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B.C.A. (Semester III) EXAMINATION, 2016
303 : INTRODUCTION TO OPERATING SYSTEM
(2013 PATTERN)

Time : Three Hours

Maximum Marks : 80

N.B. :— (i) *All* questions are compulsory.

(ii) Neat diagram must be drawn wherever necessary.

1. Attempt any *eight* of the following : **[8×2=16]**

- (a) Define system program.
- (b) What do you mean by non-preemptive scheduling ?
- (c) Define process.
- (d) What is claim edge ?
- (e) Define swap time.
- (f) Define rollback.
- (g) Define the term physical address.
- (h) What is Turn-Around Time ?
- (i) List the methods for deadlock handling.
- (j) What is CPU-I/O Burst Cycle ?

2. Attempt any *four* of the following : **[4×4=16]**

- (a) Explain Resident Monitor in brief.

P.T.O.

- (b) List and explain system call related to process and job control.
- (c) Describe solution for critical section problem.
- (d) Explain wait-for graph with e.g.
- (e) Consider the following set of processes with the length of CPU Burst time and arrival time in milliseconds :

Process	Arrival Time	Burst Time
P ₁	0	3
P ₂	2	6
P ₃	4	4
P ₄	6	5
P ₅	8	2

Calculate turn around time, waiting time, average waiting time and average turn around time using preemptive SJF Scheduling algorithm.

3. Attempt any *four* of the following : [4×4=16]

- (a) Explain direct access method in detail.
- (b) Explain the dirty bit concept.
- (c) Write a short note on multilevel queue scheduling.
- (d) List and explain *two* types of multiprocessor system.
- (e) Consider the following page reference string :

4, 3, 2, 1, 4, 3, 5, 4, 3, 2, 1, 5.

Find the number of page fault for the following algorithm with 3 frames :

- (1) MFU
- (2) FIFO.

4. Attempt any *four* of the following : [4×4=16]

- (a) Explain in detail the short term scheduler.
- (b) Explain free space management of file system in detail.
- (c) Explain in detail the various process states with the help of diagram.
- (d) Describe I/O Hardware with its types of I/O devices.
- (e) Consider the following job queue :

Job	Memory	Time
1	100 K	8
2	90 K	3
3	30 K	17
4	50 K	4
5	40 K	9

Show the memory map of various stages by using MVT scheduling. Assumption total memory is of 400 K and monitor of 100 K and all jobs are arrived at same time.

5. Attempt any *four* of the following : [4×4=16]

- (a) List and explain services provided by the operating system.
- (b) Explain contiguous Allocation method in detail.
- (c) List and explain the scheduling criteria.
- (d) The request queue is as follows :

86, 147, 91, 170, 95, 130, 102, 70

Number of Tracks : 0 to 199

Starting position or current head position = 125

Find total head movement by applying SCAN disk scheduling algorithm.

- (e) Consider the following snapshot of system. A system has 5 processes and 3 resources :

	Allocation			MAX			Available		
	A	B	C	A	B	C	A	B	C
P ₀	0	1	0	7	5	3	3	3	2
P ₁	2	0	0	3	2	2			
P ₂	3	0	2	9	0	2			
P ₃	2	1	1	2	2	2			
P ₄	0	0	2	4	3	3			

Answer the following questions using Banker's Algorithm :

- (1) What are the content of Need Matrix ?
- (2) Is the system in a safe state ? If yes, give the safe sequence.