

311301**December 2023****BCA - III SEMESTER****Introduction to Operating System (BCA-17-201)**

Time : 3 Hours]

[Max. Marks : 75

Instructions :

1. It is compulsory to answer all the questions (1.5 marks each) of Part-A in short.
2. Answer any four questions from Part-B in detail.
3. Different sub-parts of a question are to be attempted adjacent to each other.

PART-A

1. (a) System software Vs application software. (1.5)
- (b) What do you understand by Virtual Machine? (1.5)
- (c) Name any 3 registers of CPU and their function. (1.5)
- (d) What is Interrupt Vector table? (1.5)
- (e) Pre-emptive Vs Non Pre-emptive Policy (1.5)
- (f) What do you understand by time-shared operating system (1.5)
- (g) Programmed I/O Vs Direct Memory Access. (1.5)
- (h) Why does starvation occur? (1.5)

- (i) What do you understand by convoy effect? (1.5)
 (j) Logical address Vs. Physical Address. (1.5)

PART-B

2. (a) Explain any goals of a good operating system. (10)
 (b) Monolithic architecture Vs. Microkernel Architecture. (5)
3. (a) Explain the 7-State process Model. (10)
 (b) Differentiate between Process Switch and Context Switch. (5)
4. Explain the round robin algorithm for CPU scheduling and how it is better than FCFS CPU Scheduling algorithm? Also, solve the following CPU scheduling problem by Round Robin algorithm when time quantum is 2 units :

Processes	Arrival Time	Burst Time
P1	0	5
P2	1	7
P3	2	3
P4	3	4

Draw the Gantt chart and find the Average waiting time, average Turn around time and average Normalized Turnaround time for the above problem. (15)

5. (a) Explain the contiguous memory allocation techniques. Mention the placement policies that are adopted for them. (10)

- (b) Explain with the help of a diagram the address translation technique for contiguous memory allocation. (5)

6. (a) What is the resource allocation graph used for? Also mention the ways for Deadlock Prevention against each of the conditions for which Deadlock can occur. (10)
 (b) For the size of memory 16 GB and if the system is 4 bytes addressable, calculate the number of bits required to represent the memory addresses. (5)
7. Define Seek time, Rotational Latency, Transfer time and Disk Access Time. Given the following queue – 95, 180, 34, 119, 11, 123, 62, 64 with the read-write head initially at the track 50 and the tail track being at 199, show the movements of the disk arm for Scan and Look Disk Scheduling algorithm. (15)