Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/BCA/SEM-3/BCA-301/2011-12

2011

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) The technique of temporarily removing inactive programs from the memory of a computer system is

   a) switching b) swapping

   c) paging d) none of these.

   ii) The time required for read-write head to travel to target cylinder is called

   a) latency time b) seek time

   c) transfer time d) none of these.

   iii) The technique of relocating all occupied areas of storage to one end is called

   a) sharing b) relocation

   c) compaction d) distribution.

iv) Which of the following statements is false ?
   a) Implicit task is a system-defined task
   b) A process is an instance of a program execution
   c) Buffering is a sophisticated form of spooling
   d) Time-sharing system follows Round-robin algorithm.

v) The coincidence of high page traffic and low CPU utilization is
   a) Belady's Anomaly b) Mutual Exclusion
   c) Deadlock d) Thrashing.

vi) Which scheduling algorithm is inherently preemptive ?
   a) FCFS b) SJF
   c) RR d) Priority scheduling.

vii) The optimal scheduling algorithm is
   a) FCFS b) SJF
   c) RR d) None of these.

viii) Thrashing
   a) reduces page I/O
   b) decreases the degree of multiprogramming
   c) implies excessive page I/O
   d) improves the system performance.

ix) Fork is
   a) the creation of a new job
   b) the dispatching of a task
   c) increasing the priority of a task
   d) the creation of new task.

x) RMI stands for
   a) Remote Method Interface
   b) Remote Message Interface
   c) Remote Method Invocation
   d) None of these.

GROUP – B

(Short Answer Type Questions)

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

2. Consider the following resource allocation state involving processes P0, P1, P2, P3 and P4 and resources R0, R1, R2, R3 and R4 :

Resources Assigned					***Resources Still Needed***				
Processes	***Resources***				***Processes***	***Resources***			
	R1	R2	R3	R4		R1	R2	R3	R4
A	3	0	1	1	A	1	1	0	0
B	0	1	0	0	B	0	1	1	2
C	1	1	1	0	C	3	1	0	0
D	1	1	0	1	D	0	0	1	0
E	0	0	0	0	E	2	1	1	0

Available resources = 1 0 2 0

Determine whether the system is in a safe state or not.

3. Explain with examples the difference between premptive and non-preemptive priority scheduling.
4. Distinguish between 'starvation' and 'deadlock'.
5. Explain PCB with a neat diagram.
6. What is thread ? Compare it with process. 2 + 3

GROUP – C

(Long Answer Type Questions)

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

7. a) Explain the following file access methods : 3 × 3
   i) Direct
   ii) Sequential
   iii) Indexed Sequential.
   b) What is Memory Compaction ? What is its use ? 3 + 3

8. a) What is swapping ? What is its purpose ?

   b) Consider the following sequence of memory references generated by a single program in a pure paging system :

   10, 11, 104, 170, 173, 177, 309, 245, 246, 247, 458, 364.

   Determine the number of page faults for each of the following page replacement policies assuming three (3) page frames are available and all are initially empty.

   The size of a page is 100 words :

   i) LRU

   ii) FIFO

   iii) Optimal page replacement. 3 + 4 + 4 + 4

9. a) Describe a system model for deadlock.

   b) Explain the combined approach to deadlock handling.

   c) Differentiate process switching and context switching.

   5 + 5 + 5

10. a) Explain Mutual exclusion.

    b) Write the first algorithm of mutual exclusion algorithm.

    c) What are its problems ? 5 + 7 + 3

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

    a) Round Robin Scheduling

    b) Thrashing

    c) Virtual memory

    d) Paging and Segmentation.