D 51957 **(Pages 2)** **Name**.....

Reg. No.....

FIRST SEMESTER M.TECH. DEGREE EXAMINATION, DECEMBER 2013

Computer Science and Engineering

MCS 10 102—OPERATING SYSTEM DESIGN

Time : Three Hours Maximum : 100 Marks

Answer any **five** *questions by choosing at least one question from each module.*

MODULE I

1. (a) Explain the sequence of actions during context switching caused by an interrupt. (5 marks)

(b) Explain the architecture of Operating system. (5 marks)

(c) Discuss the essential properties of the following operating systems :

(i) Batch.

(ii) Time shared.

(iii) Real-time.

(iv) Distributed.

Or

2. (a) Explain how pipes allow to use variable sized messages ? What are the advantages of named pipes over pipes with internal names ? Are there any disadvantages ? (10 marks)

(b) Explain the working client-server IPC pattern. Write code for file server with clients. (10 marks)

MODULE II

3. (a) What is the distinction between competing process and co-operating process ? (5 marks)

(b) Consider the following set of five processes arrive in order P1, P2, P3, P4, P5 at time 0 with CPU-burst time and priority given in milliseconds.

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

(i) Draw Gantt chart illustrating the execution of these processes using FCFS, SJF, non-preemptive priority (smaller priority number implies higher priority) and Round Robin (quantum = l) scheduling.

Turn over

(ii) What is the turnaround time of each process for each scheduling algorithms in part I ?

(iii) What is the waiting time of each process for each scheduling algorithms in part I ?

(15 marks)

4. (a) Two-phase locking can lead to starvation. Explain how this can happen. Explain why deadlock is not possible.

(8 marks)

(b) Explain in detail the working of following synchronization primitives with example :

(i) Monitor.

(ii) Rendezvous.

(iii) Protected variables.

(12 marks)

MODULE III

5. (a) What are the advantages and disadvantages with two-level paging ? (5 marks)

(b) Explain the concept of disk caching. (5 marks)

(c) Explain general clock algorithm for page replacement. (10 marks)

6. (a) What are the similarities and difference between serial port controller and SCSI controller ?

(8 marks)

(b) A disk unit has 12 recording surfaces 7000 cylinders. There is an average of 200 sectors per track and each sector has 512 bytes of data.

(12 marks)

(i) What is the maximum number of bytes that can be stored in this unit ?

(ii) What is the data transfer rate in bytes per second at a rotational speed of 7200 r.p.m. ?

MODULE IV

7. (a) Explain the working of pathname lookup algorithm in directory implementation with relevant flowcharts.

(10 marks)

(b) Explain the concept of file system mounting. How does mounting change pathname lookup algorithm.

(10 marks)

8. (a) Advantages of log structured file system. (5 marks)

(b) Describe mechanisms adopted to improve reliability of file system. (5 marks)

(c) Explain various mechanisms by the operating system to ensure software protection.

(10 marks)