BRAINWARE UNIVERSITY

Course – MCA

Operating System (MCA 301)

(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) A process in the ready queue when selected by the scheduling mechanism for execution and dispatched to the CPU becomes a

a. ready process
b. waiting process
c. running process
d. none of these.

(ii) A thread is also known as

a. heavy weight process
b. file
c. light weight process
d. program.

(iii) IPC can be done through

a. mails
b. message passing
c. system calls
d. traps.

(iv) Throughput is

a. processes that completed per unit time
b. the completion of whole process
c. time for waiting in ready queue
d. waiting to get into memory.

(v) Which of the following scheduling algorithm does give minimum average waiting time?

a. FCFS
b. Priority
c. Round-Robin
d. SJF.

(vi) Banker's algorithm used for

a. deadlock avoidance
b. deadlock recovery
c. mutual exclusion
d. context switching.

(vii) An edge from a resource instance to a process in RAG (resource allocation graph) is known as

a. claim edge
b. request edge
c. wait edge
d. assignment edge.

(viii) A page table entry provides

a. offset
b. limit address
c. base address
d. logical address.

(ix) An address generated by the CPU is known as

a. logical address
b. physical address
c. relational address
d. virtual address.

(x) To detect deadlock in single instance of resource types,which graph is used?

a. directed graph
b. wait for graph
c. undirected graph
d. resource allocation graph.

Group – B

(Short Answer Type Questions) 3 x 5 = 15

Answer any *three* from the following

2. What is thread? Write down the different types thread of an operating system? What is the difference between a process and a thread? [1 + 2 + 2]
3. What is pid? What are co-operating processes? What are the different types of way for interprocess communication? [1 + 2 + 2]
4. Explain Deadlock prevention algorithm. [5]
5. Explain the difference between internal and external fragmentation with example. What is the technique to remove external fragmentation? [4 + 1]
6. What is demand paging? Why the page replacement algorithm is required? Name the file accessing methods. [1 + 2 + 2]

Group – C

(Long Answer Type Questions) 3 x 15 = 45

Answer any *three* from the following

7. (a) Explain the features of Time Sharing System and Real Time Operating System. Describe various component of operating system with diagram. [4 + 4]

   (b) What is I/O bound and CPU bound process? What do you mean by context switch? [4 + 3]

8. (a) What is long term scheduler and short term scheduler? What are the criterias for a scheduling algorithm? [4 + 3]

   (b) Consider the following set of processes with the length of CPU burst time given in the milliseconds.

Process	Arrival Time	Burst time	Priority
P1	1	8	3
P2	0	1	1
P3	4	3	2
P4	2	2	4
P5	3	6	3

   Calculate average turnaround time and average waiting time with Gantt chart for First-come first served scheduling and Priority scheduling algorithm. Consider all the scheduling algorithms are non-preemptive (Minimum number indicate highest priority). [8]

9. (a) What do you mean by process synchronization? Describe the Dining Philosopher problem. [2 + 3]

   (b) Explain Readers-writers problem and solve it using semaphore. Write pseudo code for the same. [6]

   (c) Explain deadlock detection using resource allocation graph for single instance resource. [4]

10. (a) What is called segmentation? How it differs from paging? Distinguish between fixed and variable partitioning. [4 +2]

    (b) Given memory partition of 100K, 500K, 200K, 300K, and 600K in order, How would each of the First-fit, Best-fit and Worst-fit algorithms place the processes of 212K, 417K, 112K and 426K in order? Which algorithm makes the most efficient use of memory? Show the diagram of memory status in each cases. [6]

    (c) What is called device driver? Explain its function in brief. [3]

11. (a) Suppose disk drive has 300 cylinders. The current position of head is 90.
The queue of pending request is
36, 79, 15, 120, 199, 270, 89, 170, 210
Calculate head movement for the following algorithms.
i) SSTF
ii) C-Scan. [4 + 4]

(b) What is Belady's anomaly? What is bootstrap program? [2 + 1]

(c) Explain various file attributes. [4]