BRAINWARE UNIVERSITY

Term End Examination 2018 - 19

Programme – Bachelor of Science (Honours) in Computer Science

Course Name – Operating System

Course Code - 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 Question) 10 x 1 = 10

1. *Choose the correct alternative from the following*

(i) Which module gives control of the CPU to the process selected by the short-term scheduler?

a. dispatcher b. interrupt

c. scheduler d. compiler

(ii) Dijkstra's Banking algorithm in an OS solves the problem of

a. mutual exclusion b. context switching

c. deadlock recovery d. deadlock avoidance

(iii) Concurrent access to shared data may result in

a. data consistency b. data insecurity

c. data inconsistency d. data duplication

(iv) Semaphore is a/an _____ to solve the critical section problem.

a. hardware for a system b. special program for a system

c. integer variable d. software package

(v) The circular wait condition can be prevented by

a. defining a linear ordering of resource types
b. using thread
c. using pipes
d. using Semaphore

(vi) In RR CPU scheduling if the time quantum is greater than the burst time of any process, it works like

a. FCFS
b. SJF
c. Priority scheduling
d. RR scheduling

(vii) IPC stands for

a. Internal Program Controller
b. Internal Process Control
c. Interprocess Communication
d. None of these

(viii) The page table contains

a. base address of each page in physical memory
b. page offset
c. page size
d. frame size

(ix) Virtual memory is normally implemented by

a. demand paging
b. buses
c. virtualization
d. scheduler

(x) Which one of the following is not a valid state of a process

a. Load
b. Blocked
c. Ready
d. Running

Group – B

(Short Answer Type Questions) 3 x 5 = 15

Answer any *three* from the following

2. What do you understand by short term scheduling and long term scheduling of process? What is swapping? 3+2

3. Differentiate between process and thread. In which environment thread works optimally? 3+2

4. State the difference between Internal & External Fragmentation.
   Consider a logical address space of 8 page of 1024 words, each mapped onto a physical memory of 32 frames. How many bits are required to represent the logical and physical addresses? 3+2
5. Explain different Disk Allocation methods with their corresponding advantages & disadvantages. 5
6. Write short notes on a) Belady's Anomaly b) Thrashing 2.5+2.5

Group – C

(Long Answer Type Questions) 3 x 15 = 45

Answer any *three* from the following

7. (a) Explain the following :

   i) Waiting time, (ii) Turn around time 3

   (b) Consider the following process with the length of CPU burst time.

Process	**Burst Time**	**Priority**
P1	10	3
P2	1	1
P3	2	3
P4	1	4
P5	5	2

   Draw Gnatt charts, illustrating the execution of these processes using:

   a) FCFS

   b) SJF

   c) Priority Scheduling

   Also find out average waiting time in all the cases. 12

8. (a) What is a process?

   What is PCB? What does it contain? 2+4

   (b) Discuss various process states with the help of state transition diagram. 4

   (c) What are the advantages of using threads over using separate processes? 3

   (d) When a process migration is required? 2

9. (a) Different memory partitions of 150 K, 820 K, 360 K and 450 K (in the given order) are present. Explain how best fit algorithm can be used to place a process of 315 K. What are the advantages and disadvantages of using best fit over worst fit and first fit algorithms ? 6+3

   (b) Explain Producer-Consumer problem and show how it can be solved. 6

10. (a) Consider the following page reference string :

    7, 8, 9, 0, 7, 9, 1, 0, 8, 7, 9, 1

    Assuming memory consists of four (4) frames, calculate the hit ratio using

    (a) FIFO

    (b) LRU

    page replacement algorithms. Show each step. 8

    (b) Compare between Paging and Segmentation. 4

    (c) How can Access Matrix be implemented? 3

11. (a) Suppose a disk drive has 300 cylinders numbered 0-299. The current head position is at 90 and the previous position was at 100. The queue of pending requests in FIFO order is :

    36, 79, 15, 120, 199, 270, 89, 170.

    Calculate average cylinder movements for the following algorithms :

    FCFS, SSTF, C-SCAN. 9

    (b) Discuss about different types of viruses. 3

    (c) Differentiate between Symmetric key and Asymmetric key cryptography. 3
