Exam No: _____

GANPAT UNIVERSITY

B. TECH SEM- IV (CE/IT) REGULAR EXAMINATION– APRIL-JUNE 2016

2CE402/2IT402: Operating System

TIME: 3 HRS

TOTAL MARKS: 60

Instructions: (1) This Question paper has two sections. Attempt each section in separate answer book.
(2) Figures on right indicate marks.
(3) Be precise and to the point in answering the descriptive questions.

SECTION: I

Q.1 (A) Define operating system. Explain dual mode operation of operating system. [2]

Q.1 (B) Consider the following set of processes with the length of CPU burst time (service time) given in milliseconds. [5]

Process	Arrival Time	Burst Time
P1	0	8
P2	3	4
P3	6	3
P4	12	2
P5	15	6

Calculate the average turnaround time and average waiting time using following algorithms: 1) FCFS 2) SJF- non-preemptive 3) SJF- preemptive 4) RR (with q=3)

Q.1 (C) Explain PCB. Describe context-switching mechanism with an example. [3]

OR

Q.1 (A) Define scheduler. Explain types of scheduler. [2]

Q.1 (B) Consider the following set of processes with the length of CPU burst time (service time) given in milliseconds. [5]

Process	Arrival Time	Burst Time	Priority
P1	0	6	2
P2	1	4	1(highest)
P3	5	2	3
P4	7	3	4 (lowest)

Calculate the average turnaround time and average waiting time using following algorithms: 1) SJF- non-preemptive 2) SJF- preemptive 3) RR (with q=2) 4) Priority

Q.1 (C) Explain following operating system structures: [3]
1. Simple 2. Layered Approach 3. Micro-kernels

Q.2 (A) Define the bounded buffer problem. Write a solution to the problem using semaphore. [3]

Q.2 (B) Define Deadlock. Explain four necessary conditions for the deadlock in a system. [3]

Q.2 (C) Discuss race conditions with an example. [2]

Q.2 (D) Draw the resource allocation graph for the following: [2]

Allocation	Request
R1→ P2, R1→P3	P1→R1
R2→P1, R2→P4	P3→R2

Will deadlock occur or not? Consider two instances of each resource type R1 & R2.

OR

Q.2 (A) Define sleeping barber problem. Write a solution to the problem using semaphore. [3]

Q.2 (B) Explain Deadlock and mechanisms to handle it. Describe deadlock avoidance approach when each resource in the system have single instance. [5]

Q.2 (C) Describe deadlock recovery approaches. [2]

Q.3 (A) Explain process state diagram.

Q.3 (B) Consider the following snapshot of a system:

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 (1,1,0,0), can the request be granted immediately?

Q.3 (C) Define critical section. Write down different mechanisms to provide mutual exclusion. Explain any one mechanism in brief. [3]

SECTION: II

Q.4 (A) Explain concept of paging with block diagram. [4]

Q.4 (B) Given fixed memory partition of 200KB, 350KB, 400KB, and 600KB. Show with neat sketch how would each of the first-fit, best-fit and worst-fit algorithms place process of 400KB, 317KB, 112KB and 326KB. Which algorithm is most efficient in memory allocation? [4]

Q.4 (C) Describe the swapping with an example. [2]

OR

Q.4 (A) What is page fault? Explain and write steps to handle page fault. [4]

Q.4 (B) Explain contiguous and linked file allocation method using proper diagram. [4]

Q.4 (C) Consider three processes (P1, P2 and P3) in system. Process P1 size is 55 pages, Process P2 size is 97 pages and Process P3 size is 135 pages. Split available 150 frames among these three processes using proportional allocation scheme. [2]

Q.5 (A) List our various directory structures and explain any two. [4]

Q.5 (B) Draw and explain moving head mechanism of magnetic disk. [4]

Q.5 (C) Differentiate Internal and External fragmentation. [2]

OR

Q.5 (A) List out various structures of page tables and Explain any one in details. [4]

Q.5 (B) Assuming the current disk cylinder to be at 50 and the sequence of request for the cylinders is as follows: 1, 36, 49, 65, 53, 1, 2, 3, 20, 55, 16, 65, 78. Calculate total head movements (in terms of cylinders) using following algorithms: [4]

a) Shortest-Seek Time First (SSTF).
b) LOOK

Q.5 (C) Define: i) Hit Ratio ii) Locality of reference [2]

Q.6 (A) A process has been allocated 3 page frames. Assume that none of the pages of the process are available in the memory initially. The process makes the following sequence of page reference(reference string); b, a, e, b, b, a, c, f, d, b, e, a, c, f
How many page faults would be encountered using FIFO, OPTIMAL and LRU page replacement policy? [4]

Q.6 (B) Discuss various file access methods in brief. [4]

Q.6 (C) What is Belady's anomaly in operating system? Explain by an example [2]

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