

**GANPAT UNIVERSITY****B. Tech Semester - IV Computer Engineering/Information Technology****Regular Examination May-June - 2013****2CE402/2IT402/CE402/IT402: OPERATING SYSTEMS****Time: 3 Hours]****[Total Marks: 70**

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) Explain various scheduling criteria. [4]
- (B) Describe the various services which are provided by operating system from the user's perspective and from the system's perspective. [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

Calculate the average turnaround time for these processes with the FCFS, SJF scheduling algorithm.

**OR**

- Q-1. (A) Describe Dual mode operation with its need in operating system. [4]
- (B) Explain Process Control Block and discuss the context switching. [4]
- (C) Consider the following set of processes with the length of CPU burst time given in milliseconds. [4]

Process	Arrival Time	Burst Time	Priority
P1	0	10	3
P2	0	1	1
P3	1	2	3
P4	2	1	4
P5	3	5	2

Calculate the average turnaround time and average waiting time using following algorithm: 1) Priority Non-Preemptive 2) Priority Preemptive

- Q-2. (A) Discuss the Sleeping barber problem in brief. Write a solution to the problem using semaphore. [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) List out the various ways to achieve mutual exclusion and explain the Peterson's solution in detail. [3]

**OR**

- Q-2. (A) Discuss the producer consumer problem in brief. Write a solution to the problem using semaphore. [4]
- (B) Describe Banker's algorithm with an example. [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. Describe Race condition with an example.
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	9	4

Calculate Average waiting time for following Algorithm

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

## SECTION-II

Q-4. (A) A process needs 5 pages A,B,C,D,E in following order: A,B,C,D,A,B,E,A,B,C,D,E (Assume the available free frames are 3) Calculate the number of page faults using FIFO, LRU and Optimal algorithm. [4]

(B) Justify : "Paging doesn't suffer from External fragmentation" [4]

(C) Define: Seek Time, Rotational latency, Thrashing, Hit Ratio. [4]

OR

Q-4. (A) Explain FIFO & Optimal page replacement algorithm with an example. [4]

(B) Discuss the various implementation of page table with its advantages and disadvantages. [4]

(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. [4]

Q-5. (A) Explain following Disk block Allocation methods for files along with their relative advantages & disadvantages: [5]

- (a) Continuous Allocation Method
- (b) Linked Allocation Method

(B) How many page faults would be encountered using FIFO, LRU and Optimal page replacement algorithms for following reference string? Available free frames are 4. [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 External Fragmentation. [2]

OR

Q-5. (A) Describe different directory structure in brief. [5]

(B) Discuss the various attributes of a file? What are the methods that help in accessing the information stored in a file? Discuss them briefly? [4]

(C) Describe Internal fragmentation. [2]

Q-6. (A) Given memory partition of 100 KB, 500 KB, 200 KB, and 600 KB. Show with neat sketch how would each of the first-fit, best-fit and worst-fit algorithms place process of 412 KB, 317 KB, 112 KB and 326 KB. Which algorithm is most efficient in memory allocation? [4]

(B) Suppose that disk drive has 512 cylinders numbered 0 to 511. The drive is currently serving a request at cylinder 110. The queue of pending request in FIFO order is 84, 302, 103, 96, 407, 113. Calculate total head movement (in cylinder) using FCFS, SSTF, SCAN and LOOK disk scheduling algorithm. [4]

(C) Explain Disk structure in details. [4]

END OF PAPER