

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.*

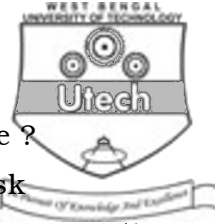
**GROUP – A**

**( Multiple Choice Type Questions )**

1. Choose the correct alternatives for the following :

10 × 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.  $3 \times 5 = 15$

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

| <b>Resources Assigned</b> |                  |    |    | <b>Resources Still Needed</b> |                  |                  |    |    |    |
|---------------------------|------------------|----|----|-------------------------------|------------------|------------------|----|----|----|
| <b>Processes</b>          | <b>Resources</b> |    |    |                               | <b>Processes</b> | <b>Resources</b> |    |    |    |
|                           | 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.

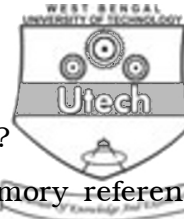
3. Explain with examples the difference between preemptive and non-preemptive priority scheduling.
4. Distinguish between 'starvation' and 'deadlock'.
5. Explain PCB with a neat diagram.
6. What is thread ? Compare it with process.  $2 + 3$

**GROUP – C**

**( Long Answer Type Questions )**

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

7. a) Explain the following file access methods :  $3 \times 3$
- 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.
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