

Q1(a) 3 abstraction levels (distribution of six marks)

(OR)
ans

without example

fig	1	M
Theory	2	M
Total	3	Marks

With Example - clearly depicting what lies at each level

fig	2	M
Theory	4	M

6 M

level 2

partly taken date at view levels.

level 1

~~date~~ ~~to~~ date with date types may be described with any High Level language record.

level 0

example as { Block of RAW data = ie { consecutive storage locations

Q1 : ALL six - explained as asked gets 6 Marks
(1 Mark each)

- ① Data Redundancy, Inconsistency
- ② Data Isolation
- ③ Integrity problem
- ④ Atomicity
- ⑤ Concurrent Access Anomaly
- ⑥ Security

Q No 2: Differentiate following
①, ② & ③ } 2 Marks each
Total ⑥

Q No 3: a) Find the names and ages of sailors
with rating above 7

SQL : select sname, age
from sailors
where rating > 7

RA : $\Pi_{sname, age} (\sigma_{rating > 7} (Sailors))$

Q.3: b) Find the sailors Id, ^{Sailors} name, reservation day for each reservation

SQL : Select sid, sname, day
 from sailors, Reserves
 where (Sailors.sid = Reserves.sid)

RA : $\Pi_{sid, sname, day} (\sigma_{sailors.sid = Reserves.sid} (Sailors \times Reserves))$

OR
using

Natural
Join

OR

$\Pi_{sid, sname, day} (Sailors \bowtie Reserves)$

Q3 c) Give the name of Sailors who have reserved boat 103

SQL Select sname
 from sailors, Reserves
 where Sailors.sid = reserves.sid
 and reserves.bid = 103

RA $\Pi_{sname} (\sigma_{sailor.sid = reserves.sid \wedge reserves.bid = 103} (Sailors \times Reserves))$

OR

RA $\Pi_{sname} (\sigma_{bid=103} (Sailors \bowtie Reserves))$

Find the name of Sailors who have reserved red boat ⁽²⁾

SQL select sname
 from Sailors S, Reserves R, Boats B
 where S.sid = R.sid AND
 R.bid = B.bid AND
 B.color = "red"

RA $\pi_{sname} \left(\sigma_{\substack{S.sid = R.sid \wedge \\ R.bid = B.bid \wedge \\ B.color = "red"}} (Sailors S \times Reserves R \times Boats B) \right)$

e) Find the name of Sailors whose age is greater than 20

SQL select sname
 from Sailors
 where age > 20

RA $\pi_{sname} (\sigma_{age > 20} (Sailors))$

Note ①: SQL = 1 Mark each query

RA (ie relational Algebra) = 1 Mark each query

- ② IF query is completely correct then 1 Mark will be given.
- ③ Keeping alias is optional
- ④ Natural join, if case used - in query ④ is accepted
- ⑤ Natural Join is Associative (Brackets accepted)

Q4 Relational Query

$$a) \{ T \mid \exists S (S \in \text{Sailors} \wedge S.\text{rating} > 7) \wedge T.\text{name} =$$

or

$$T.\text{name} = S.\text{name} \wedge T.\text{age} = S.\text{age} \}$$

$$a) \{ T \mid \exists S \in \text{Sailors} (S.\text{rating} > 7 \wedge$$

$$T.\text{name} = S.\text{name} \wedge T.\text{age} = S.\text{age}) \}$$

$$b) \{ P \mid \exists S \in \text{Sailors} \exists R \in \text{Reserves} ($$

$$(S.\text{sid} = R.\text{sid} \wedge P.\text{sname} = S.\text{sname} \wedge P.\text{bid} = R.\text{bid} \wedge P.\text{day} = R.\text{day}) \}$$

Query (a) = 2 Marks
Query (b) = 2 Marks } for completely correct query

Q5 Ans Limitation \rightarrow (say Aggregation) 1 Marks

Overcoming drawback \rightarrow 1 Mark

Justification \rightarrow 2 M

OR

Cardinality Reinterpreted 2 Marks

Examples 1 Mark each

(X)