

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)**

CLASS: MCA
BRANCH: MCA

SEMESTER : II
SESSION : SP/19

SUBJECT : CA457 OPERATING SYSTEM

TIME: 3.00 Hrs.

FULL MARKS: 50

INSTRUCTIONS:

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
 2. Attempt all questions.
 3. The missing data, if any, may be assumed suitably.
 4. Before attempting the question paper, be sure that you have got the correct question paper.
 5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
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Q.1(a) What do you mean by a time sharing system? Two persons using the same time sharing system at the same time notice that the response times to their programs differ widely. What are the possible reasons for the difference? Compare their activities. [5]

Q.1(b) What do you mean by 'degree of multiprogramming'? An increase in the degree of multiprogramming, m , would result in an increase in throughput. Justify. [5]

Q.2(a) As a process executes, it changes state. The state of a process is defined in part by the current activity of that process. With a neat diagram, discuss the various states of a process. [5]

Q.2(b) Consider the following set of processes, with the length of the CPU bursts given in milliseconds: [5]

Process	Burst time	Priority
P1	2	2
P2	1	1
P3	8	4
P4	4	2
P5	5	3

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

- (i) Draw four Gantt charts that illustrate the execution of these processes using the following scheduling algorithms: FCFS, SJF, non-preemptive priority (a larger number implies a higher priority), and RR. [5]
- (ii) What is the turn-around time of each process for each of the scheduling algorithms in part (i). [5]
- Q.3(a) *Paging* is a memory management scheme that permits the physical address space of a process to be non-contiguous. Discuss the basic method of *paging* along with the necessary paging hardware. [5]

Q.3(b) Consider the following page reference string to solve the problem- [5]

7	2	3	1	2	5	3	4	6	7	7	1	0	5	4	6	2	3	0	1
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Assume dynamic paging with 3 frames, how any page faults would occur for the following replacement algorithms: (i) FIFO replacement (ii) Optimal replacement.

Q.4(a) Write a short note, along with a neat diagram, on actions to be performed during a file deletion operation if links exist in the directory structure. [5]

Q.4(b) Users have diverse requirements of a file system, such as convenience, high reliability, fast response and access to files on other computer systems. A single file system cannot provide all these features, so an operating system provides a virtual file system (VFS), which facilitates simultaneous operation of several file systems. Discuss the various aspects of a virtual file system. [5]

Q.5(a) What are the various classes of security attacks? Discuss the various security threats. [5]

Q.5(b) Enlist and describe the various operating system techniques for defeating attacks on passwords. [5]

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