Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.Tech(EE-NEW)/SEM-5/CS-513/2010-11

2010-11

SYSTEM PROGRAMMING & 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) Minimum ....., number(s) of processes can create deadlock.
   a) four b) three
   c) two d) one.

ii) The page size and frame size
   a) should be equal b) need not be equal
   c) page size > frame size d) frame size > page size

iii) Wait-die scheme is a ..... scheme.
   a) deadlock detection b) deadlock prevention
   c) deadlock avoidance d) deadlock recovery.

iv) For designing distributed file system ..... transparencies are required.
   a) access transparency
   b) naming transparency
   c) replication transparency
   d) all of these.

v) The loader doesn't perform the function of
   a) translation b) relocation
   c) allocation d) loading.

vi) Thrashing
   a) improves the system performance
   b) decreases CPU utilization
   c) reduces page fault
   d) decreases the effective memory access time.

vii) ..... is a non-preemptive scheduling.
   a) Round-Robin scheduling
   b) Priority scheduling
   c) FCFS scheduling
   d) None of these.

viii) The time for the disk arm to move the heads to the cylinder containing the desired block is
   a) rotational latency b) search latency
   c) response time d) seek time.

ix) Linking is the process of
   a) binding an external reference to the correct link time address
   b) binding an external reference to the load time address
   c) making a link between system resources
   d) making a link between external and internal variables.

x) System calls are usually invoked by using
   a) a software interrupt
   b) a polling
   c) an indirect jump
   d) a privileged instruction.

GROUP – B
(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2. a) What are the preemptive and non-preemptive scheduling policies ? Is the deadlocks problem preventable ? Justify your answer with example and diagram.

   b) What is PCB ? $2 + 2 + 1$

3. a) If logical address space for proces *A* is very high and page size is very small then what will happen in case of fragmentation and page table formation ? What we can use inverted page table ? When Operation System can use compaction technology ?

   b) What is segmentation ? 2 + 1 + 1 + 1

4. a) What is Dining philosopher problem ? Device an algorithm to solve the problem using Semaphore.

   b) What is swapping ? 4 + 1

5. What is two pass assembler ? Explain it.

6. What is priority scheduling ? Can SJF scheduling be considered as priority scheduling ? Justify. 2 + 3

GROUP – C
(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

7. a) Draw the diagram of paging hardware with TLB.

   b) Logical address space for Process *B* is 64 KB and page size is 4 KB. If two pages is available at TLB and associative lookup time is 100 msec and memory access time is 10 msec then what will be the effective access time ?

   c) What are the advantages of the distributed system ?

   d) Give the definition of throughput, context switching, turn around time.

   e) What is the difference between logical address space and physical address pace ?

   f) What is the need of dynamic loading ? Explain with an example. 3 + 3 + 2 + 3 + 2 + 2

8. a) Draw the process state diagram and explain each of the states. 4 + 3 + 2 + 4 + 2

   b) What is meant by 'Long Term Scheduling' and 'Short Term Scheduling' ?

   c) What is the difference between tightly coupled and loosely coupled system ?

   d) How mutual exclusion, hold & wait and circular wait are different from each other ? Explain with example.

   e) What is pure demand paging ? What is roll in and roll out ?

9. a) Explain different method of record blocking and file allocation method ?

b)

	Allocation	***Max***	***Abailable***
	A B C D	***A B C D***	***A B C D***
P0	0012	0012	1520
P1	1000	1750	
P2	1354	2356	
P3	0632	0652	
P4	0014	0656	

Answer the following question using Banker's algorithm.

i) Is the system is in safe state ?

ii) If a request from process P1 arrives for (0, 4, 2, 0) can the request be granted immediately ?

iii) What is the content of the Matrix need ?

c) Explain user-oriented access control and data-oriented access control.

d) Explain different types of threat. 5 + 5 + 3 + 2

10. a) Define critical section and mutual exclusion.

b) What is semaphore ? How is it used to overcome critical section ?

c) Discuss the usability of critical region for synchronization of concurrent processes.

2 + 2 + 3 + 3 + 5

11. What are the major tasks performed by the passes of a two pass assembler ? What is forward referencing ? What are the advantages of a two pass assembler over a single pass assembler ? What are the major functions of a loader ? Describe the different types of editors. 4 + 2 + 2 + 3 + 4