



UTHM
Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER II
SESSION 2022/2023**

- COURSE NAME : DATABASE
- COURSE CODE : DAT20103
- PROGRAMME CODE : DAT
- EXAMINATION DATE : JULY / AUGUST 2023
- DURATION : 3 HOURS
- INSTRUCTIONS :
1. ANSWER **ALL** QUESTIONS.
 2. THIS FINAL EXAMINATION IS CONDUCTED VIA **CLOSED BOOK**.
 3. STUDENTS ARE **PROHIBITED** TO CONSULT THEIR OWN MATERIAL OR ANY EXTERNAL RESOURCES DURING THE EXAMINATION CONDUCTED VIA **CLOSED BOOK**.

THIS QUESTION PAPER CONSISTS OF **SIX (6)** PAGES

- Q1** Define the meaning of the Database Management System (DBMS). (1 mark)
- Q2** List **TWO (2)** advantages of using database over the traditional file-based systems. (2 marks)
- Q3** State **THREE (3)** types of software in a database system. (3 marks)
- Q4** Distinguish between the centralised and the distributed database system. (2 marks)
- Q5** Explain why the development of a database system follows the Database Life Cycle (DBLC) instead of the Systems Development Life Cycle (SDLC). (2 marks)
- Q6** Differentiate between the **TWO (2)** types of data independence provided by the three-level ANSI-SPARC architecture. (4 marks)
- Q7** The following are the attributes for a PASSENGER entity.
id, title, first_name, last_name, date_of_birth, age, nationality, passport, home_address, office_address, phone
- Identify the:
- (a) composite attributes (2 marks)
- (b) derived attribute (1 mark)
- (c) multi-valued attribute (1 mark)

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Q8 Table Q8 (a) and Table Q8 (b) are two relations with the same structure.

Table Q8 (a): Staff1

staff_no	name	department
0021	Jamil	Electrical Engineering
0034	Harun	Electrical Engineering
0027	Jee Cheng	Information Technology
0039	Fatimah	Civil Engineering
0098	Rafeah	Landscaping

Table Q8 (b): Staff2

staff_no	name	department
0021	Jamil	Electrical Engineering
0038	Elillarasu	Civil Engineering
0027	Jee Cheng	Information Technology
0039	Fatimah	Civil Engineering
0100	Halimah	Electrical Engineering

Construct the result table from the execution of the following SQL statement.

```
(SELECT staff_no, name, department
FROM Staff1)
INTERSECT
(SELECT staff_no, name, department
FROM Staff2);
```

(4 marks)

Q9 Figure Q9 shows the superclass-subclass entities in an organization's database.

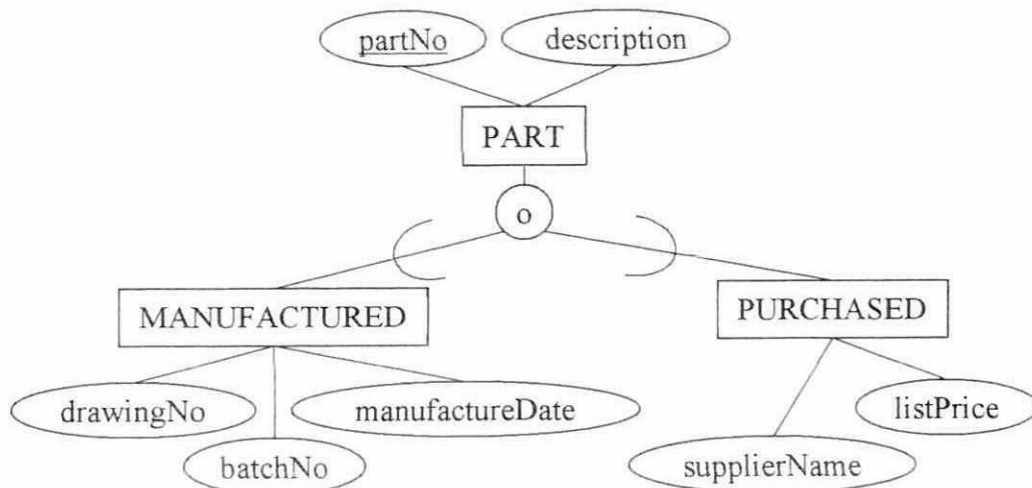


Figure Q9

Translate these entities into relational schemas.

(5 marks)

Q10 Convert the STAFF table from Unnormalized Form (UNF) to First Normalization Form (1NF).

Table Q10

STAFF

DeptCode	DeptName	StaffID	StaffName	StaffSalary
IS	Information System	PK 67	Shamsul Mohamad	10000
		PK89	Syamseer Irfan	5000
HR	Human Resources	PK56	Rafizah Mohd Hanifa	9000
		PK11	Syahmina Amani	4500
		PK34	Syahmie Iqbal	3900
ENG	Engineering	PK96	Mohamad Jamin	8300
		PK45	Chong Sek Choo	6500

(7 marks)

Q11 Given the following tables.

Table Q11

STUDENT

MatricNo	StudentName	Major
A1000	Danial Fakhri	Computer Science
A1001	Adlina Fareesya	Multimedia
A1002	Ganesh Raj	Information Science
A1003	Shukri Aman	Network Security
A1004	Jevnita	Multimedia

COURSE

CourseNo	CourseName	StaffNo
SK100	Java Programming	P1000
MM100	Graphic Design	P1000
SM100	Discrete Mathematics	P3000
RK200	Database	P3500
MM200	Visua Programming	P3000

REGISTRATION

MatricNo	CourseNo	Grade	Value
A1000	RK200	B	3.00
A1000	SK100	C+	2.33
A1001	MM200	B-	2.67
A1001	SK100	A	4.00
A1002	SM100	A-	3.67
A1004	MM200	B	3.00
A1004	RK200	C	2.00

STAFF

StaffNo	StaffName	Salary	Position
P1000	Rahman Al-Affif	4000	Senior Lecturer
S1500	Farisha Izzati	1500	Tutor
S2000	Nukman Hafiz	2500	Tutor
P2500	Fawwaz Widad	3000	Lecturer
P3000	Noralyssha Akmal	3500	Senior Lecturer
P3500	Sarveshwar	3300	Lecturer
S3000	Nurin Nazlah	2700	Tutor

- (a) Write an SQL statement for each of the following questions.
- (i) Add the following record into STUDENT table.
A1005, Aiman Hanif, Information Science
(4 marks)
 - (ii) Give a 5% salary increment to all staff holding the post of Lecturer.
(6 marks)
 - (iii) Show all records in the STAFF table, holding the post of Lecturer.
(6 marks)
 - (iv) Show the staff number, staff name and course name, for all staff holding the post of Lecturer and teaches Database.
(13 marks)
- (b) Construct the reference representation integrity table.
(9 marks)

Q12 The following is the work process of a company.

Wau Properties Sdn Bhd is a real estate company that owns, maintains and operates various office buildings, shopping centres and theme parks. It has multiple branches across Malaysia and wishes to build a new staff management system in preparation for their expansion to other South-East Asia countries.

Each of the company's branch has a unique branch number and a branch name. A branch has many staff, and a staff works at only one branch. Each staff has a unique staff number which was assigned to them upon joining the company. The company records the staff's name, address and phone number. The address consists of the house number, street, postcode and country. Some staff have multiple phone numbers, and a phone number belongs to only one staff.

A staff performs more than one task, and each task can be performed by many staff. Information about the task code, task category and task details, are kept for each task. A staff is either a permanent staff or a contract staff. Contract staff are hired for a specific service duration. Their service duration and pay rate are recorded by the company. The company also records the basic salary and allowance of all permanent staff.

Each staff can support many dependents (close family members), and each dependent is supported by only one staff. Each dependent is assigned a dependent number, and the company records the dependent's name, date of birth and relationship to staff.

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Illustrate an entity relationship diagram (ERD), complete with all the necessary entities, relationships, attributes, primary and foreign keys, cardinalities, and other relevant elements.

(28 marks)

– END OF QUESTIONS –

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