National University of Computer & Emerging Sciences, Karachi

Fall-2017 CS-Department

MidTerm 2

27th October 2017, 9:00 am – 10am

Course Code: CS203	Course Name: Database Systems
Instructor Name / Names: Dr Zeeshan Ahmed, Mr. Ahsan Shah, Miss Tania Iram	
Student Roll No:	Section No:

Instructions:

- Return the question paper.
- Read each question completely before answering it. There are **3 questions and 2 pages.**
- In case of any ambiguity, you may make assumption. But your assumption should not contradict any statement in the question paper.
- This paper is subjective

Time: 60 minutes. **Max Marks:** 50 points

Question 1: Marks:15

Consider the following Constable Training Database schema instances:

Training_passed

Constable_id	Course_title	grade
CB101	Firing	A
CB101	Observation	F
CB102	Firing	A
CB102	Psychology	A
CB102	Physical Fitness	B
CB103	Observation	C
CB103	Psychology	A
CB104	Psychology	B
CB104	Firing	B

Courses

Course_title	Level
Physical Fitness	1
Observation	2
Psychology	3
Firing	4

Costables

Constable_id	C_name
CB101	Ali
CB102	Rafeeq
CB103	Pervaiz
CB104	Tariq

Assumption: Salaried_commission are possible for constables who passed both level 1 and 2 courses.

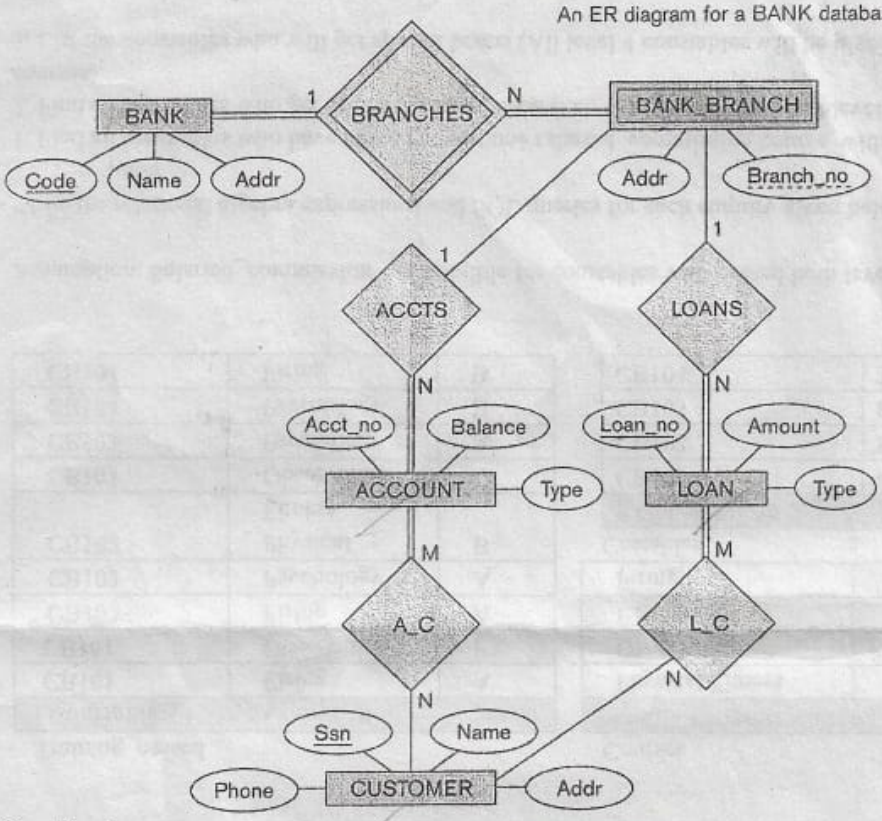
Write the relational algebra expressions and SQL queries for each enquiry given below:

1. Find all constables who have passed atleast one salaried_commission course with 'A' grade.
2. Find all constables who get salaried_commission (i.e., who have passed bothlevel 1 and 2 courses).
3. List the constables who will get special bonus (All level 4 constables will be given special bonus).

Question 2: Marks:15

Translate the following ER diagram into Relational model using the concepts of ER to relational mapping.

An ER diagram for a BANK database schema.



Question 3: Marks:20

Consider the relation R with attributes; R = {A, B, C, D, E, F, G, H, I, J}. Suppose that the following functional dependencies hold on R:

{A} → {B, C, D, E, F, G, H}
{B, C} → {A, D, E, F, G, H}
{E} → {F}
{G} → {B}
{C} → {H}
{H} → {I, J}

Normalize this relation into 1NF, 2NF, 3NF and BCNF.