NEPAL COLLEGE OG INFORMATION TECHNOLOGY
ASSESMENT EXAM

Level: Bachelor Semester – Spring Year : 2020
Programme: BE(SE/CE) Full Marks: 100
Course: Database Management System Time : 3hrs.

Candidates are required to give their answers in their own words as far as practicable.
Attempt all the questions.

1.	a) Suppose you want to design a database system what key properties will you use. Discuss. Give an organizational example of the benefits of each property. b) Design an E/R diagram describing the following domain: _ A Person has attributes pid (key) and name. _ A Skier is a type of Person with attribute aptitude. _ A Snowboarder is a type of Skier. _ A PairOfSkis has attribute sid (key) and model. _ A Snowboard has attribute sid (key) and model. _ A Skier owns zero or more PairOfSkis. The ownership relation has a purchase price. A PairOfSkis is owned by at most one Skier. _ A Snowboarder owns zero or more Snowboards. The ownership relation has a purchase price. A Snowboard is owned by at most one Snowboarder. _ a Person can rent a PairOfSkis or a Snowboard. A person cannot rent more than one PairOfSkis or one Snowboard at the same time. A person cannot rent a PairOfSkis and a Snowboard at the same time either. A piece of equipment can be rented by at most one person at a time. The rental comes with a start date and an end date. Note: PairOfSkis and Snowboard should be Generalized.	8 10
2.	a) Consider the following schema: Customers (cid, cname, city) Products (pid, pname, city, quantity, price) Agents (aid, aname, city) Orders (ordno, cid, aid, pid, month, quantity, total) Answer the following queries using Relational Algebra: i) Find all (ordno, cid) pairs for order with a total value less than 5000. ii) Find all (ordno, cname) pairs for orders in August. iii) Find all product names of products in Kathmandu ordered in March.	10

iv) Find pids of products ordered through agent 4 but not through agent 7.

v) Find all orders with quantity equal to 2000 or more. 7

b) Construct a B+-tree for the following set of key values:

(d, f, i, j, l, p, s, t, w, z)

Assume that the tree is initially empty and values are added in ascending order. Construct B+-trees for the case where the number of pointers that will fit in one node is **Four**. Also show the form of the tree after deletion of **'t'**.

3. Consider the following database schema to write queries in SQL 8

Sailor(sid, sname, age, rating)

Boats(bid, bname, bcolor)

Reserves(sid, bid, day)

i) Find the sailors who have reserved a red boat

ii) Find the names of the sailors who have reserved at least two boats

iii) Find the colors of the boats reserved by 'Mohan'.

iv) Find number of sailor of each age.lined.

b) For what purpose DDL, DML,DCL commands is used? Discuss with example. 7

4. a) Consider following table 8

brno	braddress	telno	mgrstaffno	name
B101	Newroad kathmandu	435267	M1100	Ram
B102	Bchowk Butwal	560651	M0090	Bimal
B103	Thamel Kathmandu	434591	M0590	Sita
B104	Gchowk Birgunj	570123	M6501	Hari

(i) Why is this table not in 3NF?

(ii) Describe and illustrate the process of normalizing the data shown in this table to third normal form (3NF).

(iii) Identify the primary, (alternate) and foreign keys in your 3NF Relations.

b) For what purpose Trigger is used? Consider following bank database 7

	Branch-schema = (*branch-name, branch-city, assets*) *Loan-schema* = (*loan-number, branch-name, amount*) Write an assertion for the bank database to ensure that the assets value for the Koteshwor branch is greater to the sum of all the amounts lent by the Koteshwor branch	
5.	a) Explain how you could estimate costs while performing query processing? Illustrate an example of query Optimization. b) Why old value is not required while maintaining log in deferred database modification but is required in immediate database modification? How shadow paging does recovery?.	7 8
6.	Discuss about conflict Serializability with an example.	8
7.	Consider a table Player, with attributes name, team and nationality, and a table Team, with attributes name and country. The team attribute in Player gives the name of the team for which the player plays. We assume that in each table the name attribute is the primary key. Consider also the following SQL query: SELECT Player.name, Team.name FROM Team, Player WHERE Team.name=Player.team AND country='Nepal' AND nationality='Nepali'; i) Suppose that we wish to require that every team attribute must appers in name attributes of Team Table. Propose a syntax for expressing such constraints. ii) Assuming the default constraints associated with (i), how would this affect insertions and deletions of rows in the two tables? iii) Rewrite the FROM clause in the SQL query so that it uses a JOIN expression instead. iv) Describe in what the above query returns.	12