



Name :

Roll No. :

Invigilator's Signature :

CS/M.Tech (IT)/SEM-2/MSE-201/2012
2012
OPERATING SYSTEM

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words
as far as practicable.*

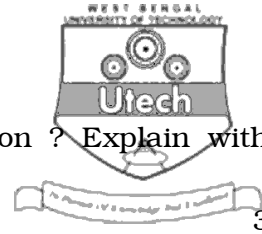
Answer any *five* questions.

5 × 14 = 70

1. a) Describe the task of long term, short term and medium term scheduler. 3
- b) What do you mean by CPU scheduling ? 2
- c) Mention one characteristic each of time sharing system and batch processing system. 2
- d) Describe process control block with proper explanation. 3
- e) Consider the following set of processes.

| Process | CPU Burst time (in ms) |
|---------|--------------------------|
| P_1 | 15 |
| P_2 | 5 |
| P_3 | 7 |
| P_4 | 10 |

Draw the Gantt chart for Round Robin scheduling, where time quantum = 4 ms. Calculate average waiting time and turn around time. 4



2. a) What do you mean by critical section ? Explain with example. 3
- b) What is semaphore ? 3
- c) Describe with proper example about mutex. 3
- d) What is dining philosopher's problem ? Describe an algorithm to solve the problem using semaphore. 5
3. a) What do you mean by an absolute loader ? Explain the difference between linking and loading. 1 + 2
- b) Explain the salient differences between a high level language and an assembly level language. 3
- c) Explain with example, top-down and bottom-up parsing. 3
- d) What are the different phases in a compilation process ? Exhibit by means of a figure. 3
- e) What is Belady's Anomaly ? 2



4. a) Distinguish between deadlock and starvation. 3
- b) Explain the deadlock detection mechanism in case of single instance of each resource type. 3
- c) Consider the following example.

| Process | Allocation | | | Max | | | Available | | |
|---------|------------|---|---|-----|---|---|-----------|---|---|
| | X | Y | Z | X | Y | Z | X | Y | Z |
| P_1 | 0 | 1 | 0 | 7 | 5 | 3 | 3 | 3 | 2 |
| P_2 | 2 | 0 | 0 | 3 | 2 | 2 | | | |
| P_3 | 3 | 0 | 2 | 9 | 0 | 2 | | | |
| P_4 | 2 | 1 | 1 | 2 | 2 | 2 | | | |
| P_5 | 0 | 0 | 2 | 4 | 3 | 3 | | | |

Solve the following questions using the Banker's algorithm. 6

- i) What is the content of the matrix need ?
- ii) Is the system in a safe state ? Explain.
- iii) If a request from process P_2 arrives for (1, 0, 2), can the request be granted immediately ?
- d) What is the difference between multi-programming and multi-tasking ? 2
5. a) Why are page sizes always power of 2 ? 2
- b) What are the major differences between paging and segmentation ? 4



- c) Given references to the following pages by a program.

0, 9, 0, 1, 8, 1, 8, 7, 8, 7, 1, 2, 8, 2, 7

How many page faults will occur, if the program has three page frames available to it and uses both

- i) FIFO replacement strategy

- ii) LRU replacement strategy ? 4 + 4

6. a) Write down the merits and demerits of a virtual memory system. 4

- b) Explain the difference between internal fragmentation and external fragmentation. Which one occurs in paging system ? How the problem of external fragmentation be solved ? 3 + 1 + 2

- c) Suppose a disk drive has 300 cylinders numbered 0 to 220. The current head position of the disk is at 80. The queue of pending request in FIFO order is 36, 79, 15, 120, 198, 165, 89, 172.

Calculate the average cylinder movements for SSTF algorithm. 4

7. Write short notes on any *two* of the following : 2 × 7

- a) File allocation technique
b) Thrashing
c) Demand paging.
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