

EGR115

Problem Solving

Exercise

Prepare a solution in the Simplified Standard Format for this problem:

Provide a MATLAB program that will request the user provide grams of sulfuric acid and volume of water in milliliters, TWICE. Each should also be provided a description by the user. The program will then display the resulting molarity and pH of the sulfuric acid solution in a table as shown in the example below. Although neither is strictly correct, for simplicity you may assume the acid does not significantly impact the volume of solution and that all H^+ ions of the strong diprotic (“two hydrogen”) sulfuric acid will completely separate from the compound in water solution.

```
T01: DEFINE "MW" as 98, the molecular weight of sulfuric acid

T02: INPUT "grams_SulfAcid_1"
T03: INPUT "ml_water_1"
T04: INPUT "desc_1"
T05: INPUT "grams_SulfAcid_2"
T06: INPUT "ml_water_2"
T07: INPUT "desc_2"

T08: DEFINE "g_per_L_1" using grams_SulfAcid_1, ml_water_1
T09: DEFINE "molarity1" using g_per_L_1, MW
T10: DEFINE "pH1" using molarity1
T11: DEFINE "g_per_L_2" using grams_SulfAcid_2, ml_water_2
T12: DEFINE "molarity2" using g_per_L_2, MW
T13: DEFINE "pH2" using molarity2

T14: OUTPUT table using previous variables except MW
```

Note that the MW variable is not strictly necessary since it's a constant for this problem. However, having it makes the DEFINEs (T09 and T12) easier to follow.

An alternative:

```
T01: INPUT "grams1", "ml1", "desc1"
T02: INPUT "grams2", "ml2", "desc2"

T03: DEFINE "gL1" using grams1, ml1
T04: DEFINE "molarity1" using grams1, ml1
T05: DEFINE "pH1" using molarity1
T06: DEFINE "gL2" using grams2, ml2
T07: DEFINE "molarity2" using grams2, ml2
T08: DEFINE "pH2" using molarity2

T09: OUTPUT table using all variables
```

Here we reduce the length of the variable names, combine INPUTs, and don't make a MW variable, treating it like the constant it is. Also, computation of molarity is computed from grams and ml instead of the g/L value already computed.