Given the following database schema:

```
Product (Model, Maker, Type)
PC (Model, PSpeed, RamSize, HdSize, DSpeed, Price)
Laptop (Model, Speed, RamSize, HdSize, Screen, Price)
Printer (Model, Color, Type, Price)
```

where

- each underlined attribute is the primary key of its relation
- *Type* in *Product* is either PC, laptop, or printer.
- *PSpeed* is the speed of a processor (in megahertz).
- *DSpeed* is the speed and type of a removable disk (CD or DVD).
- *Screen* is the screen size (in inches).
- *Color* of a printer is either true (a color printer) or false (a BW printer).
- *Type* in *printer* is either laser, ink-jet, or bubble.

Formulate the following queries (without using any aggregation functions) in SQL:

(I) **Data Retrieval**

(a) Find the model number, pspeed, and hard-disk size for all PC’s whose price is under $1200.

(b) Find the manufacturer and speed of laptops with a hard disk of at least thirty gigabytes.

(c) Find those manufacturers that sell laptops, but not PC’s.

(d) Find those hard-disk sizes that occur in two or more PC’s.

(e) Find those manufacturers of at least two different computers (PC’s or laptops) with speeds of at least 1000.

(f) Find the model number of each PC, laptop, and printer with the highest price.

(g) Find the maker(s) of the PC(s) with the fastest processor among all those PC’s that have the smallest amount of RAM.

(II) **View Definition**

(a) Define a view EitherOne that retrieves all manufacturers who either make laptops and not printers, or make PCs and not laptops.

(b) Define a view HighLow that retrieves all manufacturers who make at least one of the cheapest PCs or one of the most expensive printers.

(c) Define a view GoodDeal that retrieves all the laptops (identified by their model numbers) with the largest screen and their prices are not the highest among all the laptops.

(d) Write a query using your view created in (b) asking for all manufacturers (retrieved by the view) who do not make laptops.
(e) Write a query using your view created in (c) asking for all manufacturers (retrieved indirectly by the view) who market laptops but do not make printers or PCs with price lower than $600.

(f) Drop all the views that have been created. (You are allowed to use up to three different SQL statements.)

NOTE: For each view that you create, you must follow the creation with a “SELECT * FROM view_definition” statement to verify the correctness of the view.

(III) Database Update

(a) Insert into the database the facts that for every PC there is a laptop with the same manufacturer, speed, RAM, and hard disk, a 15-inch screen, and a model number 1100 greater, and a price $500 more. You are allowed to use up to two INSERT statements for this query.

(b) Using two INSERT statements to store in the database the fact that PC model 1100 is made by manufacturer C, has speed 1800, RAM 256, hard disk 80, a 20x DVD, and sells for $2499.

(c) Delete all laptops made by a manufacturer who doesn’t make printers.

(d) Delete the manufacturer who sells PCs, laptops, and printers such that the price of at least one of its PCs is lower than one of its laptops or printers.

(e) For each PC, double the amount of RAM and add 20 gigabytes to the amount of hard disk using one UPDATE statement.

(f) For each laptop made by manufacturer B, add one inch to the screen size and subtract $100 from the price.

(g) Change all products made by manufacturer B to manufacturer A.

NOTE:

(i) Each query must be formulated using a single SQL statement, unless stated otherwise.

(ii) Each modification query must apply to the original database, i.e., it does not depend on the result of the previous modification query.

(iii) You must show the query result after each SQL query (statement), especially on the queries in Part (III) for which you must show the tables that are affected by either an insertion deletion, or update.

(iv) This project assignment is worth 100 points.