SIM GLOBAL EDUCATION

UNIVERSITY OF WOLLONGONG AUSTRALIA

School of Computing and Information Technology

Student to complete:

Family name	
Other names	
Student number	
Table number	

CSCI235
Database Systems

Final Examination Paper
Session 2 2021

Exam duration	3 hours and 40 minutes
Weighting	40% of the subject assessment
Marks available	40 marks
Items permitted by examiner	Text-book, Lecture slides, and Tutorial notes
Directions to students	4 questions to be answered. Marks for each question are shown beside the question. All answers must be written in the answer booklet provided.

This examination is a take-it-home examination to be done on-line on the date of examination.

Version 2.0

Question 2 - (Total 8 marks)
Indexing

Time allocated: 40 minutes
Start time: 10:55 am SGT
End time: 11:35 am SGT
Submission time start: 11:30 am SGT
Submission time end: 11:45 am SGT

Consider a relational database that consists of the relational tables created by the following CREATE TABLE statements:

```
CREATE TABLE PART(
P_PARTKEY          NUMBER(12) NOT NULL,
P_NAME             VARCHAR(55) NOT NULL,
P_RETAILPRICE      NUMBER(12,2) NOT NULL,
CONSTRAINT PART_PKEY PRIMARY KEY (P_PARTKEY) );

CREATE TABLE SUPPLIER(
S_SUPPKEY          NUMBER(12) NOT NULL,
S_NAME             CHAR(25) NOT NULL,
S_NATIONKEY        NUMBER(12) NOT NULL,
S_PHONE            CHAR(15) NOT NULL,
CONSTRAINT SUPPLIER_PKEY PRIMARY KEY (S_SUPPKEY) );

CREATE TABLE PARTSUPP(
PS_PARTKEY         NUMBER(12) NOT NULL,
PS_SUPPKEY         NUMBER(12) NOT NULL,
PS_SUPPLYCOST      NUMBER(12,2) NOT NULL,
CONSTRAINT PARTSUPP_PKEY PRIMARY KEY (PS_PARTKEY, PS_SUPPKEY),
CONSTRAINT PARTSUPP_FKEY1 FOREIGN KEY (PS_PARTKEY)
REFERENCES PART(P_PARTKEY),
CONSTRAINT PARTSUPP_FKEY2 FOREIGN KEY (PS_SUPPKEY)
REFERENCES SUPPLIER(S_SUPPKEY) );
```

Determine what index should be created to improve the performance of the queries listed below in the best possible way. **Consider each one of the queries as an individual case**. If you decide that an index should be created, then **list** the names of attributes that form an index key and **write** the **'create index'** statement to create the index. Remember that the order of attributes in an index key is important. **Explain** why a new index is needed **or** is not needed to improve the performance of the queries. That is, if a new index is created, explain why the index improves the performance of the query, and if no new index is created, explain why the performance of the query is not suffered (degraded). Assume that all relational tables are large enough to make full tables scan more time consuming than accessing the tables through an index.

i.
```
SELECT DISTINCT P_NAME, P_RETAILPRICE
FROM PART
ORDER BY P_RETAILPRICE;
```
(1.0 mark)

ii.
```
SELECT PS_SUPPKEY, COUNT(*)
FROM PARTSUPP
GROUP BY PS_SUPPKEY
HAVING COUNT(PS_SUPPLYCOST) > 3;
```
(1.0 mark)

iii.
```
SELECT *
FROM SUPPLIER
WHERE S_NATIONKEY = 1
OR S_PHONE = '26-118-226-8835';
```
(1.0 mark)

iv.
```
SELECT COUNT(*)
FROM PART
WHERE P_NAME = 'COOLING-FAN';
```
(1.0 mark)

v.
```
SELECT PS_PARTKEY, COUNT(*)
FROM PARTSUPP
GROUP BY PS_PARTKEY
HAVING COUNT(*) > 3;
```
(1.0 mark)

vi.
```
SELECT PS_SUPPKEY
FROM PARTSUPP
WHERE PS_SUPPKEY = '1759';
```
(1.0 mark)

vii.
```
SELECT S_NAME
FROM SUPPLIER;
```
(1.0 mark)

viii.
```
SELECT *
FROM SUPPLIER
WHERE S_NAME = 'Best Supplier'
AND S_NATIONKEY = '22';
```
(1.0 mark)

END OF QUESTION 2