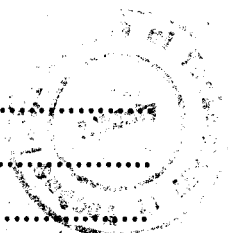


Name :
Roll No. :
Invigilator's Signature :



**CS/BCA/SEM-3/BCA-301/2009-10
2009**

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) Long-term scheduler is also known as
- a) admission scheduler b) dispatch scheduler
 - c) swapping scheduler d) process scheduler
 - e) none of these.
- ii) To avoid the race condition the number of processes that may be simultaneously inside their critical section is
- a) 0 b) 1
 - c) 2 d) 4
 - e) 5.

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[Turn over

- iii) Trashing
- a) reduces page I/O
 - b) implies excessive page I/O
 - c) decreases the degree of multiprogramming
 - d) improve the system information
 - e) none of these.
- iv) Inter-process communication
- a) is never necessary
 - b) allows process to synchronize activity
 - c) is required for all process
 - d) is usually done via disk drives
 - e) none of these.
- v) With a segmentation, if there are 64 segments and the maximum segment size is 512 words, the length of logical address in bits is
- a) 12
 - b) 14
 - c) 15
 - d) 16
 - e) 10.
- vi) The operating system is responsible for
- a) controlling peripheral devices such as monitor, printers, disk drives
 - b) detecting errors in users' programs
 - c) provide an interface that allows users to choose programs to run and to manipulate files
 - d) all of these.

- vii) When an interrupt occurs, the operating system
- a) ignores the interrupt
 - b) always changes state of interrupted process after processing the interrupt
 - c) always resumes execution of interrupted process after processing the interrupt
 - d) schedules another process.
- viii) Context switching is
- a) part of spooling
 - b) part of polling
 - c) part of interrupt handling
 - d) part of interrupt servicing.
- ix) Fork() is
- a) creation of a new job
 - b) termination of a job
 - c) increment of task priority
 - d) none of these.
- x) Producer consumer problem solved by
- a) semaphore
 - b) event counters
 - c) monitors
 - d) all of these.

GROUP - B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2. Describe thrashing. Explain the demand paging in memory mangement scheme. 2 + 3

3. Describe race condition, starvation, solution of starvation, spin lock. $1 + 1\frac{1}{2} + 1\frac{1}{2} + 1$

4. What do you mean by process ? Draw the block digram of Process Control Block. Write down the different process states. 1 + 2 + 2

5.

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

a) What is the average turnaround time for these processes with the FCFS scheduling algorithm ?

b) What is the average turnarono time for these processes with the SJF scheduling algorithm ? 5

6. Differentiate any *two* of the following : 5

- Logical vs physical address space
- Process vs threads
- Single partition allocation vs multiple partition allocation.

GROUP - C

(Long Answer Type Questions)

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

- What are the objectives of three levels of scheduling ? Define contiguous, linked and indexed disk blocks allocation methods.
 - Assume that you have the following jobs to execute with one processor.

Job	Burst Time	Priority
1	15	3
2	2	1
3	4	3
4	2	4
5	8	2

- Draw the "Gantt chart" illustration the execution of these jobs using FCFS, Round Robin (time quantum = 2).
- Find average turn around time and average waiting time for the above RR scheduling algorithm.

$$4 + 3 + (4 + 4)$$

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8. Describe a system model for deadlock. Explain the combined approach to deadlock handling. Explain Banker's algorithm for deadlock avoidance. Differentiate process switching and context switching. $3 + 5 + 4 + 3$

9. What is semaphore ? How can semaphore be used to enforce mutual exclusion ? Explain Readers and Writers problem. Explain Dining philosopher problem. $4 + 3 + 4 + 4$

10. a) Consider the following page reference string :

0100, 0432, 0101, 0612, 0102, 0103, 0104, 0101,
0611, 0102, 0103, 0104, 0101, 0610, 0102, 0103,
0104, 0101, 0609, 0102, 0105.

Calculate the page fault rate for the following algorithm :

- FIFO
- LRU
- Optimal

[Memory size is 3 frames]

b) What do you mean by "Virtual memory" ? $12 + 3$

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

- a) Process Control Block
 - b) Scheduler
 - c) Paging
 - d) Segmentation
 - e) Optimal page replacement algorithm.
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