**KINGDOM OF SAUDI ARABIA**

**QASSIM UNIVERSITY**

**COLLEGE OF COMPUTER**

# CS222: OPERATING SYSTEMS - FINAL EXAMINATION

**Time: 2 Hours | Total Marks: 50**

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## SECTION I: OBJECTIVE QUESTIONS [15 Marks]

**1. Choose the correct answer:**

I. The hardware device that maps virtual addresses to physical addresses is:

(a) TLB (b) MMU (c) Cache (d) CPU

II. The "Cache-consistency problem" in distributed systems is also known as:

(a) Global table (b) Lock-key (c) Network virtual memory (d) Segmentation

III. A memory-management scheme that supports the user view of memory is called:

(a) Paging (b) Serialization (c) Segmentation (d) Swapping

**2. Mark (T) for True or (F) for False:**

( ) Access matrix design separates mechanism from policy.

( ) The rows of an Access Matrix represent the objects in the system.

( ) Capability list is a protected object maintained by the OS and accessed indirectly.

( ) The Base register contains the value of the largest physical address.

( ) Revocation of access rights is typically inefficient in Capability List implementations.

## SECTION II: SCHEDULING PROBLEM [8 Marks]

Consider the following processes arriving at Time 0:

| Process | Burst Time |
|---|---|
| P1 | 24 |

| | |
|---|---|
| P2 | 3 |
| P3 | 3 |

**Required:** Use **Round Robin (RR)** with **q = 4ms** to draw the Gantt Chart and calculate the Average Waiting Time.

Gantt Chart:

Calculations:

## SECTION III: SUBJECTIVE QUESTIONS

**[27 Marks]**

**Q1. List six (6) operations performed on a Directory:**

**Q2. List the five (5) Security Violation Categories:**

**Q3. Explain the differences between the four (4) Access Matrix Implementation options:**

**Q4. What is the difference between "Signature-based" and "Behavior-based" detection?**

## SECTION IV: MEMORY MANAGEMENT

**Translate Logical Address to Physical Address:**

Given: **Frame Number = 5**, **Page Size = 4 bytes**, and **Offset = 0**. Show your calculation.

*End of Examination Questions - Good Luck*