

(b) What do you understand by free space management in file allocation? (5)

7. Write short notes on (any **three**): (15)

(i) File allocation methods in Operating Systems.

(ii) Four necessary conditions for deadlock.

(iii) Mutual Exclusion.

(iv) Segmentation.

Roll No.

Total Pages : 4

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B.Sc. (MATHS & COMP.) - II SEMESTER

Introduction to Operating System (BCG-102-V)

Time : 3 Hours]

[Maximum 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) Differentiate between Program and Process. (1.5)
- (b) What is multiprogramming? (1.5)
- (c) What is Race Condition? (1.5)
- (d) What is context switching? (1.5)
- (e) What is a page fault? (1.5)
- (f) What is Thread? (1.5)
- (g) What is thrashing in memory management? (1.5)
- (h) What is Inter Process communication? (1.5)

- (i) Why is SJF scheduling better than other? (1.5)
 (j) What is the main disadvantage of Contiguous File Allocation scheme? (1.5)

PART-B

2. (a) Define an operating system and Explain the services of the operating system that are helpful for the user and the system. (5)
 (b) What is PCB? Explain its contents in detail. (5)
 (c) With a neat diagram, explain the states of a process with a transition diagram. (5)
3. (a) Consider the following set of processes, with the length of the CPU burst time given in milliseconds: (10)

Draw two Gantt charts that illustrate the execution of these processes using the following scheduling algorithms: SJF(non-premptive) and Round Robin algorithms and calculate the average waiting time of the system.

	Arrival Time	Burst Time
P ₀	1	4
P ₁	2	8
P ₂	3	2
P ₃	4	6
P ₄	5	9

- (b) What is TLB? Explain TLB in detail with a paging system with a neat diagram. (5)

4. (a) Explain deadlock prevention and avoidance techniques. (5)
 (b) Using Banker's algorithm, calculate the Need matrix and find if the system is in safe state: (10)

Process	Max	Allocation	Available
	A, B, C, D	A, B, C, D	A, B, C, D
P0	3 2 1 1	4 0 0 1	4 2 1 1
P1	2 2 1 0	1 1 0 0	
P2	2 3 5 4	1 3 5 2	
P3	1 4 3 2	0 2 1 2	
P4	1 6 5 6	0 2 1 2	

5. (a) What are semaphores? Explain its types. Write pseudocode for Producer Consumer problem. (7)
 (b) Suppose the head of moving disk with 200 tracks, numbered 0 to 199 is currently serving a request at track 132 and has just finished a request at track 120. If the queue of requests is kept in the FIFO order 38, 55, 86, 123, 147, 91, 177, 115, 94, 150, 100, 175, 130 and 185. What is total head movement to satisfy these request for the following disk scheduling algorithms?
 (a) FCFS.
 (b) LOOK. (8)
6. (a) What is a file? What are its attributes? Discuss any two file allocation methods in detail. (10)