(a)	Outline two uses of a data model in a database.	(2 marks)
(b)	Distinguish between data redundancy and data inconsistency as used in databases.	(4 marks)
		h
(c)	Describe three components of a three tiered architechure in a client server datab system.	ase (6 marks
(d)	An organisation uses a time card system to track hours worked by employees to b when computing payments. A time card should have hours worked, date submitte	e used d, a uniq
	id and status. Each time card is associated with exactly one employee and each enhas a unique id, name, address and payment type. An employee submits a time capay period. Each employee is associated with exactly one manager and each managurique id and a name. Each manager is in charge of multiple employees and each	npioyee ard every ager has a
	approves time cards for multiple employees.  Draw an ER diagram to represent the information.	(8 marks

2920/206

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	<b>-</b>	
(a)	Distinguish between a sophisticated user and an end user as used in databases.	(4 ma
(a)	Distinguish between a sophisticated user and an end user as used in databases.	(4 ma
	Distinguish between a sophisticated user and an end user as used in databases.	(4 ma
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	Distinguish between a sophisticated user and an end user as used in databases.	(4 ma
		(4 ma
		(4 ma
		(6 ma
	Describe three classifications of Database Management Systems.	(6 ma
	Describe three classifications of Database Management Systems.	(6 ma
	Describe three classifications of Database Management Systems.	(6 ma
	Describe three classifications of Database Management Systems.	(6 ma
-	Describe three classifications of Database Management Systems.	(6 ma
-	Describe three classifications of Database Management Systems.	(6 ma
-	Describe three classifications of Database Management Systems.	(6 ma
-	Describe three classifications of Database Management Systems.	(6 ma

(c)	Distinguish between non-lossy decomposition and lossy decomposition as used in normalization.
	(4 marks
(d)	Figure 1 shows a type of database organisation model. Use it to answer the question that follows.
	Ph# PhName MBirth Deliv Ph# MWt
	Figure 1
	Explain three benefits of using this type of database model. (6 marks
	Explain that the beliefits of using this type of database model.
	,
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2920/206 4

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Turn over

(a)	Andrew a manager, would like to purchase a Database Management System for leading the selection.	his (4 marl
	,	
(b)	The following are SQL statements. Use them to answer the question that follows.	
(-)	Create Table (Staffno varchar(5), lname(varchar(15), saddecimal ((7,2);	
	<pre>INSERT TO STAFF ('ST678','Lenny' "15700"); SELECT staffno,lastname,salary</pre>	
	From staff Where salary >10000;	
	Identify and correct the errors found in the statements	(4 mar
<u>.</u>		
(c)	Mary developed a system with the following modules; sales, invoicing and payro maintaining their own data files. Explain three disadvantages she would experient this approach	ice from
	this approach.	(6 mai
_•		
·		etwork.
(d)	Describe three database security measures that can be applied on data within a ne	
(d)		etwork. (6 mai

(a)	Desc	ribe a n	ormal form as used in normalization	(2 m
(b)	(i)	Outli	ne four factors to consider when to setting	(4 m
	(ii)	Desc I.	ribe the following during database design Logical;	
		II.	Physical.	(2 m

6

2920/206

(c)	Explain three objectives a Query builder in a database system.	(6 marl
		<u> </u>
		,
	,	
<del></del>	·	
(d)	Eric would like to de-normalise a table. Explain two problems that he may er this approach.	counter fron (4 mark
<del></del> -		
(a)	Distinguish between COUNT DISTINCT and COUNT * as used in structured language.	query (4 ma
(a)	Distinguish between COUNT DISTINCT and COUNT * as used in structured	query (4 ma
(a)	Distinguish between COUNT DISTINCT and COUNT * as used in structured language.	query (4 ma
(a)	Distinguish between COUNT DISTINCT and COUNT * as used in structured language.	query (4 ma
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	Distinguish between COUNT DISTINCT and COUNT * as used in structured language.	(4 ma
	Distinguish between COUNT DISTINCT and COUNT * as used in structured language.	(4 ma
	Distinguish between COUNT DISTINCT and COUNT * as used in structured language.	(4 ma
	Distinguish between COUNT DISTINCT and COUNT * as used in structured language.	query (4 ma)
	Distinguish between COUNT DISTINCT and COUNT * as used in structured language.	(4 ma

(c) Figure 2 shows a customer's order form. Use it to answer the question that follows.

(10 marks)

Customer No Customer Na Customer Add	me	Order No Order date		
Product No	Product Description	Quantity	Price	Value
Total				

Figure 2

	Perfo	rm each of the following normal forms:
	(i)	I <sub>st</sub>
		*
	/::X	$2^{\mathrm{nd}}$
	(ii)	2
	<del></del>	
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		•

2920/206 8

<u></u>	(iii) 3 <sup>rd</sup>	
	· · · · · · · · · · · · · · · · · · ·	
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	·	
		<del></del> -
•		
(a)	Explain two benefits an organisation would gain from using a multidimensional data	а <i>ва</i> 4 п
·		
<u></u>		
<u></u>		
		-
(b)		-
(b)	Outline the function of each of the following symbols used in an Entity Relationship Diagram.	

	(ii)	-		(1 mark)
 c)		rences between	a join operator and a union ope	erator as used in relational (6 marks)
	algebra.			(o marks)
	· · · · · · · · · · · · · · · · · · ·			
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			Marian Transcript	
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		······································	1/4 A A A A A A A A A A A A A A A A A A A	
				1 1 1
(d)			tionships between the student so	ore and grades. Use them to
	answer the ques	tions that folio	w.	
	Names	Score	Grade	
	ALI	10	В	
	ALI	20	Α	
	BEATRICE	10	В	
	Table R			
	Names	Score	Grade	
	ALI	20	A	
	ALI	30	A	
	Table K	30		
		€ر ماه دره سرماد رو	he following enerations are ann	lied between the tables
•		when each of	he following operations are app	
	(i) R∪K			(2 marks)
	(ii) Π names, g	rade (R)		(2 marks
	(22) Za hames, g	tranc ()		
		<del></del>		
				·
				() marks
	(iii) R-K			(2 marks
			·	

10

2920/206

T01010   BENERD   COMPUTER   30,000     T01011   RICHARD   BUSINESS   40,000     T01012   LIONE   MECHANICAL   35,000     T02011   MAURICE   MECHANICAL   45,000     Lectures table	T01010 BENERD COMPUTER 30,000  T01011 RICHARD BUSINESS 40,000  T01012 LIONE MECHANICAL 35,000  T02011 MAURICE MECHANICAL 45,000  Lectures table  LECTURES COURSE ID	(a)	respectively. Use th	nem to answer the	information and the c questions that follow DEPATMENT	ourses assigned to	each of them
T01011 RICHARD BUSINESS 40,000  T01012 LIONE MECHANICAL 35,000  T02011 MAURICE MECHANICAL 45,000  Lectures table  LECTURES COURSE ID	T01011 RICHARD BUSINESS 40,000  T01012 LIONE MECHANICAL 35,000  T02011 MAURICE MECHANICAL 45,000  Lectures table  LECTURES COURSE ID		LECTURES ID	NAME			
T01012 LIONE MECHANICAL 35,000  T02011 MAURICE MECHANICAL 45,000  Lectures table  LECTURES COURSE ID ID T01010 CS-001  T01012 BU-001  T01014 MC-001  Course table  (i) State the output when the following operations are applied on the tables.  1. Lecturers Course (2 mark)	T01012 LIONE MECHANICAL 35,000  T02011 MAURICE MECHANICAL 45,000  Lectures table  LECTURES COURSE ID ID T01010 CS-001  T01012 BU-001  T01014 MC-001  Course table  (i) State the output when the following operations are applied on the tables.  1. Lecturers Course (2 mar.)					<del></del>	
T02011 MAURICE MECHANICAL 45,000  Lectures table  LECTURES COURSE ID ID T01010 CS-001  T01012 BU-001  T01014 MC-001  Course table  (i) State the output when the following operations are applied on the tables.  I. Lecturers Course (2 mark)	T02011 MAURICE MECHANICAL 45,000  Lectures table  LECTURES COURSE ID ID T01010 CS-001  T01012 BU-001  T01014 MC-001  Course table  (i) State the output when the following operations are applied on the tables.  I. Lecturers Course (2 mar.)						·
Lectures table    Lectures   COURSE ID	Lectures table    Lectures   Course ID						_ <del>-</del> -
LECTURES   COURSE ID	LECTURES   COURSE ID			MAURICE	MECHANICAL	45,000	
T01010 CS-001 T01012 BU-001 T01014 MC-001  Course table  (i) State the output when the following operations are applied on the tables.  I. Lecturers □ Course (2 mar	T01010 CS-001 T01012 BU-001 T01014 MC-001  Course table  (i) State the output when the following operations are applied on the tables.  1. Lecturers □ Course (2 mar		Lectures table				
T01012 BU-001 T01014 MC-001  Course table  (i) State the output when the following operations are applied on the tables.  1. Lecturers Course (2 mar	T01012 BU-001 T01014 MC-001  Course table  (i) State the output when the following operations are applied on the tables.  1. Lecturers Course (2 mar.)			COURSE ID			
T01014 MC-001  Course table  (i) State the output when the following operations are applied on the tables.  I. Lecturers Course (2 mar	T01014 MC-001  Course table  (i) State the output when the following operations are applied on the tables.  I. Lecturers  Course (2 mar		T01010	CS-001			
Course table  (i) State the output when the following operations are applied on the tables.  I. Lecturers Course (2 mar	Course table  (i) State the output when the following operations are applied on the tables.  I. Lecturers Course (2 mar		T01012	BU-001			
Course table  (i) State the output when the following operations are applied on the tables.  1. Lecturers Course (2 mar	Course table  (i) State the output when the following operations are applied on the tables.  I. Lecturers Course (2 mar		T01014	MC-001			
II. Lectures Course (2 mar	II. Lectures Course (2 ma		* * * * * * * * * * * * * * * * * * * *	_		e applied on the t	
II. Lectures Course (2 mar	II. Lectures Course (2 ma		* * * * * * * * * * * * * * * * * * * *	_		e applied on the t	ables. (2 mar
			* * * * * * * * * * * * * * * * * * * *	_		e applied on the t	
			1. Lec	cturers \ Cou	urse	e applied on the t	(2 mar
			1. Lec	cturers \ Cou	urse	e applied on the t	(2 mar
			1. Lec	cturers \ Cou	urse	e applied on the t	(2 ma

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III.	Lecturers		Course.		(3 marks)
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 <u> </u>					
	········				
					. 10
 IV.	department	avg(sala	ry) as avgsal		(3 mark
 		<u> </u>			2/2.4
 		<del></del>			
 Table I sho follows.	ws a relation t	named <i>pr</i>	oduct in a database.	Use it to answer t	he question that
	ows a relation t	named <i>pr</i>	Product Name	DailySales	he question that
 follows.		<b>Age</b> 25	Product Name Soap	DailySales 50,000	he question that
 follows.  Sales ID	SalesMan	Age 25 45	Product Name Soap Oil	<b>DailySales</b> 50,000 20,000	he question that
 Sales 1D S/001	SalesMan Andrew	Age 25 45 35	Product Name Soap Oil Soap	DailySales 50,000 20,000 25,000	he question that
 Sales ID S/001 S/010	SalesMan Andrew Mary	Age 25 45	Product Name Soap Oil Soap Oil	DailySales 50,000 20,000 25,000 40,000	he question that
 Sales 1D S/001 S/010 S/015	SalesMan Andrew Mary Philip	Age 25 45 35	Product Name Soap Oil Soap	DailySales 50,000 20,000 25,000	he question that
 Sales ID S/001 S/010 S/015 S/002	SalesMan Andrew Mary Philip Billy	Age 25 45 35 27	Product Name Soap Oil Soap Oil	DailySales 50,000 20,000 25,000 40,000	he question that
 Sales ID	SalesMan Andrew Mary Philip Billy Sarah	Age 25 45 35 27 36	Product Name Soap Oil Soap Oil Soap Oil Soap	DailySales 50,000 20,000 25,000 40,000 80,000	
 Sales ID	SalesMan Andrew Mary Philip Billy Sarah	Age 25 45 35 27 36	Product Name Soap Oil Soap Oil	DailySales 50,000 20,000 25,000 40,000 80,000	he question that
Sales ID	SalesMan Andrew Mary Philip Billy Sarah	Age 25 45 35 27 36	Product Name Soap Oil Soap Oil Soap Oil Soap	DailySales 50,000 20,000 25,000 40,000 80,000	
Sales ID	SalesMan Andrew Mary Philip Billy Sarah	Age 25 45 35 27 36	Product Name Soap Oil Soap Oil Soap Oil Soap	DailySales 50,000 20,000 25,000 40,000 80,000	

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	(ii)	display the fields, salesman, age, dailysales for those salesman whose a than 30 and daily sales is in the range of 20,000 and 40,000;	ige is more (2 marks)
	(iii)	add a column named department that would store data of at most five of	characters; (2 marks)
	(iv)	sort the records in ascending order by Salesman and dailysales;	(2 marks)
	(v)	create a view from products table with the fields salesman and agc.	(2 marks)
(a)		ne the function of each of the following SQL statements. FROM;	
	(ii)	HAVING;	(1 mark)

	(iii)	ORDER BY;				(1 mark)
	(iv)	WITH.				(1 mark)
	·				//	
	<del></del> -					
(b)	Distin	nguish between <i>re</i> .	lational algebra	and structured	query language	as used in databases. (4 marks)
	······································					· · · · · · · · · · · · · · · · · · ·

(c) The following are tables named *customer* and *order* respectively. Use them to answer the questions that follow.

CUSTOMER ID	NAME	ADDRESS	AGE	SALARY
C/001	ALI	788 NRB	45	40,000
C/002	ANNE	2000 KSM	75	30,000
C/003	MATHEW	3412 NRB	25	33,000
C/004	DEBORAH	4222 NR	33	22,000
C/005	ANTONY	7243 MA	22	10,000

## Customer

ORDER ID	DATE	CUSTOMER ID	AMOUNT
0/0001	24/12/2012	C/003	20,000
0/0002	23/05/2014	C/003	30,000
0/0003	20/07/2014	C/002	40,000
0/0004	20/02/2014	C/004	5,000

Order

2920/206 14

(i)	State th	State the output when the following SQL statements are applied on the tables. (12 marks)					
	Ĭ.	SELECT ID,NAME,AMOUNT,DATE FROM CUSTOMERS INNER JOIN ORDERS ON CUSTOMERS ID=ORDERS.CUSTOMERS ID					
	II.	SELECT CUSTOMER ID,NAME,AMOUNT FROM CUSTOMERS FULL JOIN ORDERS ON CUSTOMERS ID=ORDERS.CUSTOMERS ID					
	-						