Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.Tech(ECE-NEW)/SEM-7/EC-704A/2009-10

2009

SYSTEMS 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 of the following : 10 × 1 = 10

i) Compaction is the solution for

a) internal fragmentation

b) external fragmentation

c) mutual exclusion

d) both (a) and (b).

ii) Which of the following process scheduling algorithm has the minimum average waiting time ?

a) FCFS b) SJF

c) Round robin d) Priority.

iii) Compile and Go is a

a) compiler b) loader

c) linker d) assembler.

iv) Arithmetic operators and keywords are stored during lexical analysis in

a) terminal table b) identifier table

c) uniform symbol table d) literal table.

v) In segmentation, the allocation is controlled by

a) user b) operating system

c) overlay manager d) lazy swapper.

vi) When processes enter the system they are put into

a) job queue b) ready queue

c) waiting queue d) none of these.

vii) Which of the following statements are correct ?

I. A safe state is not a deadlock state

II. A deadlock state is an unsafe state

III. Not all unsafe states are deadlocks.

Of the statements :

a) All are correct

b) I and II are correct

c) II and III are correct

d) I and III are correct.

viii) Optimizing transformation is a rule for rewriting a program to improve its

a) execution efficiency b) execution timing

c) both (a) and (b) d) can't say.

ix) The difference between semantic of application domain and execution domain is known as

a) semantic gap b) serial gap

c) sequential gap d) none of these.

x) A dead code can be omitted from a program

a) affecting the result

b) without affecting the result

c) may or may not affect result depending upon criteria of the program

d) none of these.

GROUP – B
(Short Answer Type Questions)

Answer any *three* of the following. 3 × 5 = 15

2. a) What is an operating system ?

b) Differentiate between batch processing and multitasking operating system.

c) What is context switching ? 2 + 2 + 1

3. a) What is a boot strap loader ?

b) Differentiate between worm and virus.

c) What is page fault ? 2 + 2 + 1

4. What is process ? What are the different states of a process ? Distinguish thread and a process ? 1 + 2 + 2

5. What is Thrashing ? Why do page fault occur ? 2 + 3

6. "A safe state never be in deadlock, but an unsafe state may enter in deadlock". Justify the statement.

GROUP – C

(Long Answer Type Questions)

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

7. a) Explain the concept of simple paging system with diagram.

   b) How does an Operating System view processes ? Explain the process Control Block (PCB) in this context with diagram.

   c) Write an assembly language program (8086 based) to find the average of two numbers. 6 + 4 + 5

8. a) What is a semaphore ? Solve the producer-consumer using semaphore.

   b) Explain with diagram, the Pass-I of a 2-pass assembler. What data structures are required for this purpose ?

   c) Explain the concept of dynamic linking and loading. 6 + 5 + 4

9. a) What are the characteristics of a real time operating system ?

   b) Explain the general model a compiler in brief. What is lexical analysis ?

   c) Briefly explain the operation of a relocating loader.

   3 + 7 + 5

10. Why are the page sizes always power of 2 ? Explain the concept of demand paging. What is swapping ? Why are segmentation and paging sometime considered into one scheme ? Discuss the following page replacement algorithm :

    LRU, FIFO and optimal and compare their characteristics.

    2 + 2 + 2 + 3 + 6

11. What are the merits and demerits of different types of inter-process communication schemes ? What do you understand by co-operating of process ? Briefly discuss the Producer Consumer Problem. Why is protection necessary ? What are the main differences between capability lists and access lists ? 4 + 2 + 4 + 3 + 2

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

a) Message passing system

b) Page replacement policies

c) Resident and cross-compiler

d) Dinning philosopher problem

e) Timing Sharing system

f) Round robin scheduling algorithm

g) Spooling.