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 : $10 \times 1 = 10$

   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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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 reguired 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.

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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 swiching is

a) part of spooling

b) part of poling

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

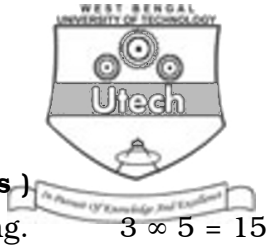
a) semaphore

b) event counters

c) monitors

d) all of these.

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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

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

   a) Logical *vs* physical address space

   b) Process *vs* threads

   c) Single partition allocation *vs* multiple partition allocation.

GROUP – C

(Long Answer Type Questions)

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

7. a) What are the objectives of three levels of scheduling ? Define contiguous, linked and indexed disk blocks allocation methods.

   b) 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

   i) Draw the "Gantt chart" illustration the execution of these jobs using FCFS, Round Robin (time quatum = 2).

   ii) 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

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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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