# BRAINWARE UNIVERSITY

**Course – BSc. (CS)**

**Operating Systems (BCS303)**

(Semester – 3)

**Time allotted: 3 Hours** **Full Marks: 70**

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

## Group –A

(Multiple Choice Type Questions)

10 x 1 = 10

1. *Choose the correct alternative from the following:*

(i) RR scheduling is essentially a preemptive version of

a. FCFS b. SJF

c. SRTF d. none of these

(ii) A page fault occurs

a. when a page is in memory b. when a page entry is not in page table

c. when sufficient memory is not available d. when page table is corrupted

(iii) Virtual memory is

a. extremely large main memory b. extremely large secondary memory

c. an illusion of extremely large main memory d. a completely different hardware

(iv) TLB stands for

a. Transaction Lookaside Buffer b. Translation Lookaside Buffer

c. Translation Lookup Buffer d. Transaction Lookup Buffer

(v) In TLB based architecture, to read a byte from memory, number of memory access for TLB miss

a. only 1 memory access b. 2 memory access

c. 4 memory access d. unpredictable

(vi) The number of processes completed per unit time is usually termed as

a. output b. throughput

c. efficiency d. capacity

(vii) Processes that are in blocked state are waiting for

a. I/O events b. processor

c. memory d. none of these

(viii) The mechanism to bring a page into memory only when it is needed is called

a. Segmentation b. Fragmentation

c. Demand paging d. Page replacement

(ix) Bankers' algorithm is a

a. deadlock detection algorithm b. deadlock prevention algorithms

c. deadlock rectifier d. none of these

(x) A simplest way to break a deadlock is to

a. kill both the processes b. restart the system

c. kill one of the processes d. none of these

## Group – B

(Short Answer Type Questions)

(Answer any *three* from the following)

3 x 5 = 15

2. What is a PCB? Discuss the components of PCB. [1 + 4]

3. Discuss about direct and indirect communication in IPC. [5]

4. Discuss segmentation technique. [5]

5. What is a lazy swapper? What is the difference between internal and external fragmentation? [2 + 3]

6. Illustrate Circular wait condition of deadlock. Give a possible solution to break this situation. [3 + 2]

## Group – C

(Long Answer Type Questions)

(Answer any *three* from the following)

3 x 15 = 45

7. (a) Explain how deadlock can be prevented. [5]
   (b) Write Bankers' algorithm for deadlock avoidance. Mention the notations used. [10]

8. (a) With suitable diagram, discuss paging technique with TLB. [7]
   (b) In a TLB based paging scheme, it requires 30ns to search the TLB and 150ns to access memory. Assuming that the page table resides in main memory, compute separately effective page access time if TLB hit ratio is 80% and 90%. [5]
   (c) Write the significance of PTBR. [3]

9. (a) What is virtual memory? [3]
   (b) For a given reference string {1,2,3,4,1,2,3,4,2}, calculate number of page faults individually if memory has 3 frames and 4 frames considering Optimal page replacement strategy. [8]
   (c) What is Belady's anomaly? [4]

10. (a) Briefly discuss concurrent and parallel execution. [2]
    (b) A disk is serving a request at cylinder 143. The queue of pending requests in FIFO order is 96, 150, 413, 157, 548, 250, 125, 375, 80. Between FCFS and SSTF strategy, which one is better in terms of distance covered by disk arm (in cylinders) to serve all the requests? [10]
    (c) Write down difference between LOOK and C-LOOK disk scheduling. [3]

11. (a) From the following table, draw a Gantt chart if RR scheduling is used with quantum (Q) = 10ms. Also compute average waiting time of the processes.

| Process | Burst Time (ms) |
|---|---|
| P1 | 20 |
| P2 | 12 |
| P3 | 30 |
| P4 | 22 |
| P5 | 17 |

[8]

    (b) Write a short note on dining-philosopher problem. [5]
    (c) What is aging? [2]