2025 MODEL PAPER 03

MCQ - Analyzation

Model Paper 03 Marking Scheme

PART I – MCQ

1) 4	11) 1	21) 3	31) 3	41) 1
2) 2	12) 1	22) 4	32) 2	42) 2
3) 3	13) 1	23) 1	33) 2	43) 1
4) 4	14) 1	24) 3	34) 1	44) 2
5) 2	15) 1	25) 4	35) 1	45) 3
6) 2	16) 2	26) 3	36) 1	46) 2
7) 1	17) 2	27) 4	37) no answer	47) 5
8) 2	18) 3	28) 3	38) 4	48) 3
9) 4	19) 3	29) 4	39) 3	49) 2
10) 2	20) 4	30) 1	40) 5	50) 3

1) (4) Universal Automatic Computer

2) (2) ENIAC
They designed and built **ENIAC** (1945–46). (They later founded the company that produced UNIVAC, but their famous invention is ENIAC.)

3) (3) Vacuum Tubes
1st-gen machines (1940s–mid-1950s) used thermionic **vacuum tubes**. Transistors/ICs came in later generations.

4) (4) +17

5) (2) 11110111

6) (2) AND

7) (1) $(X+Y)Z \oplus X$

- Left gate is OR: output = **X + Y**.
- Middle gate is AND with Z: output = **(X + Y) · Z**.
- Rightmost gate is XOR combining that with X: **F = X ⊕ ((X+Y)·Z)**, i.e. **(X+Y)Z ⊕ X**.

8) (2) $X' \cdot Y' + Z'$

9) (4) $X'Z' + YZ$

10) (2) Paging
Paging is the memory-management technique where the OS moves fixed-size pages between secondary storage (backing store) and main memory on demand.

11) (1) Logical address
A running program generates logical (virtual) addresses; the MMU translates them to physical addresses.

12) (1) Each process
Every process has its own page table that maps its virtual pages to physical frames.

13) (1) $(96)_{10}$

14) (1) Enough total memory exists to satisfy a request but it is not contiguous
That is the definition of **external fragmentation**—free memory is split into pieces too small/too scattered to satisfy a request that needs one contiguous block.

15) (1) Frames
In paging, physical memory is divided into fixed-size **frames**.

16) (2) Pages
Logical (virtual) memory is divided into equal-size **pages** (mapped onto frames).

17) (2) Page number & page offset
In a paged virtual memory system, every logical (virtual) address is split into:

- **Page number** – identifies which virtual page.
- **Page offset** – displacement inside that page.

18) (3) Page
The **page table** holds, for each virtual page, the **base (frame) address** in physical memory.

19) (3) Frame
The OS keeps a **frame table** to record which physical frames are allocated, how many exist, and how many are free.

20) (4) Turn around
Paging involves page faults and disk I/O which lengthen the overall **turnaround time** (total time from job submission to completion). It can indirectly raise waiting and execution times too, but the key textbook effect is increased turnaround.

21) (3) Optical fiber
Among the listed media, **optical fiber** offers the highest transmission speed and bandwidth.

22) (4) All of the mentioned
The physical layer specifies:

- mechanical specs of connectors and cables,
- electrical signal levels,
- and optical/IR specifications.
  All of these are its responsibility.

23) (1) Data link layer
The **data link layer** is the lowest layer that translates network-layer logical communication into hardware-specific operations (framing, MAC addressing, etc.) for the physical medium.

24) (3) Multiplexing
Multiplexing allows multiple signals/users to share a single channel by dividing it in time, frequency, or code.

25) (4) Password
Among key card, fingerprint, retina pattern and password, a simple password is generally the easiest to guess or steal. Biometric methods and physical tokens (key card) are stronger.

26) (3) P@ssw0rd
A strong password mixes uppercase, lowercase, numbers, and symbols. "P@ssw0rd" contains all these varieties, unlike the date or a simple word.

27) (4) Having change password every 2 years
Good policy requires *regular* password changes (months, not years). Waiting two years is far too long and is **not** best practice.

28) (2) C and D only

29) (4) 5

30) (1) 172.16.112.0

31) (3) 172.16.64.0

32) (2) 8 subnets, 8,190 hosts each

33) (2) Secondary memory
Swap space (paging file) lives on disk/SSD (backing store), not in primary memory.

34) (1) it is spending more time paging than executing
That is the textbook definition of **thrashing**—excessive page faults keep the CPU busy swapping instead of running.

35) (1) Delayed until run time
If a process can move during execution, address binding must be **dynamic** (done at run time) so relocation can be adjusted.

36) (1) Memory manager
The OS's **memory manager** (swapper/pager) is responsible for swapping processes in and out of main memory.

37) 0100000000001

38) (4) Page 5

39) (3) The address maps to frame 001.

40) (5) 7

41) (1) 1NF (First Normal Form)
The table has atomic values (so it's in 1NF) but attributes like **Name** depend only on **StudentID** and **CourseName/Instructor** depend only on **CourseID** while the natural key is **(StudentID, CourseID)** for enrollments. Those **partial dependencies** violate 2NF, so it's **only** in 1NF.

42) (2) `SELECT DISTINCT CourseName FROM Student;`
`DISTINCT` removes duplicates and returns each course name once. (Option 1 would include repeats; the others are invalid/non-standard.)

43) (1) `SELECT Name FROM Student WHERE CourseName = 'Databases';`
The question asks for "all students enrolled" in that course—the students' **names** whose **CourseName** equals "Databases."

44) (2) `UPDATE Student SET Instructor = 'Dr. Lee' WHERE CourseName = 'Algorithms';`
We update the **Instructor** for the row(s) where **CourseName** is "Algorithms."

45) (3) 960 × 1024 → 983,040 bytes

46) (2) Computer Virus
A computer **virus** spreads by inserting copies of itself into other executables/documents.

47) (5) MSN
Internet Explorer, Mozilla Firefox, and Google Chrome are web browsers. **MSN** is a web portal/service (not a browser).

48) (3) RAM
RAM is **primary, volatile** memory, not secondary storage. Floppy disk, optical disk, flash drive, and DVD are secondary storage.

49) (2) Q only

- **P** (ROM is volatile) → **False** (ROM is non-volatile).
- **Q** (RAM is volatile) → **True**.
- **R** (Secondary memory is volatile) → **False** (secondary storage is non-volatile).
  Hence only **Q** is true.

50) (3) URL