



Name : .....

Roll No. : .....

Invigilator's Signature : .....

**CS/B.Tech/(ICE-NEW)/SEM-6/IC-604D/2013**

**2013**

**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 × 1 = 10

i) Banker's algorithm solves the problem of

- a) deadlock avoidance
- b) deadlock recovery
- c) deadlock prevention
- d) mutual exclusion.

ii) A thread is a

- |            |                          |
|------------|--------------------------|
| a) task    | b) process               |
| c) program | d) light weight process. |



iii) The time to move the disk arm to the desired cylinder in hard disk is known as

- a) rotational latency                      b) seek time
- c) positional time                          d) disk time.

iv) Thrashing

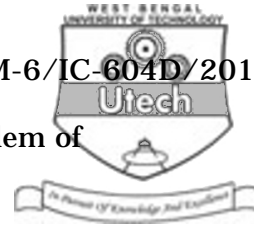
- a) reduces page I/O
- b) decrease the degree of multiprogramming
- c) implies excessive page I/O
- d) improve the system performance.

v) ..... provides an interface to the operating system for the user.

- a) Kernel                                      b) Micro kernel
- c) Shell                                        d) None of these.

vi) Which scheduling policy is most suitable for a time-shared operating system ?

- a) Shortest job first                      b) Round robin
- c) First come first serve                d) Priority.



- vii) Compaction is used to solve the problem of
- a) external fragmentation
  - b) internal fragmentation
  - c) both of these
  - d) none of these.
- viii) RAID configuration disk are used to provide
- a) fault tolerance
  - b) nearest cylinder next
  - c) high data density
  - d) none of these.
- ix) The scheduler which selects jobs from the pool of jobs and loads to the ready queue is
- a) long term
  - b) short term
  - c) medium term
  - d) none of these.
- x) Part of the program where the shared memory accessed and which should be executed indivisibly, is called
- a) semaphores
  - b) directory
  - c) critical section
  - d) mutual exclusion.



**( Short Answer Type Questions )**

$$3 \times 5 = 15$$

- $$2 + 1 + 2$$



6. What is fragmentation ? Explain different types of fragmentation. 2 + 3

**GROUP - C**  
**( Long Answer Type Questions )**

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

7. What is paging ? Explain the hardware for paging. How does paging differ from segmentation wrt Hardware ? What is Virtual memory ? How can segmentation be done with the concept of virtual memory ? What is external fragmentation ?

$2 + 5 + 2 + 1 + 3 + 2$

8. What is Dead Lock ? What are the conditions for deadlock ? Give practical examples to demonstrate recovery from deadlock ? What are allocation, need and max matrices wrt Banker's algorithm ? Does presence of cycle in a resource allocation graph necessarily creates deadlock ? Explain your answer. What are safe and unsafe states ? What is a resource allocation graph ?  $1 + 3 + 2 + 2 + 3 + 3 + 1$

9. a) What is job scheduling ? What are CPU and I/O bursts ?



- b) Suppose that the following processes arrived for execution at the times indicated :

Process	Arrival time	Burst time
P1	0.0	8
P2	0.4	4
P3	1.0	1

What is the average waiting time for these processes with FCFS scheduling algorithm and RR scheduling algorithm with time quantum = 2 ?

- c) What is Dispatch Latency ?

- d) What is SRT scheduling ?  $2 + 3 + 5 + 2 + 3$

10. a) State 50% rule. How it affects fragmentation ?

- b) Given a process size memory size 1024 k. Allocate the following processes with sizes 100k, 90k, 230k, 38k, 120k. Calculate internal & external fragmentation.

- c) What is compaction ? Why is it useful ?  $5 + 5 + 5$



11. a) Explain thrashing. Thrashing is severe in global page replacement — Justify.
- b) Calculate page faults using LRU and Optimal page replacement algorithm with the following reference string with four page frames.

1 2 3 4 5 3 4 1 6 7 8 7 8 9 7 8 9 5 4 5 4 2

$$6 + \left( 4\frac{1}{2} + 4\frac{1}{2} \right)$$

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