



## ICT502 TEST June 2024 Q

Database Engineering (Universiti Teknologi MARA)



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**UNIVERSITI TEKNOLOGI MARA**  
**TEST 1 (SET 1)**

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<b>COURSE</b>	:	<b>DATABASE ENGINEERING</b>
<b>COURSE CODE</b>	:	<b>ICT502 / ITS571</b>
<b>DATE</b>	:	<b>11 JUNE 2024</b>
<b>TIME</b>	:	<b>1 HOUR 30 MINUTES</b>
<b>STUDENT NAME</b>	:	.....
<b>UiTM ID NO.</b>	:	..... <b>GROUP:</b> .....
<b>LECTURER</b>	:	.....

<b>INSTRUCTIONS CANDIDATES</b>	<b>Question</b>	<b>Full Marks</b>	<b>Your Marks</b>	<b>TO</b>
	1	12		
1.	This question paper consists of <b>FOUR (4)</b> questions.	14		
2.	Answer <b>ALL</b> questions in English.	14		
3.	No discussions are allowed during the test.	10		
	<b>Total marks</b>	50		

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*This question paper consists of 5 printed pages*

## **QUESTION 1 (12 MARKS)**

- a) Regularly, Suraya can finish the staff monthly claims analysis in less than an hour. But ever since the database is shared for the whole company using the DBMS approach, the time taken to do the analysis has increased to 3 hours. Explain the situation that is happening to Suraya. (4 marks)
- b) Sales Information System and Human Resources System are two systems that are mainly used by Akar Harapan Company to manage their business. The databases of the systems are not linked together because of the departmental ownership. Explain **TWO (2)** problems that the company might encounter if the current database approach is still being practiced. (4 marks)
- c) In data modeling, sometimes it is necessary to show an entity with a relationship to itself but in different roles. Name that type of relationship and illustrate it with **ONE (1)** example. (4 marks)

## **QUESTION 2 (14 MARKS)**

- a) The schedule below shows transactions in the MBIC bank database.

**Schedule 1**

Time	Transaction A	Transaction B	BALANCE X
t1		Start	4000
t2		Read X	4000
t3		X = X + 1000	4000
t4	Start	Write X	5000
t5	Read X	..	5000
t6	X = X + 2000	..	5000
t7	..	Rollback	4000
t8	Write X	..	7000
t9	Commit	..	7000

Based on Schedule 1, Azman was happy because as suddenly, his account's balance was higher than it should be. But the bank was losing money because of the problem encountered in the schedule above. Answer the following questions.

- i) Explain the problem encountered by the bank's database. (3 marks)

- ii) State the correct Balance X if the problem in (i) is solved.  
(2 marks)
- b) Study the following transaction schedule.

<b>R2 (B) , R1 (A) , W1 (C) , R2 (C) , W1 (B) , R1 (B) , W3 (A) , R3 (C) , W2 (D) , W1 (A) , W3 (D)</b>
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**Schedule 1**

- i) Tabulate the transaction into the transaction table.  
(3 marks)
- ii) Based on the transaction table in (i), draw a precedence graph.  
(6 marks)

### **QUESTION 3 (14 MARKS)**

- a) As one of its benefits, the AirPro company provides quarters for its employees. Currently, the staff needs to apply for quarters through a paper-based system to the welfare department. Since the company has more than 200 staff, the department has problems managing bulk applications at one time. Hence, the top management has decided to develop a database management system for quarters applications with these requirements:

- Staff details must be provided, such as their ID, full name, email, salary, and current branch.
- A branch has many staff that is eligible to apply for quarters.
- Quarters are divided into terrace or apartment types, which have different attributes.
- Many staff can apply for quarters that will be approved by the manager.
- Each application will have a status of "pending," "approved" or "rejected."
- The staff can reapply for the quarters if the previous application is rejected.

As a database designer, you are required to design the entity relationship diagram (ERD) with cardinality and modality before the development stage starts. You can add any appropriate data to the ERD to complete the basic requirements.

(14 marks)

### **QUESTION 4 (10 MARKS)**

The relational schema below shows the examination registration system for students in College Jati. Each student will be assigned a location (hall) for each subject that they have registered for.

STUDENT	<b>(STID, STNAME, STADDRESS, STCITYCODE, STEMAIL, STPHONE, STFAC)</b>
EXAM	<b>(EXAMID, EXAMDATE, EXAMTIME, STID*, SUBCODE*, HALLID*)</b>
SUBJECT	<b>(SUBCODE, SUBNAME, LECID*)</b>
HALL	<b>(HALLID, HALLNAME, HALLOCATION, HALLCAPACITY)</b>
LECTURER	<b>(LECID, LECNAME, LECEMAIL, LECPHONE, LECFAC)</b>

For each subject, there is a lecturer-in-charge who should be contacted during the examination if there is any problem with the questions. The default date format is 'DD-MON-YYYY'.

Answer the following questions by using **Structured Query Language (SQL)**.

- a) Display all the details of students that has 'Ahmad as the start of their name from KPPIM faculty. (2 marks)
- b) List the name of students from Jasin who registered for the Database Engineering subject examination in July 2023. (4 marks)
- c) Find the total number of students that have taken 'Java Programming', 'Calculus' and 'Data Communication examinations in 2022. (4 marks)

**END OF QUESTIONS**