

**GANPAT UNIVERSITY**

**B. Tech Semester - IV Computer Engineering/Information Technology**  
**Regular Examination May/June - 2012**

**2CE402/2IT402/CE402/IT402: OPERATING SYSTEMS**

**[Total Marks: 70]**

**Time: 3 Hours]**

**Instructions:**

1. Attempt all questions.
2. Figures to the right indicate full marks
3. Each section should be written in a separate answer book

**SECTION-I**

- Q-1.** (A) Discuss & Compare FCFS and RR Scheduling algorithm in brief. [4]  
 (B) Explain Producer Consumer problem in details. Write a solution to the problem using semaphore. [4]  
 (C) Suppose that the following processes arrive for execution at the times indicated. Each process will run the listed amount of time. In answering the questions, use non-preemptive scheduling and base all decisions on the information you have at the time the decision must be made. [4]

Process Name	Arrival Time	Burst(service) time
P1	0.0	8
P2	0.4	4
P3	1.0	1

- a. What is the average turnaround time for these processes with the FCFS scheduling algorithm?
- b. What is the average turnaround time for these processes with the SJF scheduling algorithm?
- c. Compute what the average turnaround time will be if the CPU is left idle for the first 1 unit and then SJF scheduling is used.

**OR**

- Q-1.** (A) Differentiate preemptive & non preemptive scheduling approaches. Describe SJF preemptive in brief. [4]  
 (B) Describe the concept of Micro kernel & virtual machines. [4]  
 (C) Discuss the Sleeping barber problem in brief. Write a solution to the problem using semaphore. [4]  
**Q-2.** (A) Write a short note on Deadlock recovery approach. [4]  
 (B) Consider the following snapshot of a system. [4]

Process	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P0	0	0	1	2	0	0	1	2	2	1	0	0
P1	2	0	0	0	2	7	5	0				
P2	0	0	3	4	6	6	5	6				
P3	2	3	5	4	4	3	5	6				
P4	0	3	3	2	0	6	5	2				

Answer the following question using Banker's Algorithm:

- i) What is the content of matrix Need?
  - ii) Is the system in safe state? If yes then write a safe sequence.
  - iii) If a request from process P2 arrives for (0,1,0,0), can the request be granted immediately?
- (C) What is busy waiting? Define Race conditions and describe the method used to prevent race condition. [3]

**OR**

- Q-2.** (A) Discuss the usage of resource allocation graph and wait for graph in brief. [4]  
 (B) Write a short note on deadlock prevention. [4]  
 (C) What is scheduler? Explain types of scheduler in brief. [3]



Q-3. (A) Answer the following questions:

1. What do you mean by an Operating System? Discuss Simple Structure of an Operating System.
2. Write down necessary conditions for deadlock.
3. Discuss the dual mode operations of operating systems
4. Explain Process state diagram.

(B) Consider the following set of process.

Process Name	Arrival Time	Burst (service) time
P0	0	3
P1	1	5
P2	3	2
P3	8	5
P4	12	4

Calculate Average waiting time for following Algorithm

- (1) Round Robin (Time quantum = 3)
- (2) Shortest Job First (Preemptive)
- (3) FCFS

## SECTION-II

Q-4. (A) Explain paging with block diagram.

(B) When page fault will occur? Write down step to Handle page fault

(C) Explain dynamic loading and dynamic linking in brief.

OR

Q-4. (A) Describe Hierarchical paging with diagram.

(B) Define the following terms:

(1) ASIDs (2) Thrashing (3) Hit Ratio (4) pre-paging

(C) Write the differences between Global Allocation and Local Allocation. Consider three processes (P1, P2 and P3) running in system. Process P1 size is 50 pages, Process P2 size is 180 pages and Process P3 size is 170 pages. Split the available 200 frames among these three processes using proportional Allocation scheme.

Q-5. (A) Describe inverted page table with diagram.

(B) How many page faults would be encountered using FIFO, Stack and Optimal page replacement algorithms for following reference string? Frames size is 4

Reference string: 1 0 2 1 2 3 4 1 2 5 3 4 8 4 1 2 5 1 2 3 1

(C) Explain Layered structure of file system in details.

OR

Q-5. (A) Discuss access methods for files in brief.

(B) Explain counting based and page buffering page replacement algorithm.

(C) Discuss acyclic graph directory structure in brief.

Q-6. Answer the following (Any Three)

(A) Explain contiguous and linked file allocation method in detail.

(B) Discuss different way for Directory Implementation.

(C) Suppose that disk drive has 350 cylinders numbered 0 to 349. The drive is currently serving a request at cylinder 75, and the previous request was at cylinder 25. The queue of pending request in FIFO order is 92, 80, 333, 12, 10, 124, 196, and 289. Calculate total head movement (in cylinder) using FCFS, SSTF, SCAN and LOOK disk scheduling algorithm.

(D) Explain Disk structure in details.

END OF PAPER