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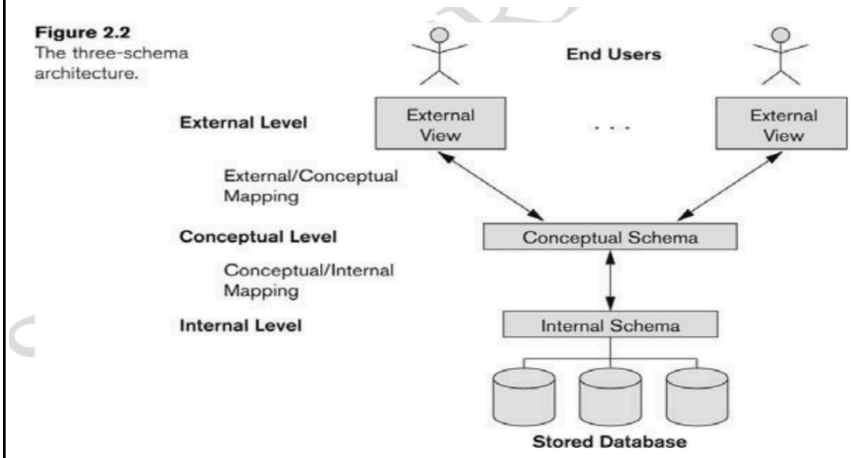
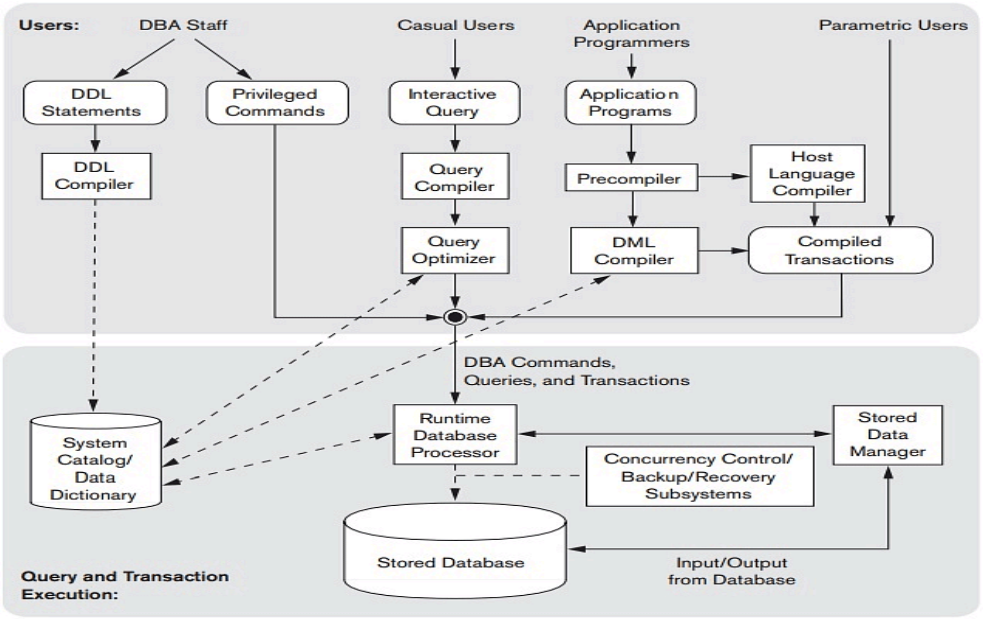
Internal Assessment Test 1 – March 2025

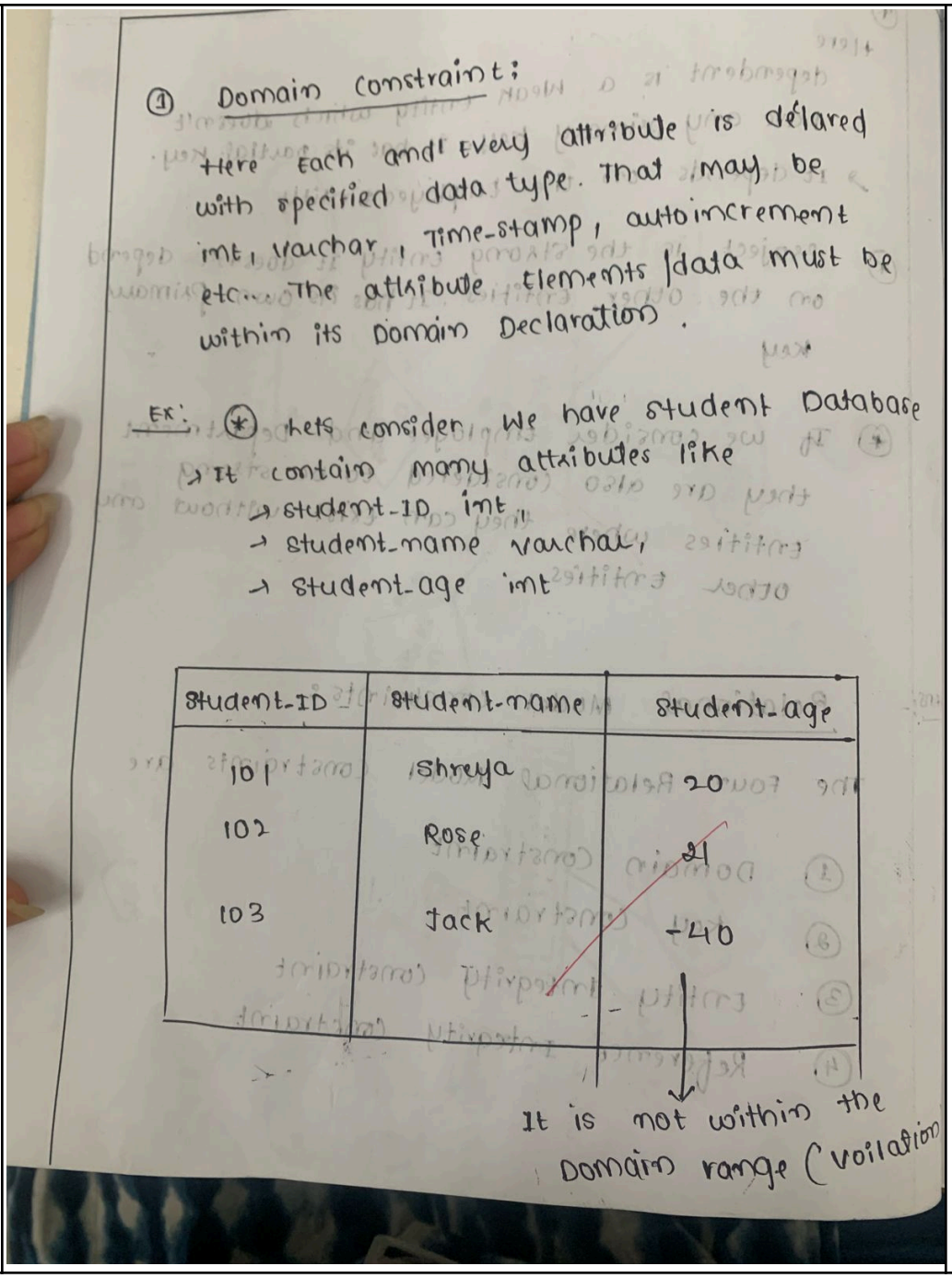
Sub:	**Database Management System**					Sub Code:	**BCS 403**	Branch:	**AINDS / CS (DS)**	
Date:	**25/03/2025**	Duration:	**90 minutes**	Max Marks:	**50**	Sem	**IV**		**OBE**	
Answer any FIVE Questions								**MARKS**	**CO**	**RBT**

1	a	Define
		
		1) Data Model - 1 mark
		
		a **data model** is a **collection of concepts** that can be used to **describe the structure of a database**, including:
		
		Data types
		Relationships
		Constraints
		Operations on the data
		Types of Data Models
		
		High-Level (Conceptual) Data Models
		Low-Level (Physical) Data Models
		Representational (Implementation) Data Models
		
		2) Schema 1 mark
		A schema is defined as the **description of a database**. It defines the structure and organization of the data and how the data is related. The schema includes definitions of tables (relations), types of data (attributes), and relationships between data.
		
		3) Cardinality Ratio 1 mark
		the **cardinality ratio** is a key concept in the **Entity-Relationship (ER) model**. It refers to the **number of entities** that can be associated with entities of another type via a relationship.
		They are:
		One-to-One (1:1)
		One-to-Many (1:N)
		Many-to-One (N:1)
		Many-to-Many (M:N)
		
		4) Composite Attribute 1 mark
		A **composite attribute** is an attribute that can be **divided into smaller subparts**, which represent more basic attributes with independent meanings.
		Eg: **`Address`**
		
		`Street`
		`City`
		`State`
		`ZipCode`
		
		5) Weak Entity Type 1 mark
		A **weak entity type** is an entity that **does not have a primary key** of its own and **relies on a related strong entity** (also called the **owner**) to be uniquely identified.
			5	CO1	L1

	b	Explain three schema Architecture with a neat diagram.  Figure 2.2 The three-schema architecture. Diagram - 3 Marks Explanation- 2 marks **1. Internal Level** • The internal level has an internal schema which describes the physical storage structure of the database. • The internal schema is also known as a physical schema. • It uses the physical data model. It is used to define that how the data will be stored in a block. • The physical level is used to describe complex low-level data structures in detail. **2. Conceptual Level** • The conceptual schema describes the design of a database at the conceptual level. Conceptual level is also known as logical level. • The conceptual schema describes the structure of the whole database. • The conceptual level describes what data are to be stored in the database and also describes what relationship exists among those data. • In the conceptual level, internal details such as an implementation of the data structure are hidden. • Programmers and database administrators work at this level. **3. External Level** • At the external level, a database contains several schemas that sometimes called as subschema. The subschema is used to describe the different view of the database. • An external schema is also known as view schema. • Each view schema describes the database part that a particular user group is interested and hides the remaining database from that user group. • The view schema describes the end user interaction with database systems Mapping between Views There are basically two types of mapping in the database architecture: o Conceptual/ Internal Mapping o External / Conceptual Mapping Conceptual/ Internal Mapping • The Conceptual/ Internal Mapping lies between the conceptual level and the internal level.	5	CO1	L2

		• Its role is to define the correspondence between the records and fields of the conceptual level and files and data structures of the internal level. External/ Conceptual Mapping • The external/Conceptual Mapping lies between the external level and the Conceptual level. • Its role is to define the correspondence between a particular external and the conceptual view.			
2		With the block diagram, explain the database system environment.  Diagram 5 Marks Explain each block 5 Marks	10	CO1	L2
3			10	CO2	L4

4		Explain the four relational model constraints with an Example. 1. Domain Constraint with example 2 Marks 2. Key Constraint with example 3 Marks 3. Constraint on Null 2 Marks 4. Referential integrity Constraint 3 Marks If they explain these constraint effects on Insert, update and delete will be the plus point along with definition of relational model constraints.	10	CO1	L2



① Domain Constraint:

Here each and every attribute is delared with specified data type. That may be int, varchar, Time-stamp, autoincrement etc... The attribute elements /data must be within its Domain Declaration.

Ex: ⊛ lets consider We have student Database

→ It contain many attributes like

→ student-ID int

→ student-name varchar

→ student-age int

student-ID	student-name	student-age
101	shreya	20
102	Rose	21
103	Jack	-40

It is not within the Domain range (voilation

② Key constraint:

Here If we declare any attribute as a primary key it must be unique. We should make sure that there should not be any duplications.

Ex: Lets consider student Database with

→ S-ID int primary key,
→ s-name varchar,
→ S-age int,

S-ID	S-name	S-age
101	Shreya	20
102	Jack	20
103	Sitha	40
104	Ravan	20
104	Lakshman	80

Here the key constraint is repeated (It is considered to be voilation of key constraint)

③ Entity Integrity constraint:

→ If we declare any attribute as a primary key we can't initialize them with NULL values.

→ If we add any NULL values it is considered to be Entity Integrity constraint.

Ex: consider we have Employee Data base

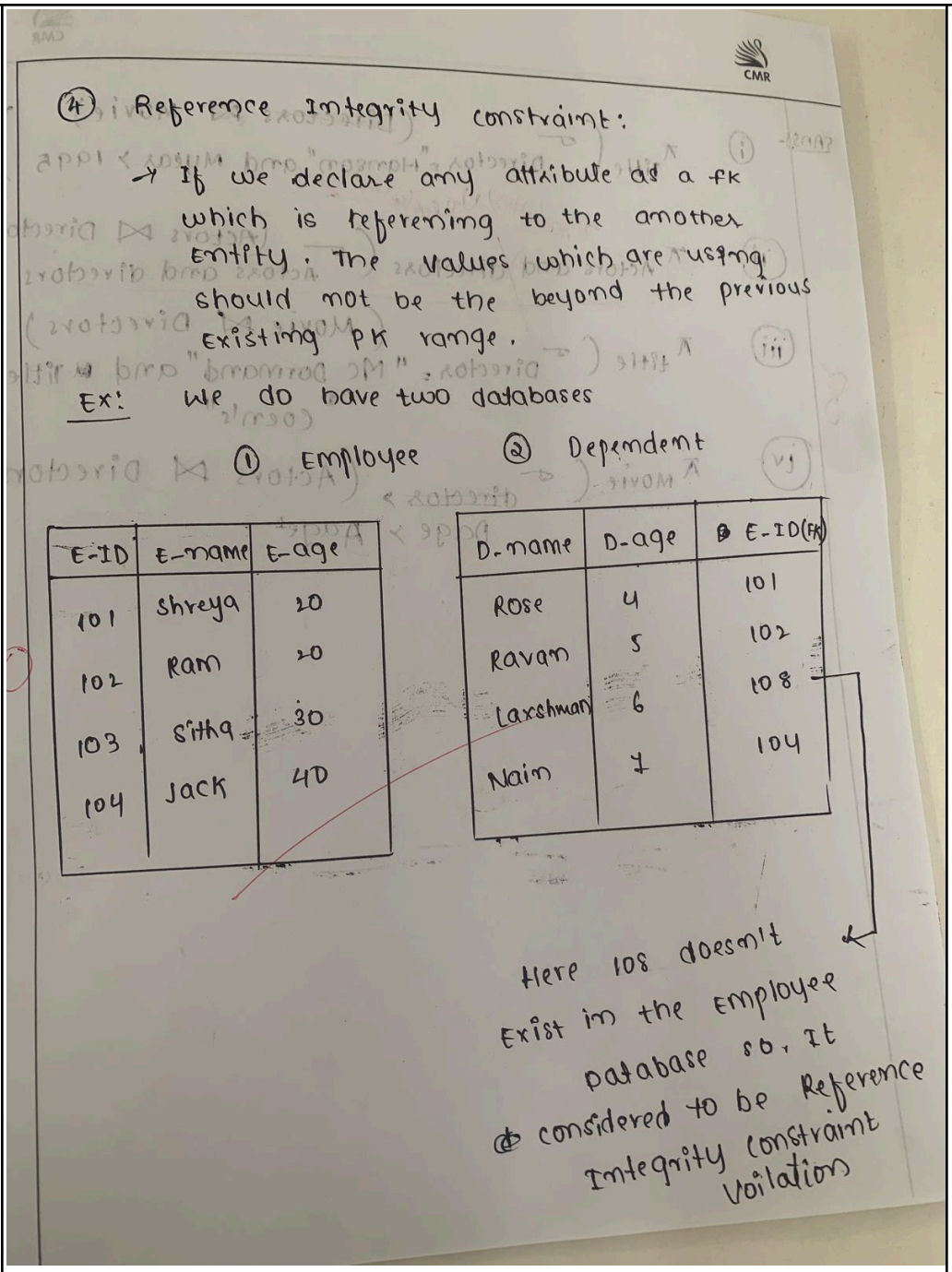
→ E-ID int primary key,

→ E-name varchar,

→ E-age int,

E-ID	E-name	E-age
101	shreya	50
102	Rose	20
103	Jack	80
NULL	Queen	100

The NULL value is inserted into the primary key Attribute.



④ Reference Integrity constraint:

→ If we declare any attribute as a fk which is referening to the another entity. The values which are using should not be the beyond the previous existing pk range.

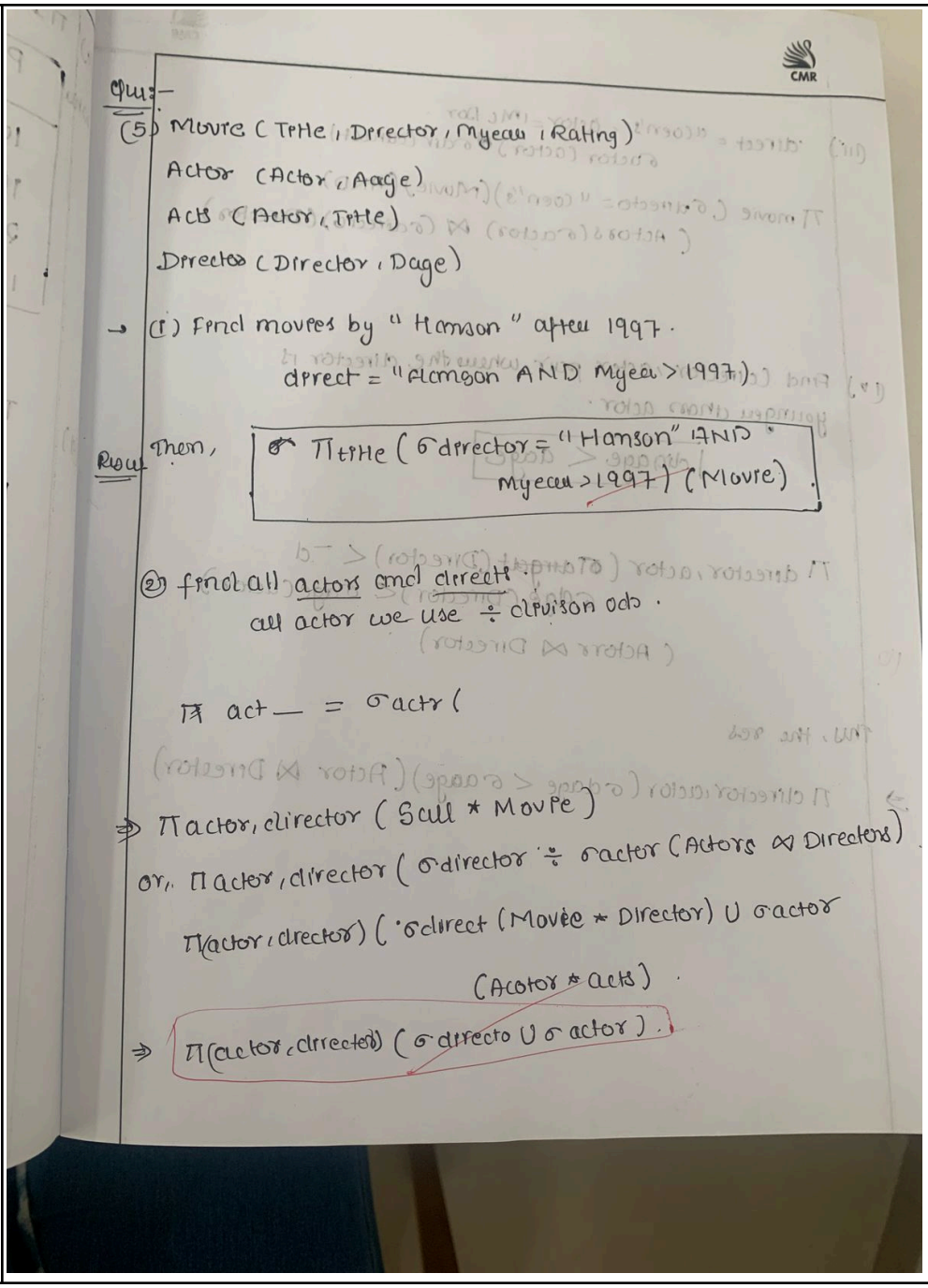
Ex: We do have two databases

① Employee ② Dependent

E-ID	E-name	E-age
101	Shreya	20
102	Ram	20
103	Sitha	30
104	Jack	40

D-name	D-age	E-ID(FK)
Rose	4	101
Ravan	5	102
Laxshman	6	108
Nain	7	104

Here 108 doesn't Exist in the employee database so, It considered to be Reference Integrity constraint Voilation

5			10	CO3	L2

Qu:-
(5) Movie (Title, Director, Myear, Rating)
Actor (Actor, Aage)
Acts (Actor, Title)
Director (Director, Dage)
→ (1) Find movies by "Hanson" after 1997.
direct = "Hanson AND Myear > 1997)
Now Then, σ ΠTitle (σ director = "Hanson" AND Myear > 1997) (Movie).
(2) find all actors and directs.
all actor we use ÷ division ods.
Π act__ = σactr (
⇒ Πactor, director (Scull * Movie)
or, Πactor, director (σdirector ÷ σactor (Actors ⋈ Directors)
Π(actor, director) (σdirect (Movie * Director) U σactor
(Actor * acts)
⇒ Π(actor, directed) (σ directo U σ actor).

(iii) direct = σ(coen's = actor = 'Mc Dor'.
σactor(actor) ⋈ σdir(direct))

Π movie (σdirecto = "coen's)(Movie) (AND)
(Actors(σactor) ⋈ (σdirecto)(Director))

(iv) Find (director, actor pair where the director is youngeu than actor.

d.dage < aage

Π director, actor (σTarget(Director) < -d
σage(Director) ≤ σage(actor)
(Actorr ⋈ Director)

Thus, the res

Π clirector, actor (σdage < σaage)(Actor ⋈ Director)

TABLE T1

P	Q	R
10	a	5
15	b	8
25	a	6

TABLE T2

A	B	C
10	b	6
25	c	3
10	b	5

a. $T1 \bowtie_{T1.P = T2.A} T2$

b. $T1 \bowtie_{T1.Q = T2.B} T2$

c. $T1 \bowtie_{T1.P = T2.A} T2$

d. $T1 \bowtie_{T1.Q = T2.B} T2$

e. $T1 \cup T2$

f. $T1 \bowtie_{(T1.P = T2.A \text{ AND } T1.R = T2.C)} T2$

a.

P	Q	R	B	C
10	a	5	b	6
10	a	.5	b	5
25	a	6	c	3

2 Marks

b.

P	Q	R	A	C
15	b	8	10	6
15	b	8	10	5

1 marks

c.

P	Q	R	A	B	C
10	a	5	10	b	6
10	a	5	10	b	5
15	b	8	NULL	NULL	NULL
25	a	6	25	c	3

2 marks

d.

P	Q	R	A	B	C
15	b	8	10	b	6
15	b	8	10	b	5
NULL	NULL	NULL	25	c	3

2 marks

e.

P	Q	R
10	a	25
15	b	8
25	a	6
10	b	6
25	c	3
10	b	5

1 mark

6						10	CO3	L3

f.

P	Q	R	B
10	a	5	b

2 Mark

CI CCI HOD