Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.TECH(CSE/IT)/SEM-5/CS-501/2011-12

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 any *ten* of the following : 10 × 1 = 10

i) Time Sharing Operating system has

a) high throughput b) low execution time

c) faster I/O d) none of these.

ii) Which of the following schemes suffers from External Fragmentation ?

a) Segmentation b) Paging

c) Paged segmentation d) All of these.

iii) Main function of linker is

a) Relocation b) Linking

c) (a) & (b) d) Loading.

iv) Part of a program where the shared memory is accessed and which should be executed indivisibly, is called

a) semaphores b) directory

c) critical section d) mutual exclusion.

v) Moving process from main memory to disk is called

a) Caching b) Termination

c) Swapping d) Interruption.

vi) The page fault frequency in virtual memory is reduced when

a) the page size is reduced

b) processes are unbound

c) locality of reference is applicable to the process

d) none of these.

vii) To enable a process to be larger than the amount of memory allocated to it, one can use

a) Overlays b) Paging

c) Compaction d) Swapping.

viii) CPU generates

a) Logical addresses b) Physical addresses

c) Relocatable addresses d) None of these.

ix) What is the purpose of Resource allocation graph ?

a) to represent deadlock b) to detect deadlock

c) to avoid deadlock d) to prevent deadlock.

x) The state of a process after it encounters an I/O instruction is

a) Ready b) Blocked/Waiting

c) Idle d) Running.

xi) Under which of the following situations CPU scheduling decision takes place ?

a) When a process switches from running state to waiting state

b) When a process switches from running state to ready state

c) When a process switches from waiting state to ready state

d) All of these.

xii) If a process has 24 k bytes logical address space and the page size is 4096 bytes then the number of frames of that process is

a) 12 b) 6

c) 8 d) 16.

GROUP – B

(Short Answer Type Questions)

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

2. Describe the task of long term short term and medium term scheduler.

3. Describe the two basic operations on semaphore. Explain whether any integer variable with similar operations can act as semaphore or not. 3 + 2

4. Mention the basic principle of RR scheduling. Specify the impact of time quantum on its performance. $2\frac{1}{2} + 2\frac{1}{2}$

5. What is program probability ? Specify the difference between static and dynamic relocation ? 2 + 3

6. Describe physical and logical formatting of Disk.

GROUP – C

(Long Answer Type Questions)

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

7. a) What are the problems of busy-wait implementation of semaphore ? Explain, how it is solved.

   b) What is message ? Write down a message based solution for producer / consumer problem with bounded buffer. 6 + 9

8. a) Write down the merits and demerits of a virtual memory system.

   b) Consider a virtual memory system with combined implementation, segmentation and paging. Describe the address translation scheme along with necessary data structures. 6 + 9

9. a) What is PCB ? Mention its content.

b) Consider a paged memory system. Specify, what information will be stored in PCB to support memory management.

c) What is the difference between content switching and mode switching ?

d) Compare best fit and first fit algorithm for memory allocation.

e) Compare SSTF and C-SCAN algorithm in the context of disk scheduling. 3 + 3 + 3 + 3 + 3

10. a) What is deadlock ? Describe the necessary and sufficient conditions for the occurrence of deadlock.

b) Describe the deadlock prevention strategies.

c) What are safe and unsafe states ? 6 + 6 + 3

11. Write short notes on the following :

a) Inode

b) Working set theory

c) Content of a process

d) Belady's anomaly. 4 + 5 + 3 + 3