



Name :

Roll No. :

Invigilator's Signature :

CS/B. Tech (EE) /SEM-5/CS-513/2011-12

2011

**SYSTEM PROGRAMMING AND
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.*

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for the following : $10 \times 1 = 10$
 - i) Which of the following translator programs converts assembly language program to object program ?
 - a) Assembler
 - b) Loader
 - c) Compiler
 - d) Linker.
 - ii) In absolute loading scheme, loader function is accomplished by an assembler.
 - a) relocation
 - b) allocation
 - c) linking
 - d) loading.
 - iii) Wait-for graph is used for
 - a) deadlock prevention
 - b) deadlock avoidance
 - c) deadlock detection
 - d) all of these.

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- ## GROUP – B

Answer any *three* of the following.

$$3 \times 5 = 15$$

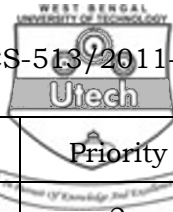
- [Turn over



GROUP – C
(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

7. a) What do you mean by forward referencing ?
- b) Discuss about various data structures and passes of a two pass assembler.
- c) What is nested macro call ?
- d) What are the function of a compiler ? $2 + 8 + 2 + 3$
8. a) Define waiting time and turn around time and preemptive scheduling algorithm.
- b) Explain how the performance of Round Robin scheduling algorithm depends on the size of time quantum with respect to context switch.
- c) Briefly explain critical section problem
- d) Consider the following set of processes, with the length of CPU burst given in milliseconds.



Process	Arrival time	Burst time	Priority
P1	0	5	2
P2	1	2	2
P3	1	4	1
P4	2	2	3
P5	3	3	4

Draw the Gantt chart for the execution of these processes using the following scheduling algorithms and determine the average waiting time for each process.

- SJF
- Priority
- Roun Robin (time quantum = 3) 3 + 3+ 3 + 6

- Explain paging technique paging technique with TLB in brief.
 - Discuss demand paging.
 - What is Belady's anomaly ?
 - Consider the following page reference string : 1, 2, 3, 4, 2, 1, 5, 6, 2, 1,2, 3, 6, 3, 2, 1.

How many page faults would occur for LRU & Optimal replacement algorithms, (assuming four frames are free) ?

4 + 3 + 2 + 6



10. a) What is bootstrap program ? Define seek time and rotational latency.

b) Consider a disk drive with 2000 cylinders, numbered 0 to 1999. The disk head is at cylinder 105 while it was servicing the request and moving towards cylinder 0. The disk requests are pending for service according to the following order.

125, 525, 925, 325, 1125, 1725, 1425, 625, 225, 825.

Starting from the current position, what is the total distances (in cylinders) that the disk arm moves for each of the disk-scheduling algorithms ?

- i) SSTF
 - ii) SCAN
 - iii) C- SCAN
- c) Write do you mean by synchronous I/O and asynchronous I/O ?

2 + 3 + 6 + 4



11. Write short notes on any *three* of the following : 3×5

- a) Distributed Operating System
 - b) Thread
 - c) Operating system services
 - d) Macro
 - e) Editors and debuggers.
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