

EMPIRICAL FORMULAS

1. Calculate the empirical formula of nicotine if it has the following composition . . .
74.0 % carbon 8.65 % hydrogen, 17.3 % nitrogen
2. Calculate the empirical formula of potassium dichromate which has the following composition:
26.6 % potassium 35.4 % chromium 38.1 % oxygen
3. Calculate the empirical formula of laughing gas which has the following composition :
63.6 % nitrogen 36.4 % oxygen
4. Ordinary rust is composed of the following: 69.9 % iron 30.1% oxygen
What is the empirical formula of rust?
5. A hydrated compound has an analysis of . . .
18.29 % calcium 32.37 % chlorine 49.34 % water
What is its formula?
6. A fat is composed, in part, of long chains of carbon and hydrogen atoms. In a reaction with a strong base, a fat forms a soap and glycerol. What is the empirical formula of a fat containing 76.5% carbon, 11.3% oxygen and 12.2% hydrogen, if it has a molecular mass of 874?
7. Citric acid, an organic acid found in lemons, and other citrus fruits, contains 37.5 % carbon, 58.3 % oxygen and 4.20% hydrogen. What is the empirical formula of citric acid if it has a molecular mass of 192?
8. A white powder used in paints, enamels, and ceramics, has the following percentage composition:
69.58 % barium 6.090 % carbon 24.32 % oxygen
What is its empirical formula ?
9. A white solid used to whiten paper has the following percentage composition . . .
32.37 % sodium 22.57 % sulfur 45.06% oxygen
What is its empirical formula?
10. Styrene, the raw material for polystyrene foam plastics, has an empirical formula of CH. Its molecular mass is 104. What is its molecular formula ?
11. Phencyclidine (“angel dust”) is $C_{17}H_{25}N$. A sample suspected of being this illicit drug was found to have a percentage composition of . . .
83.71 % carbon 10.42 % hydrogen 5.61 % nitrogen
Do these data acceptably match the theoretical data for phencyclidine?
12. The hallucinogenic drug LSD has the formula $C_{20}H_{25}N_3O$. One suspected sample contained:
74.07 % carbon 7.95 % hydrogen 9.99 % nitrogen
a)What was the percentage of oxygen?
b)Are these data consistent for LSD?