



UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
(ONLINE)
SEMESTER I
SESSION 2020/2021**

COURSE NAME : DATABASE
COURSE CODE : DAT20103
PROGRAMME CODE : DAT
EXAMINATION DATE : JANUARY 2021
DURATION : 3 HOURS
INSTRUCTION : ANSWER ALL QUESTIONS

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THIS QUESTION PAPER CONSISTS OF SEVEN (7) PAGES

- Q1** Describe the meaning of database. (1 mark)
- Q2** Differentiate between the Systems Development Life Cycle (SDLC) and the Database Life Cycle (DBLC). (2 marks)
- Q3** List **FOUR (4)** limitations of the file-based systems. (4 marks)
- Q4** Explain how controlling data redundancy reduces the risk of data inconsistency. (2 marks)
- Q5** Data redundancy can be controlled through the implementation of relationships between tables. Explain **TWO (2)** constraints that help in controlling data redundancy. (3 marks)
- Q6** Most Database Management Systems (DBMS) are based on the three-level ANSI-SPARC architecture. Explain the advantage of modelling data into these three levels. (2 marks)
- Q7** The following are the attributes for an EMPLOYEE entity.

emp_id, emp_name, emp_address, emp_date_of_birth, emp_age, emp_qualification

Identify the:

- (a) composite attribute (1 mark)
- (b) derived attribute (1 mark)
- (c) multi-valued attribute (1 mark)

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Q8 The following are the relations in the database for a university.

Student

name	matrix	gender	program_code
Akmal	AC2011	Male	SCV
Hui Peng	AC2012	Female	SCV
Divya	AC2017	Female	SCJ
James	AC2018	Male	SCJ

Program

name	program_code	accreditation body
Comp Sc. (Graphics and Multimedia)	SCV	MQA
Comp. Sc. (Software Engineering)	SCJ	MQA

Course

name	course_code	session	semester	credit
IT Project Management	CS2083	2020/2021	II	3
Operating Systems	CS1013	2019/2020	I	3
Database	CS2073	2020/2021	I	3
Computer Architecture	CS1023	2019/2020	II	3

Result

matrix	course_code	point
AC2011	CS2073	3.88
AC2012	CS1013	3.65
AC2012	CS2073	4.00
AC2018	CS1023	3.79

Identify the primary key and foreign key(s) (if any) for each relation.

(4 marks)

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Q9 Figure Q9 shows one of the entities in an organization’s database.

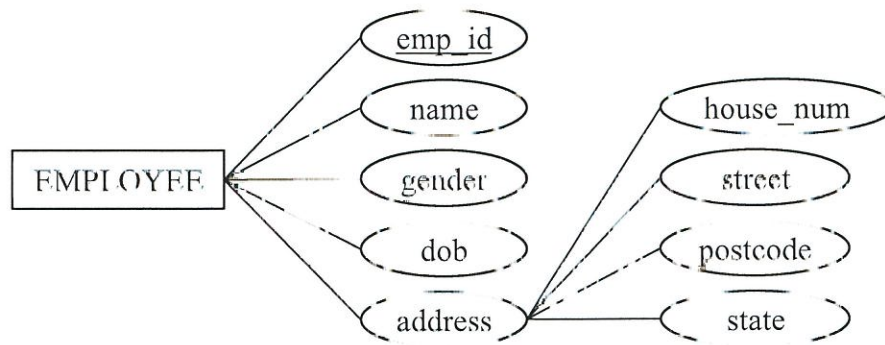


Figure Q9

Translate the EMPLOYEE entity into a relational schema.

(5 marks)

Q10 The following is the work process of a company.

Kapten Kayu Sdn. Bhd. is a company that produces and sells wood furniture. It has multiple branches across the Klang Valley and wishes to build a staff management system that will be used at all its branches.

Each 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 is assigned a unique staff number, and the company records the staff’s name, address and phone number. The address consists of the house number, street, postcode and state. 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.

(a) State the environment in which the database will be built.

(1 mark)

(b) 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)

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Q11 Figure Q11 shows the Students' Grading System database design for Universiti Muar.

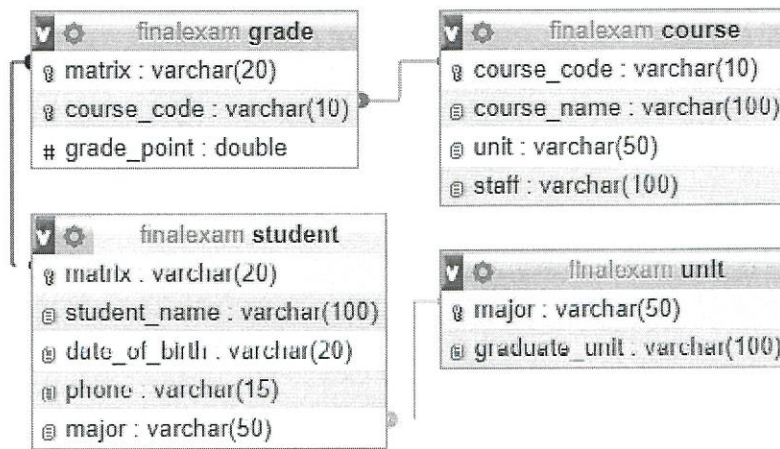


Figure Q11

Each student must choose one major. Major refers to programmes such as Software Engineering, Information System, Computer Science or Multimedia. Each student may register more than one course in a semester. They will receive only one grade for each course registered.

- (a) Produce an SQL statement that displays the students' information and the number of courses they registered, based on the records in the grade table. The output is as follows:

matrix	student_name	NumCourses
L2115	Chong Shan Choon	6
P1050	Azura binti Abu	5
S1070	Ramu a/l Raja	4

(2 marks)

- (b) Produce an SQL statement that displays the student's information and the grade point, for the student receiving the highest grade point for course code 'SK002'. The output is as follows:

matrix	student_name	course_code	grade_point
L2115	Chong Shan Choon	SK002	3.5

(4 marks)

- (c) Produce an SQL statement that lists the students' information, the sum of grade point and the average of grade point, for each student. The output is as follows:

matrix	student_name	SumGradePoint	AvgGradePoint
L2115	Chong Shan Choon	6.70	3.35
P1050	Azura binti Abu	12.03	3.01

(3 marks)

- (d) Produce an SQL statement that displays a list of students, which have not filled out their phone number. Sort the list according to the students' name. The output is as follows:

matrix	student_name	major
L2115	Chong Shan Choon	Computer Science
P1050	Azura binti Abu	Information System

(2 marks)

- (e) Produce an SQL statement that lists the students' information and the average grade point, for students receiving an average grade point of more than 3.0. The output is as follows.

matrix	student_name	AvgGradePoint
L2115	Chong Shan Choon	3.35
P1050	Azura binti Abu	3.5

(3 marks)

- (f) Produce an SQL statement that lists the students' information, course code, course name and grade point, for students with a grade point between 2.5 and 3.5. The output is as follows:

matrix	student_name	course_code	course_name	grade_point
L2115	Chong Shan Choon	SM100	Information System	3.20
P1050	Azura binti Abu	SM100	Information System	2.70
P1050	Azura binti Abu	SK001	Data Structure	3.33

(4 marks)

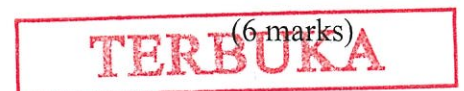
Q12 The following table shows the customer ordering data from MH Games Sdn. Bhd.

CustomerOrder

order_id	order_date	cust_id	cust_name	prod_id	unit_price	qty
1016	15/11/2020	002	Hart	7	800	2
				5	325	1
1017	16/11/2020	007	Bond	11	500	4
				5	325	3

- (a) Convert the table into the First Normal Form (1NF).

(6 marks)



(b) Figure Q12 (b) shows the dependency diagram for CustomerOrder.

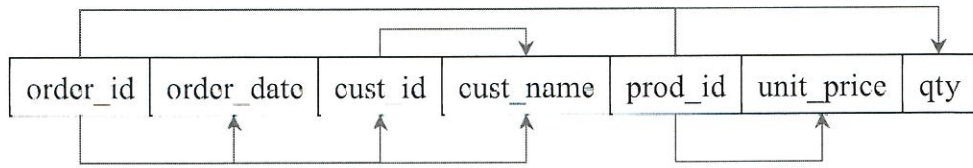


Figure Q12 (b)

- (i) Convert your answer in Q12 (a) into the Second Normal Form (2NF). (9 marks)
- (ii) Convert your answer in Q12 (b) (i) into the Third Normal Form (3NF) (12 marks)

– END OF QUESTIONS –

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