Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.Tech(ECE-New)/SEM-7/EC-704A/2010-11

2010-11

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 any *ten* of the following : $10 \times 1 = 10$

   i) Which of the following is external to Operating System area ?

      a) Kernel b) Shell

      c) Application Program d) Critical Section.

   ii) A loader is used

      a) to convert assembly level program into machine code

      b) to place the machine code into memory

      c) to interact with the hardware

      d) none of these.

iii) Main function of Linker is

a) to adjust symbolic constants

b) relocation of program

c) resolve symbolic references

d) none of these.

iv) Addressing mode of the instruction 'CMA' of 8085 is

a) Implied b) Direct

c) Register Indirect d) Combined.

v) PCB stands for

a) Program Control Block

b) Process Control Block

c) Process Communication Block

d) None of these.

vi) What is the memory from 1K – 640K called ?

a) Extended Memory

b) Normal Memory

c) Low Memory

d) Conventional Memory.

vii) Virtual memory is

a) an extremely large main memory

b) an extremely large secondary memory

c) an illusion of extremely large main memory

d) a type of memory used in super computers.

viii) What is a shell ?

a) It is a hardware component

b) It is a command interpreter

c) It is a part in compiler

d) It is a tool in CPU scheduling.

ix) Which is not the state of the process ?

a) Blocked b) Running

c) Ready d) Privileged.

x) The number of processes completed per unit time is known as

a) Output b) Throughput

c) Efficiency d) Capacity.

xi) Switching the CPU to another process requires saving state of the old process and loading new process state which is called as

a) Process Blocking

b) Context Switch

c) Time Sharing

d) None of these.

GROUP – B
(Short Answer Type Questions)

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

2. a) What is Thrashing ?

b) What is Belady's anomaly ? State the anomaly with proper diagram. 2 + 3

3. a) What is the difference between logical and physical addresses ?

b) What is Bootstrapping ? 2 + 3

4. a) Distinguish between multiprogramming nad multitasking OS.

b) State the function of Batch processing system. 3 + 2

5. State four necessary conditions of deadlock with explanation.

6. Discuss Dining philosopher problem with its solution.

GROUP – C
(Long Answer Type Questions)

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

7. a) Define the critical section and identify the requirements to be satisfied to solve the critical section problem.

   b) Given a memory partition of 100K, 500K, 200K, 300K and 600K in order. How would each of the first-fit, best-fit, worst-fit algorithms place processes of 212K, 417K, 112K and 426K in order ? Which algorithm makes the most efficient use of memory ?(3 + 4) + 6 + 2

8. What are the advantages of assembly language ? Write the advantages of 2 pass assembler over 1 pass assembler. What is compile and go loader ? How does it differ from absolute loader ? 4 + 4 + 3 + 4

9. What is deadlock ? State Banker's algorithm. Consider the following snapshot of a system :

Process	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P_1	0	0	1	2	0	0	1	2	1	5	2	0
P_2	1	0	0	0	1	7	5	0				
P_3	1	3	5	4	2	3	5	6				
P_4	0	6	3	2	0	6	5	2				
P_5	0	0	1	4	0	6	5	6				

Justify whether the system is in safe state or not. If a further request (0 4 2 0) is made by P2, illustrate whether that may be granted or not. What is the difference between deadlock and starvation ? 2 + 4 + 4 + 3 + 2

10. State the differences between Internal and External fragmentations. What are 'TLB hit' and 'TLB miss' ? Compare Paging with Segmentation. How many page faults would occur for the following page replacement algorithms ?

i) LRU

ii) FIFO

iii) Optimal.

Compare their results.

Reference String : 1 2 3 4 2 1 5 6 1 2 2 3 7 6 3 2 1 2 3 6

(Assume there are 4 frames and all frames are initially empty) 2 + 3 + 4 + 6

11. What is Busy Waiting ? What are the different scheduling criteria ? Define context switching. What is the drawback of Priority Scheduling ?

Consider the following set of processes : (assume smallest number has highest priority)

Process	*Burst Time*	*Priority*
P_1	10	2
P_2	5	3
P_3	3	1
P_4	3	4

Applying SJF, FCFS, Priority based scheduling algorithm calculate the turn around time and waiting time for each case. 2 + 2 + 3 + 3 + 5

12. a) What is effective access time ?

Consider a system with 80% hit ratio, 50 ns time to search the associate registers, 750 ns time to access memory. Find the time to access a page.

b) When is the page number in associative memory ?