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BRAINWARE UNIVERSITY

Library
Brainware University
398, Ramkrishnapur Road, Barasat
Kolkata, West Bengal-700125

Term End Examination 2025-2026
Programme – MCA-2025
Course Name – Computer Organization and Operating System
Course Code - MCA17403 (T)
(Semester I)

Full Marks : 40 **Time : 2:0 Hours**

[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) 1 x 10=10

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

(i) Find, which law is represented by A + A = A.
a) Idempotent Law b) Associative Law
c) Distributive Law d) Absorption Law

(ii) Classify which of the following is a sequential circuit.
a) Half adder b) Full adder
c) Flip-flop d) Encoder

(iii) Infer the maximum decimal value that can be represented by a 32-bit immediate value.
a) 8388607 b) 2147483647
c) 4294967295 d) 1073741823

(iv) Choose the 2's complement of 10101011.
a) 1011101 b) 1010101
c) 1010100 d) 1110101

(v) Show a key challenge in shared-memory multiprocessor systems.
a) Ensuring cache coherence among different processors. b) Managing multiple I/O devices.
c) Synchronizing the clock speed of different processors. d) Reducing the physical size of memory modules.

(vi) Analyze the purpose of virtual memory in a computer system.
a) To extend the apparent amount of RAM available by using disk storage. b) To provide a faster access speed for frequently used programs.
c) To increase the size of the CPU cache. d) To reduce the power consumption of the CPU.

(vii) Which of the following is the basis of CPU scheduling?
a) multiprogramming operating system b) larger memory sized system
c) multiprocessor system d) none of these

(viii) Select which of the following scheduling increases process flow time?

a) FCFS
b) LIFO
c) SJF
d) none of these

(ix) Identify the right option: the operating system keeps a small table containing information about all open files called _____.

a) file table
b) directory table
c) open-file table
d) system table

(x) Analyze why the resource allocation graph is used for in simulating deadlocks?

a) To visualize the allocation of resources to processes
b) To determine the order in which processes should be terminated
c) To identify the processes involved in a deadlock
d) To simulate the execution of processes and detect deadlocks

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Group-B

(Short Answer Type Questions) 3 x 5=15

2. Recall the Information conveyed by addressing modes. (3)
3. Explain the difference between SOP and POS forms in Boolean expressions. (3)
4. Assess the impact of virtual machines on system resource utilization. (3)
5. Describe the role of cache memory in improving system performance. (3)
6. Distinguish between deadlock prevention and deadlock avoidance. (3)

OR

Examine the role of synchronization in preventing race conditions during process execution. (3)

Group-C

(Long Answer Type Questions) 5 x 3=15

7. Compare different types of flip-flops (RS, JK, D) and explain their roles in sequential circuits. (5)
8. Develop a CPU scheduling algorithm suitable for real-time systems and justify its effectiveness. (5)
9. Compare and contrast contiguous, linked, and indexed allocation methods in file systems. (5)

OR

Choose the most efficient directory operation (e.g., create, delete, rename) for maintaining a large file system with frequent changes. Justify your choice based on factors such as performance and data integrity. (5)

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