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Total number of printed pages – 3

B. Tech
PCCS 4304

Sixth Semester Regular Examination – 2015

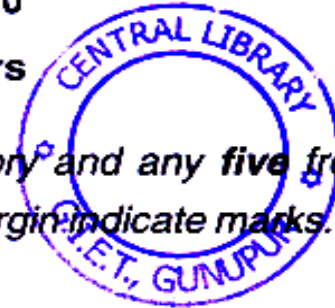
OPERATING SYSTEM

BRANCH : CSE

QUESTION CODE : J 202

Full Marks – 70

Time : 3 Hours



*Answer Question No. 1 which is compulsory and any five from the rest.
The figures in the right-hand margin indicate marks.*

1. Answer the following questions : 2×10
 - (a) What are the main advantages of multiprogramming ?
 - (b) What is Throughput, Turnaround time, Waiting time and Response time ?
 - (c) Consider a system consisting of four resources of the same type that are shared by three processes, each of which needs at most two resources. Show that the system is deadlock free.
 - (d) Differentiate between a page and a segment.
 - (e) Differentiate between internal and external fragmentation.
 - (f) What is a Process control block ? Explain all its components.
 - (g) What is the difference between synchronization and mutual exclusion ?
 - (h) What is swapping and what is its purpose ?
 - (i) Differentiate between Logical and Physical file system.
 - (j) What do you mean by logical address and physical address ?
2. (a) Distinguish between multiprogramming and multiprocessing. What are the key motivation for the development of each ? 5

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- (b) Differentiate between long-term scheduler and short-term scheduler. What is the purpose of medium-term scheduler? 5
3. (a) Assume, we have the workload as shown below. All 5 processes arrive at time 0, in the order given. The length of the CPU burst time is given in milliseconds 5

Process :	P1	P2	P3	P4	P5
Burst Time :	10	29	3	7	12

Considering the FCFS, SJF and RR (time quantum=10 ms) scheduling algorithms, which algorithm would give the minimum average waiting time.

- (b) Explain Dining Philosophers Problem and give its solution. 5
4. Consider the following snapshot of a system : 10

	<u>Allocation</u>				<u>MAX</u>				<u>Available</u>			
	A	B	C	D	A	B	C	D	A	B	C	D
P0	0	0	1	2	0	0	1	2	1	5	2	0
P1	1	0	0	0	1	7	5	0				
P2	1	3	5	4	2	3	5	6				
P3	0	6	3	2	0	6	5	2				
P4	0	0	1	4	0	6	5	6				

Answer the following questions using the Banker's algorithm

- (i) What is the content of the matrix Need ?
- (ii) Is the system in safe state? If so, what is the safe sequence ?
- (iii) If a request from a process P1 arrives for (0, 4, 2, 0) can the request be granted immediately ?
5. (a) Give an example of a simple resource deadlock involving three processes and three resources. Draw the appropriate resource allocation graph. 5
- (b) Explain the principles of segmentation with examples. 5
6. (a) When do page fault occurs ? Describe the actions taken by the operating system, when a page fault occurs. 5
- (b) Given the memory partitions of 600K,200K,250K,500K(in order) how would each of the *first-fit*, *best-fit* and *worst-fit* algorithms place processes of 128K,581K,411K,221K(in order) ? Which algorithm makes the efficient use of memory ? 5

7. (a) Suppose that the head of a moving hard disk with 200 tracks, numbered 0 to 199, is currently serving a request at track 143 and has just finished a request at track 125. The queue of requests is kept in the FIFO order- 86,147,91,177,94,150,102,175,130

What is the total number of head movements needed to satisfy these requests for the following disk-scheduling algorithms ? 5

- (a) FCFS Scheduling
- (b) SSTF Scheduling
- (c) SCAN Scheduling.

- (b) Discuss the linked allocation and index allocation schemes for a file allocation. Compare the index allocation scheme with the contiguous allocation scheme

5

8. Answer any **two** of the following :

5 × 2

- (a) Disk Structure
- (b) RAID Structure
- (c) Thrashing
- (d) I-Nodes.

