



UNIVERSITI TUN HUSSEIN ONN MALAYSIA

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

COURSE NAME : DATABASE

COURSE CODE : BIC 21404

PROGRAMME CODE : BIS / BIP / BIW / BIM

EXAMINATION DATE : JULY / AUGUST 2023

DURATION : 3 HOURS

- INSTRUCTION
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 FIVE (5) PAGES

Q1 Q1 (a) and Q1 (b) are based on **Table Q1**, where it represents a hypothetical list of **employees** in a company.

Table Q1

ID	name	position	salary
1	John	Manager	80,000.00
2	Sarah	Analyst	50,000.00
3	Mike	Analyst	55,000.00
4	Emily	Manager	85,000.00
5	Tom	Analyst	50,000.00
6	Kelly	Manager	90,000.00
7	Alex	Analyst	45,000.00
8	Jane	Manager	85,000.00

(a) Write an SQL statement to insert a new employee with the following details: ID = 9, name = 'Avery', position = 'Analyst', and salary = 60,000.00. (6 marks)

(b) Suppose Emily has been promoted to a new position as Senior Manager and her salary has been increased to 95,000.00. Write an SQL statement to update Emily's record with the new position and salary. (6 marks)

Q2 Consider the following PatientDb scenario in **Figure Q2 (a)** and its Schema in **Figure Q2 (b)**. Assume PatientDB is populated with data using the following SQL code as shown in **Figure Q2 (c)**. Draw an Entity Relationship Diagram (ERD) for this PatientDb database. (24 marks)

The PATIENT table stores information on patients. When a patient is injured, a "case specialist" enters patients' information, which is recorded into the MEDICAL CASE table with CaseId as the primary key. The same patient could be injured multiple times. Hence, the same SSN could have multiple CaseId's associated with them in the CASE table. The TREATMENT table stores the patient's treatment information such as DName (Doctor Name), TDate (Treatment Date), and disease with which the patient is being diagnosed. A patient can make multiple claims, and this information is recorded in the CLAIM table. A claim has information of CaseId, Date of Claim (ClaimDate), amount of claim, type of claim, and an Approved status. If the approved status is null, it means the status of the claim is unknown. If Approved is 'Y', the claim is approved. If Approved is 'N', the claim is denied.

Figure Q2 (a)



```

CREATE TABLE PATIENT (
  SSN varchar(9) primary key,
  PName varchar(25),
  HealthPlan char(1) CHECK (HealthPlan in ('A','B','C','D')),
  primary key (ssn) );

CREATE TABLE MEDICAL_CASE (
  CaseId int primary key,
  SSN varchar(9),
  InjuryDate date,
  foreign key (SSN) references PATIENT(SSN));

CREATE TABLE CLAIM (
  CaseId int primary key,
  ClaimDate date,
  Amount int,
  Type varchar(15) CHECK (Type in ('InPatient', 'Emergency',
'OutPatient', 'Prescription') ),
  Approved char(1) DEFAULT null,
  foreign key (CaseId) references MEDICAL_CASECASE(CaseId),
  constraint claim_chk1 CHECK (Approved = 'Y' or Approved = 'N'));

CREATE TABLE TREATMENT (
  CaseId int primary key,
  DName varchar(15),
  TDate date,
  Disease varchar(15),
  foreign key (CaseId) references MEDICAL_CASECASE(CaseId));

```

Figure Q2 (b)

```

insert into PATIENT values ('123', 'John', 'B');
insert into PATIENT values ('234', 'Mike', 'C');
insert into PATIENT values ('345', 'King', 'A');
insert into PATIENT values ('456', 'Mark', 'B');

insert into MEDICAL_CASE values (1, '123', '2004-06-16');
insert into MEDICAL_CASE values (2, '234', '2004-06-24');
insert into MEDICAL_CASE values (3, '123', '2004-10-12');
insert into MEDICAL_CASE values (4, '123', '2005-01-09');
insert into MEDICAL_CASE values (5, '123', '2005-02-09');

insert into CLAIM values (1, '2004-07-10', 10000, 'InPatient', 'Y');
insert into CLAIM(CaseId, ClaimDate, Amount, Type) values (3, '2004-11-14', 40000, 'Emergency');

insert into TREATMENT values (1, 'Clark', '2004-06-18', 'LegInjury');
insert into TREATMENT values (3, 'Blake', '2004-10-15', 'SmallPox');
insert into TREATMENT values (4, 'Clark', '2005-01-16', 'Flu');
insert into TREATMENT values (5, 'Harry', '2005-02-10', 'StomachPain');

```

Figure Q2 (c)

Q3 Table **Q3** shows information on student's subjects' registration.

Table Q3

<u>studId</u>	<u>name</u>	<u>address</u>	<u>Post-code</u>	<u>state</u>	<u>subjectId</u>	<u>subjectName</u>	<u>marks</u>	<u>grade</u>
AI1010	Awie	No 10	83000	Johor	BIC20104	Database	89	A
					UMS10101	English	65	C
					BIE10101	Java	78	B
AI1210	Azie	13 Lorong 1	41000	Selangor	BIC20104	Database	98	A
					BIS10111	Networking	68	C
CI1520	Muaz	Kg New	27000	Pahang	UMS10101	English	80	A
					BIS10111	Networking	68	C
					BIE10101	Java	78	B

- (a) Discuss **THREE (3)** key differences between First Normal Form (1NF), Second Normal Form (2NF), and Third Normal Form (3NF). (9 marks)

- (b) Justify if relation in **Table Q3** in 1NF. (3 marks)

- (c) Construct normalize table based on **Table Q3**.
 - (i) From UNF to 1NF.
 - (ii) From 1NF to 2NF.
 - (iii) From 2NF to 3NF.(12 marks)

Q4 Typically, an Inventory System has four basic elements: products, purchases, orders, and suppliers. Each element must be tracked based on its location, Stocks Keeping Unit (SKU), and quantity. Current inventory, or products on hand, is updated by tracking incoming shipments and outgoing orders.

- (a) Prepare a database design that represents the Inventory System database based on the above condition, include the primary key and the cardinality for each table. (10 marks)

- (b) Identify if all tables need to be rendered in the 3NF. (5 marks)



Q5 Justin is appointed as new IT Officer in one cosmetic manufacturer company. For the time being, before he works there, the company just manually keep the data in the traditional filling, as a new IT officer, he introduces the database management system for keeping the stock information of cosmetics produced by his company. Towards implementing the database system, he found that it is difficult as all the stocks were not in place, many of those are missing or being stolen by the worker, and the stocks that were missing in highly bulky goods too.

Based on the scenario, give your opinion on whether introducing a new database management system or data warehousing with web integration would be the most effective approach for Justin. Justify your answer.

(5 marks)

-END OF QUESTIONS-