

The following mixtures of isotopes are found in nature. Calculate the expected molar mass of a sample.

1. ^{10}B : 18.8%, ^{11}B : 81.2%

$$= (10 \times 0.188) + (11 \times 0.812)$$
$$= 1.88 + 8.932 = 10.812 = 10.81$$

$$10.81 \text{ g/mol}$$

2. ^{69}Ga : 60.0%, ^{71}Ga : 40.0%

$$= (69 \times 0.600) + (71 \times 0.400)$$
$$= 41.4 + 28.4 = 69.8$$

$$69.8 \text{ g/mol}$$

3. ^{35}Cl : 75.77%, ^{37}Cl : 24.23%

$$= (35 \times 0.7577) + (37 \times 0.2423)$$
$$= 26.5195 + 8.9651$$
$$= 35.4846 = 35.48$$

$$35.48 \text{ g/mol}$$

4. ^{70}Ge : 20.5%, ^{72}Ge : 27.4%, ^{73}Ge : 7.8%, ^{74}Ge : 36.5%, ^{76}Ge : 7.8%

$$= (70 \times 0.205) + (72 \times 0.274) + (73 \times 0.078) + (74 \times 0.365) + (76 \times 0.078)$$
$$= 14.35 + 19.728 + 5.694 + 27.01 + 5.928$$
$$= 72.71 = 72.7$$

$$72.7 \text{ g/mol}$$

5. ^{64}Zn : 48.9%, ^{66}Zn : 27.8%, ^{67}Zn : 4.1%, ^{68}Zn : 18.6%, ^{70}Zn : 0.6%

$$= (64 \times 0.489) + (66 \times 0.278) + (67 \times 0.041) + (68 \times 0.186) + (70 \times 0.006)$$
$$= 31.296 + 18.348 + 2.747 + 12.648 + 0.42$$
$$= 65.453 = 65.5$$

$$65.5 \text{ g/mol}$$

6. ^{90}Zr : 51.5%, ^{91}Zr : 11.2%, ^{92}Zr : 17.1%, ^{94}Zr : 17.4%, ^{96}Zr : 2.8%

$$= (90 \times 0.515) + (91 \times 0.112) + (92 \times 0.171) + (94 \times 0.174) + (96 \times 0.028)$$
$$= 46.35 + 10.192 + 15.732 + 16.356 + 2.688$$
$$= 91.318 = 91.3$$

$$91.3 \text{ g/mol}$$

7. ^{92}Mo : 15.8%, ^{94}Mo : 9.0%, ^{95}Mo : 15.7%, ^{96}Mo : 16.5%, ^{97}Mo : 9.5%, ^{98}Mo : 23.8%, ^{100}Mo : 9.6%

$$= (92 \times 0.158) + (94 \times 0.090) + (95 \times 0.157) + (96 \times 0.165)$$
$$+ (97 \times 0.095) + (98 \times 0.238) + (100 \times 0.096)$$
$$= 14.536 + 8.46 + 14.915 + 15.84 + 9.215 + 23.324 + 9.6$$
$$= 95.89 = 95.9$$

$$95.9 \text{ g/mol}$$