



# UNIVERSITY OF THE PUNJAB

Fifth Semester 2013

Roll NO. \_\_\_\_\_

Examination: B.S. 4 Years Programme

PAPER: Database Systems (CMP)

TIME ALLOWED: 2 hrs. & 30 mins.

Course Code: IT-304

MAX. MARKS: 50

**Attempt This Paper on Separate Answer Sheet provided.**

## SUBJECTIVE TYPE

**Q2: Answer the following short questions.**

**(15 marks)**

- I. Write a query to show the location & name of those whose salary is less than the salary of King.
- II. Show the salary Grade of all employees whose salary is greater than the salary of King, Ford and Michel.
- III. Show the name and job title of all those employees whose name is containing 'Z' or at fifth place having 'S' or starting with 'Y' or having two A's in it and job title is greater than Accounts.
- IV. Display the name of all those employees who join the company after six month of King and currently serving in Lahore.
- V. Display the name of those employees whose salary is greater than average salary of all departments and less than the salary of maximum salary of all departments.

### **Schema:**

Emp (Empno, Ename, sal, comm, deptno, mgr, job, HireDate)

Dept (Deptno, Dname, Loc)

SalGrade (Hisal, Losal, SalGrade)

**Q3: Normalize the relation given below in 2<sup>nd</sup> normal form**

**(10 marks)**

<u>CourseID</u>	Name	Age	Student	NIC	CourseName	Grade	Skills
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**Q4: Normalize the relation given below in 2<sup>nd</sup> normal form**

**(10 marks)**

A customer is someone who places, has placed or may place orders with the company. A regular customer places orders at regular intervals. An order is placed by one customer only, so two or more customers cannot place an order jointly. Note that some customers may not have placed an order yet. A customer can operate at a number of sites. The delivery address is included on the customer order.

Each order will request product items. Most orders will request several product items, and an order must request at least one product item. A particular product item may be requested on several orders. Product items are organized into product types. Each product item will be of a specific type. Product types organize product items into specific categories (e.g. Beans, Cereals, and Pet Food etc. ). Each product item is supplied by a single supplier may supply several different product types.

Each order consists of a number of requests for items, known as order items. Each order will have at least one order item. Most orders will consist of many order items. Each order item relates to a particular product item that has been requested. A product item can be requested on several orders and thus several order items.

**Q5: Explain Transaction. What are ACID properties of transaction?**

**(8 marks)**

**Q6: What is meant by ANSI SPARC Architecture explain 3 layers describe in it?**

**(7 marks)**

**Q7: During transformation which entities, relationships and attributes form new tables (Relations)?**

**(5 marks)**



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Fifth Semester 2014

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**TIME ALLOWED: 2 hrs. & 30 mins.**

**Course Code: IT-304**

**MAX. MARKS: 50**

**Attempt This Paper on Separate Answer Sheet provided.**

## SUBJECTIVE TYPE

### Question2:

**(10 marks)**

The boat reservation database has the following schema:

**sailor:** sname (string), rating (integer)

**boat:** bname (string), color (string), rating (integer)

**reservation:** sname (string), bname (string), weekday (string)

The rating attribute for boats indicates the minimum rating required of a sailor reserving the boat. In addition, the following hold:

- *sname* is the primary key of *sailor* (so every sailor has just one rating);
- *bname* is the primary key of *boat* (so every boat has just one color and one rating);
- *bname* is a foreign key in the *reservation* relation, referencing relation *boat* (so every *bname* in reservation occurs in boat, but the converse need not be true)
- *sname* is a foreign key in the *reservation* relation, referencing relation *sailor* (so every *sname* in reservation occurs in sailor, but the converse need not be true)

Here is one example instance given in Figure 1 over the above schema:

<i>sailor</i>	<i>sname</i>	<i>rating</i>
	Brutus	1
	Andy	8
	Horatio	7
	Rusty	8
	Bob	1

<i>boat</i>	<i>bname</i>	<i>color</i>	<i>rating</i>
	SpeedQueen	White	9
	Interlake	Red	8
	Marine	Blue	7
	Bay	Red	3

<i>reservation</i>	<i>sname</i>	<i>bname</i>	<i>weekday</i>
	Andy	Interlake	Monday
	Andy	Bay	Wednesday
	Andy	Marine	Saturday
	Rusty	Bay	Sunday
	Rusty	Interlake	Wednesday
	Rusty	Marine	Wednesday
	Bob	Bay	Monday

Figure 1: Database instance for Question 2

Write the following queries in SQL **(of course, the queries must work on all data, not just the sample one):**

- a) **(2 points)** List all boats reserved on Wednesday and their color.
- b) **(2 points)** List all sailors never reserve a boat on Friday.
- c) **(2 points)** Write a query to tell sum of sailor reserve boat on Wednesday.
- d) **(2 points)** For each day, list the number of red boats reserved on that day.
- e) **(2 points)** Write a query to find the sum of reservation in which Andy reserve Interlake or Speed Queen boat.

**Question 3:**

**(10 marks)**

Consider the following relations:

**Emp (eno, ename, title, city)**

**Proj (pno, pname, budget, city)**

**Works (eno, pno, resp, dur)**

**Pay (title, salary)**

Where the primary keys are underlined, and Emp.title is a foreign key to Pay.title, Works.eno is a foreign key to Emp.eno, and Works.pno is a foreign key to Proj.pno.

For each part of this question (considered independently of the other parts), write a single SQL statement that accomplishes the given requirements.

- a) **(3 points)** For each city, how many projects are located in that city and what is the total budget over all projects in the city?
- b) **(3 points)** List all projects located in "Lahore".
- c) **(4 points)** Write a query to the name of employees working in cadcam proj and their city is not Lahore and resp is manager and salary is less than 20000.

**Question 4:****(10 marks)**

Prepare an E-R diagram for an educational institute. The following describes this organization:

- In an educational institute, there are several departments and students belong to one of them. Each department has unique department number, name and a location.
- Professors have a unique employee id, name and they work in a particular department.
- We like to keep track of the following details regarding students: name, unique roll number, date of birth, age and one or more email addresses.
- Students have a local address consisting of the hostel name and the room number. They also have home address consisting of house number, street and city.
- A course taught in a semester of the year has sections. There can be several sections of the same course in a semester; these are identified by the section number. Each section is taught by a different professor and has its own timings and a room to meet. However, a professor can teach many sections in a semester.
- Students enroll for several sections in a semester. Each department offers many course may be pre-requisite for many courses.

**Question 5:****(10 marks)**

Normalize the given table in 3<sup>rd</sup> normal form

CourseID	StudentID	Course Title	Student Name	Total Marks	Pass Date	Pass Marks	St. Email	Course Code
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**Question 6:****(10 marks)**

- a) Define Transaction
- b) Define DML
- c) Define weak entity
- d) Define Multi value Attribute
- e) **Not Available.**





# UNIVERSITY OF THE PUNJAB

Fifth Semester 2015

Roll NO. \_\_\_\_\_

Examination: B.S. 4 Years Programme

**PAPER: Database Systems (CMP)**

**TIME ALLOWED: 2 hrs. & 30 mins.**

**Course Code: IT-304**

**MAX. MARKS: 50**

**Attempt This Paper on Separate Answer Sheet provided.**

## **SUBJECTIVE TYPE**

**Q 2: Give Answer of following Questions?**

**(5x4 marks)**

Write Queries for the given statements

1. Give name of all the employees working as a manager and getting salary between 34000 to 50000.
2. Give the name of all projects, their Budget amount and total amount pay to these project employees in Descending Order.
3. Give the salary, name and title of all the employees who has single 'A' in their name.
4. Show name and give 25% bonus to those managers whose working duration is more than 24 hours and they are not working on CAD/CAM project.
5. Show the name, Project name and salary of a person working maximum number of hours and give 10% Bonus to this employee and show the attribute with the heading Bonus + Salary with rounding the digit after 1<sup>st</sup> place of decimal.

**Q 3: Draw E-R Diagram for following scenario.**

**(10 marks)**

Our client "XYZ Ltd." is starting rent a car Business. Initially they will have one office in Lahore. They will have cars of different models from different makers. Customers can have a car on rent for some period from their office and will return the car at the office after use. Customers will be charged on hourly bases. There will also be some discount packages for customers in which they will initially pay a specific amount and will be given a specific discount on each bill.

**Q 4: Normalize the following relation and also explain each normal form?**

**(5 marks)**

Book-id	Book-name	price	Writer-id	publisher	Book Type	Writer Name
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**Q5: Explain ANCI SPARC ARCHITECTURE?**

**(8 marks)**

**Q6: What is meant by ACID properties of Transaction?**

**(7 marks)**

**Table for Queries**

**Pay**

Title	Sal
Elect. Eng.	40000
Syst. Anal.	34000
Mech. Eng.	27000
Programmer	24000

**ASG**

Eno	Pno	Resp	Dur.
E1	P1	Manager	12
E2	P1	Analyst	24
E2	P2	Analyst	8
E3	P3	Consultant	24
E3	P4	Engineer	16
E4	P2	Programmer	18
	P2	Manager	0
E6	P4	Engineer	36



**Employee**

<b>ENO</b>	<b>EName</b>	<b>Title</b>	<b>Bonus</b>	<b>Hiredate</b>
E1	John	Elec. Eng.	1000	22-11-1990
E2	Smith	Syst. Anal.	2000	27-06-1990
E3	Lee	Mech. Eng.	1000	15-12-1990
E4	Michel	Programmer		30-05-1990
E5	Miller	Syst. Anal.	2000	11-02-1991
E6	Davis	Elec. Eng.		07-02-1993

**PROJ.**

<b>Pno</b>	<b>Pname</b>	<b>Budget</b>
P1	Instrumentation	150000
P2	Database Prog.	135000
P3	CAD/CAM	250000
P4	Maintenance	310000

# UNIVERSITY OF THE PUNJAB

Fifth Semester 2016

Examination: B.S. 4 Years Programme

Roll No. ....

PAPER: Database Systems (CMP)  
Course Code: IT-304

TIME ALLOWED: 2 hrs. & 30 mins.  
MAX. MARKS: 50

*Attempt this Paper on Separate Answer Sheet provided.*

## SUBJECTIVE TYPE

Q.2 Define (Marks 16)

- ✓ Backup and Recovery (20)
- ✓ Acid Properties (291)
- ✓ Candidate Key (12)
- ✓ Security (19)

## Short Questions

✓ Q.3 Draw an ER-Diagram according to given requirements. (Marks 10)

A hospital has a large number of registered physicians. Attributes of physician include physician\_id and speciality. Patients are admitted to the hospital by physicians. Attributes of patient include patient\_id and patient name. any patient who is admitted must have exactly one admitting physician. A physician may optionally admit any number of patients. Once admitted a given patient must be treated by atleast one physician. A particular physician may treat any number of patients or may not treat any patients. Whenever a patient is treated by a physician, the hospital wishes to record the details of the treatment (treatment details). Components of treatment detail include date, time and result.

✓ Q.4 Normalize the Given Relation R (Marks 08)

R = {Aircraftno, Aircraftname, Pilotno, pilotname, mission, flyinghours, hourly rate, mission coordinates}

✓ Q.5 Write SQL statements: (Marks 16)

- ✓ Write a query to get details of those employees whose emp-name are not ROY, JOHN and SMITH.
- ✓ Show the ename and salgrade of all employees working in Adam department.
- ✓ Show the name and salary of those employees getting sal more than average sal of FINANCE department.
- ✓ Write a query to display the name and dname of all employees workin in Smith department.



# UNIVERSITY OF THE PUNJAB

Fifth Semester 2017  
Examination: B.S. 4 Years Programme

Roll No. ....

PAPER: Database Systems (CMP)  
Course Code: IT-304

TIME ALLOWED: 2 hrs. & 30 mins.  
MAX. MARKS: 50

*Attempt this Paper on Separate Answer Sheet provided.*

## SUBJECTIVE TYPE

Q2: Give Answers of following Questions?

(Marks=10\*2=20)

1. Write a query to Get details of those employees whose emp- name are not "John", "Roy", and smith.
2. Write a query to display those employees whose emp-name contains 'o' OR working in same department as SMITH'.
3. Write a query to display emp-id of those employees whose salary is between 20000 and 30000 OR maximum salary greater than 35000.
4. Select department, total salary with respect to a department from employee table where total salary greater than 800000 order by Total\_Salary descending
5. Write a query to display department wise minimum salary of employees order by salary descending.
6. What is Referential Integrity?
7. Difference between Data Administrator and Database administrator?
8. Difference Simple Key and Composite Key?
9. Difference between DDL and DML?
10. Define term Generalization and Specialization?

## (Subjective)

Q3: Draw E-R diagram for following scenario, and transform into relations!  
(Marks 10+5)

UPS prides itself on having up-to-date information on the processing and current location of each shipped item. To do this, UPS relies on a company-wide information system. Shipped items are the heart of the UPS product tracking information system. Shipped items can be characterized by item number (unique), weight, dimensions, insurance amount, destination, and final delivery date. Shipped items are received into the UPS system at a single retail center. Retail centers are characterized by their type, unique ID, and address. Shipped items make their way to their destination via one or more standard UPS transportation events (i.e., flights, truck deliveries). These transportation events are characterized by a unique schedule Number, a type (e.g, flight, truck), and a delivery Route. Please create an Entity Relationship diagram that captures this information about the UPS system. Be certain to indicate identifiers and cardinality constraints.

Q4: Normalize the following relation and also explain each normal form? (Marks 05)

Aircraft No	Aircraft Name	Pilot No	Pilot Name	Mission	Flying Hours	Hourly Cost
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Q5: What properties table need to have to qualify for a relation? (Marks 10)



# UNIVERSITY OF THE PUNJAB

Fifth Semester 2018  
Examination: B.S. 4 Years Programme

Roll No. ....

PAPER: Database Systems (CMP)  
Course Code: IT-304

TIME ALLOWED: 2 hrs. & 30 mins.  
MAX. MARKS: 50

*Attempt this Paper on Separate Answer Sheet provided.*

## SUBJECTIVE TYPE

Q2: Answer the following short questions.

(03 \* 5 = 15)

1. What is the purpose of Backup and Recovery?
2. Define Candidate Key?
3. Explain Self Join?
4. What is Security in database?
5. Differentiate between consistency and integrity.

Q3: Normalize the following table up to 3rd Normal form but step by step show each intermediate resultant table with its data. (05 Marks)

Branch\_Staff

BID	Address	Tel	SID	Sname	Salary	CID	CName	Tel
B1	PU Old Campus	042-5763456	S1	Furqan	45,000	C1	PUCIT	111-923-923
			S2	Madiha	20,000	C2	PUCAD	042-9258796
			S3	Tehseen	38,000	C1	PUCIT	111-923-923
B2	PU New Campus	042-6345678	S4	Maria	46,000	C1	Math Dept.	042-9254361
			S5	Muzahir	50,000	C2	Phy. Dept.	042-9200921
			S6	Faiza	34,000	C3	Eng. Dept	111-921-921

**BID:** Branch Identification Code

**SID:** Staff Identification Code

**SName:** Staff name

**CID:** Client Identification Code

**CName:** Client name

P.T.O.

(Long Questions)

**Q4: Draw E-R Diagram for following scenario.**

**(10 Marks)**

Student can appear in the exam. Question Paper only contains MCQs but having variation of options and also there is a variation of correct number of options in one question. Different Questions may contain different marks and some of them may have negative marking. System Calculates the student Results and student can review there incorrect questions with their correct answers. System can also maintain the history of Personal information for our students.

**Q5: Write SQL Queries for the given statements:**

**(20 Marks)**

- Show Emp name salary of those employees working in LHR and working in finance and having salary less than the average salary of all employees.
- Find ename and salary of those employees getting salary less than the average salary of any department.
- Find the total numbers of employees department wise.
- Show emp-name of those employees whose getting salary more than smith and less than lara.
- Show ename salary of employees working in Jordan department but getting salary more than Jordsan

Emp_ID	Emp_Name	Dept_ID	Salary	Deptno
01	John	01	20000	10
02	Smith	01	20000	10
03	Lee	02	12000	10
04	Sam	03	12000	10
05	Jordan	03	70000	20
06	Lara	04	50000	20
07	Adam	02	60000	30
08	Michel	01	80000	30
09	Andrew	03	50000	30

Deptno	Deptname	Location
10	Finance	LHR
20	Accounts	ISL
30	IT	KHI



# UNIVERSITY OF THE PUNJAB

Fifth Semester – 2019

Examination: B.S. 4 Years Program

Roll No. ....

PAPER: Database Systems (CMP)

Course Code: IT-304 Part – II

MAX. TIME: 2 Hrs. 45 Min.

MAX. MARKS: 50

**ATTEMPT THIS (SUBJECTIVE) ON THE SEPARATE ANSWER SHEET PROVIDED**

## Short Questions (Marks 20)

Q. 2 A. Briefly explain the following questions.

2\*5=10

- Explain Group By Clause in SQL.
- Define theta join with an example.
- What is the use of IN operator in SQL command?
- What is concurrency and deadlock?
- Define multivalued attribute with an example.

B- Write SQL queries for the given statements

2\*5=10

- Show the name and salary of all clerks having salary grade 1 and 2 or manager.
- Show the dept name, Grade and ename of all employees working in Newyork or Chicago.
- Show name of those employees working with king and getting less sal than king but hired before king.
- Show ename of all employees getting salary more than king but less than any employee of dept 20 and more than any employee of department 30.
- Show name and salary of all employees working with KING and getting salary less than the king.

Emp (empno,ename,sal,comm,hiredate,mgr,deptno)

Dept(deptno,dname,loc)

SalGrade (Grade,minsal,maxsal)

Tables for queries

## Subjective Question (Marks 30)

Q. 3. Explain Three Tire ANSI-SPARC Architecture.

10

Q. 4. Explain ACID properties of transaction with example.

10

Q. 5. Define 2<sup>nd</sup> Normal Form. Remove Partial Dependency form given relation.

Where StdID and CourseID is Composite key.

10

StdID	StdName	CourseID	CourseName	CNIC	DOB	Grade	Skills
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# UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program, Fifth Semester – 2020

Paper: Database Systems (CMP)

Course Code: IT 304

Part - B

Time: 2 hrs. 45 Min. Marks: 50

Roll No.

ATTEMPT THIS (SUBJECTIVE) ON THE SEPARATE ANSWER SHEET PROVIDED

Q2: Write The SQL Queries According To Following Schema.

(5\*2 marks)

SCHEMA:

Employee(Emp\_No, E\_Name, E\_Address, E\_Salary, Dept\_No, Proj\_No)

Department(Dept\_No, Dept\_Name, Dept\_Manager\_no, Dept\_Location)

Project(Proj\_No, Proj\_Name, Dept\_No)

- Find the Employee Names And Their Related Department Name.
- Find the Department Name, Department Location and which Project is handling By Department.
- Show The Names and Salary as 'Increased SALARY' AFTER giving increment of 15 percent to each Employee.
- Find only those department names which are working without any 'MANAGER'.
- Find The Names of Those Employees Which Names are not starting with character 'A', 'Q' and 'S'.

Q3: Write The Short Answers of The Following Questions

(10 marks)

- Difference Between Primary Key And Foreign Key?
- What is 'Referential Integrity Constraint'?
- Why 'GROUP BY' Clause is used in SQL?
- What is the difference between 'ENTITY TYPE' and 'ENTITY SET'?
- What is 'WEAK ENTITY' and How it is Represent in E-R Diagram?

Q4: Normalize the relation given below in 2<sup>nd</sup> normal form

(5 marks)

Emp_No	Project_No	Emp_Name	Proj_Name	Proj_Location	Emp_Address
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Q5: Draw An 'ER Diagram' According To The Following Scenario.

(10 marks)

A university registrar's office maintains data about the following entities: (a) courses, including number, title, credits, syllabus, and prerequisites; (b) course offerings, including course number, year, semester, section number, instructor(s), timings, and classrooms; (c) students, including student-id, name, and program; and (d) instructors, including identification number, name, department, and title. Further, the enrollment of students in courses and grades awarded to students in each course they are enrolled for must be appropriately modeled.

Create The E-R Diagram and Make Appropriate Relationship Between Entities

Q6: What is 'Transaction'. What are 'ACID' properties of transaction?

(8 marks)

Q7: Explain The Three layers Schema Architecture. Describe in Detail?

(7 marks)



# UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program : Fifth Semester – Fall 2021

Paper: Database Systems (CMP)

Course Code: IT-304

Roll No. ....  
Time: 3 Hrs. Marks: 60

Q.1. Answers the following short questions:

(6x5=30)

- What is data independence and what are different types of data independence?
- What is database integrity and how it can be enforced?
- What are the limitations of hierarchical data model?
- What is data independence and what are different types of data independence?
- What is database integrity and how it can be enforced?
- What are the limitations of hierarchical data model?

Answers the following questions.

(3x10=30)

Q.2.

Draw ER Model for the following situation:

A university has many faculties such as faculty of science, faculty of commerce, faculty of law etc. A faculty operates many departments, but each department is operated by only one faculty. A department has many teachers and many students. Only one of the teachers chairs the department. Each department offers many degree programs. Each degree program comprises many courses and the same course may be offered in multiple degree programs of a department. Each degree program has one degree supervisor. Many classes are scheduled for the same course. A class is taught by one teacher and a teacher can teach up to three classes. A student may enroll in several classes (up to 6) and each class has up to 35 students.

Q.3.

Normalize the following "Customer\_Order" relation up to 3rd Normal form step by step. You must specify the definition, functional dependencies and each intermediate resultant table with every Normal Form.

ORD ID	ORD Date	CUST ID	CUST Name	CUST Address	ITEM ID	ITEM Name	ITEM Qty	ITEM price
605	14/03/2021	C 101	Naveed	Lahore	1	Scanner	50	15000
605	14/03/2021	C 101	Naveed	Lahore	2	Mouse	100	500
605	14/03/2021	C 101	Naveed	Lahore	3	Printer	40	18000
606	15/03/2021	C 102	Amjad	Quetta	2	Mouse	50	500
606	15/03/2021	C 102	Amjad	Quetta	4	Monitor	40	12000

Q.4.

Consider the following tables to answer the queries:

**EMP** (EMPNO, ENAME, JOB, SAL, HIREDATE, COMM, MGR, DEPTNO)

**DEPT** (DEPTNO, DNAME, LOC)

- List all CLERKs with SAL between 4000 and 6000.
- How many SELSMAN are working in the organization?
- Display (EmpNo, EName, Job, Salary, DeptNo, DeptName)
- Name of the employee getting maximum salary.
- List the average salary of each job for deptno 10 or 20 for the jobs with average salary greater than 1500. Sort the output with respect to average salary.