

Roll No.

BCA-402(N)

B. C. A. (Fourth Semester)

EXAMINATION, May, 2017

(New Course)

Paper Second

OPERATING SYSTEM

Time : Three Hours]

[Maximum Marks : 75

Note : Attempt questions from all Sections as directed.

Inst. : The candidates are required to answer only in serial order. If there are many parts of a question, answer them in continuation.

Section—A

(Short Answer Type Questions)

Note : All questions are compulsory. Each question carries 3 marks.

1. (A) What are major services provided by an Operating System ?
- (B) Discuss Paging and Segmentation in terms of logical address to Physical address translation technique.

- (C) Discuss external fragmentation and internal fragmentation with respect to main memory allocation.
- (D) Discuss virtual memory. Which method is used to implement virtual memory technique ?
- (E) Define throughput, CPU utilization and response time criteria of any CPU scheduling algorithm.
- (F) What is semaphore ? Describe.
- (G) Draw resource allocation graphs for three processes P1, P2, P3 and P4 resources R1, R2, R3, R4 with one, two, one, four instances respectively.

Process States Status :

- (i) Process P1 is holding an instance of resource type R2 and waiting for an instance of R1.
- (ii) Process P2 is holding an instance of R1 and waiting for R3.
- (iii) Process P3 is holding an instance of R3.
- (H) Define seek time and rotational latency of disk.
- (I) Name the different file access methods and describe each in brief.

Section—B

(Long Answer Type Questions)

Note : Attempt any two questions. Each question carries 12 marks.

- 2. (a) What are the basic functions does an operating system perform as a resource manager ?

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- (b) Write a short note on multiprogramming and time sharing systems.
3. (a) Under what circumstances does Page fault occur ? Describe the actions taken by the operating system when Page fault occurs.
- (b) Given memory partition of 100 kb, 500 kb, 200 kb, 300 kb and 600 kb (in order). How would each of the best fit, first fit and worst fit algo place processes of 210 kb, 410 kb, 110 kb and 420 kb (in order) ?
- Which Algorithm makes the most efficient use of memory ?
4. (a) Discuss swapping.
- (b) When is the need for page replacement occurs ? Consider the following reference strings :
1, 2, 3, 4, 2, 1, 6, 5, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6
- How many page faults will occur for :
- (i) LRU replacement
- (ii) FIFO replacement
- Assuming 5 frames.

Note : Initially all frames are empty.

5. Draw Gantt chart for the following situation :

Process	Burst time	Priority
P1	10	3
P2	1	1
P3	2	3
P4	1	4
P5	5	2

The processes are answered to have arrived in order P1, P2, P3, P4, P5 all at time = 0.

Find average waiting time using FCFS, SJF, non-preemptive priority. (Small priority number means highest priority).

Section—C

(Long Answer Type Questions)

Note : Attempt any *two* questions. Each question carries 12 marks.

6. (a) What is deadlock ? What are the methods to handle deadlock ?
- (b) Show disk structure pictorially. Find the total capacity of a disk based on the disk parameters.
7. Consider the following snapshot of a system :

	Allocation					Max.				Available			
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 Banker's algorithm :

- (a) What is the content of matrix need ?
- (b) Is the system in safe state ? Justify.
- (c) If a request from P1 arrives for (1, 4, 2, 0), can the request be granted immediately.

8. (a) Discuss the contiguous and linked allocation methods for disk space.
- (b) What is a process ? What are the different states of a process. What is PCB ?
9. For a disk queue with requests for I/O to blocks on cylinder :

90, 50, 80, 120, 170, 60, 70, 140

in that order. If the disk head is initially at cylinder 55, find the total no. of head movement with proper schematic diagram for the following disk scheduling :

- (a) FCFS
- (b) SCAN
- (c) C-SCAN

Assume total no. of cylinders is 200.