3

Smaller the number, higher the priority If the CPU Scheduling policy is SJF with pre-emption, then find the average waiting time and also find the turn around time.

(Solve the above problem using Gnatt chart)

4. (a) What is Critical Section ? Write down the solution to the Critical Section problem. 2+3

(b) (i) Define Deadlock. 2

(ii) Consider a system with five processes and three resources. Given that resource type A has 10 instances,

B has 5 instances and C has 7 instances. And also the following snapshot of a system : 5

Process	Allocation			Max		
	A	B	C	A	B	C
P_1	0	1	0	7	5	3
P_2	2	0	0	3	2	2
P_3	3	0	2	9	0	2
P_4	2	1	1	2	2	2
P_5	0	0	2	4	3	3

Answer the following questions using the Banken's algorithm :

(i) Find the available

(ii) Find the need matrix

(iii) Find the safe sequence

(c) How can we prevent a system from deadlock ? Explain it briefly. 3

5. (a) (i) What is preemptive and non-preemptive Scheduling ? 2

(ii) Explain indexed disk storage allocation scheme with an example. 5

(b) (i) What is disk Scheduling ?

(ii) Consider the disk queue with request for of I/o to Blocks on cylinders – 98, 183, 37, 122, 14, 124, 65, 67. Initially the disk head is at cylinder no 53 and shortest - seek - time first (SSTF) is being used for scheduling in the disk access. Now the seek time is 6 ms per cylinder. So find the total seek time. 2+4

(c) In which situation you would not use Paging and why ? 2

6. (a) Consider a paging hardware with a TLB. Assume that the entire page table and all the pages are in the physical memory. It takes 10 miliseconds to search the TLB and 80 miliseconds to access the physical memory. If the TLB hit ratio is 0.6, the find the effective memory acess time. 4

(b) How does logical address differ from physical address ? 4

(c) A certain moving arm disk storage with one head has following specification : Number of tracks 1, recording surface 100, Disk rotation speed 2400 rpm, track storage capacity 62500 bits. Then find the transfer rate. 4

(d) What is Semaphore ? Give solution to producer-consumer problems using Semaphore. 3

7. (a) If a disk has a seek time of 20 ms, rotates 20 revolution per second, has 100 words per block and each track has capacity of 300 words. Then to access one block find the total time. 5

(b) What is Locality of Reference ? Discuss the types of locality of reference. 2+3

(c) (i) Explain the difference between busy waiting and blocking. 1

(ii) Define through put and turn around time. 1

(iii) Explain starvation. When and how may starvation occur ? 3

[Internal Assessment – 30 marks]