MOCK EXAM 70 questions · 110 minutes · data sheet and non-graphing calculator allowed

1. Which of these lengths is the largest?

(A) $4.2 \times 10^{-3}\,\text{km}$

(B) $3.9 \times 10^{2}\,\text{cm}$

(C) $4.0 \times 10^{9}\,\text{nm}$

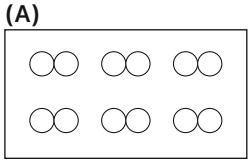
(D) $4.4 \times 10^{3}\,\text{mm}$

2. Ethanol has a density of $0.789\,\text{g/mL}$. What is the mass of $0.250\,\text{L}$ of ethanol?

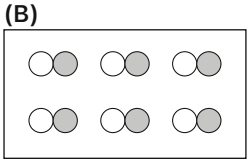
(A) $0.197\,\text{g}$ **(B)** $0.317\,\text{g}$
(C) $197\,\text{g}$ **(D)** $317\,\text{g}$

3. Each box shows particles of two elements, X (open) and Y (shaded). Which box shows a mixture of an element and a compound?

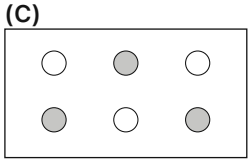
(A)



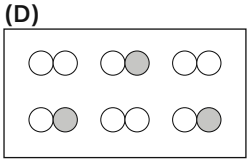
(B)



(C)



(D)



4. What is the sum $12.5 + 0.0325 + 100.1$, reported with the correct number of significant figures?

(A) 113 **(B)** 112.6325
(C) 112.63 **(D)** 112.6

5. Concentrated hydrochloric acid has a density of $1.19\,\text{g/mL}$ and is 37.0% HCl by mass. What mass of HCl is in $25.0\,\text{mL}$ of the acid?

(A) $9.25\,\text{g}$ **(B)** $11.0\,\text{g}$
(C) $29.8\,\text{g}$ **(D)** $80.4\,\text{g}$

6. How many protons, neutrons and electrons are in one ion of $^{37}_{17}\text{Cl}^{-}$? (Listed in that order.)

(A) 17, 20, 18 **(B)** 17, 20, 17
(C) 17, 20, 16 **(D)** 17, 37, 18

7. Element X has two stable isotopes: ^{10}X ($10.01\,\text{u}$, 19.9% abundance) and ^{11}X ($11.01\,\text{u}$, 80.1%). What is the atomic mass of X?

(A) $11.01\,\text{u}$ **(B)** $10.81\,\text{u}$
(C) $10.51\,\text{u}$ **(D)** $10.21\,\text{u}$

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8. What is the formula of iron(III) sulfate?

(A) $FeSO_4$ **(B)** $Fe_3(SO_4)_2$
(C) Fe_2S_3 **(D)** $Fe_2(SO_4)_3$

9. Which is the correct name for $Mg(ClO_3)_2$?

(A) magnesium chlorate

(B) magnesium chlorite

(C) magnesium perchlorate

(D) magnesium chloride

10. How many ions form when one formula unit of $(NH_4)_3PO_4$ dissolves in water?

(A) 1 **(B)** 2 **(C)** 4 **(D)** 20

11. In the gold-foil experiment, which observation required that an atom's positive charge be concentrated in a small, dense nucleus?

(A) A few alpha particles were deflected through large angles.

(B) Most alpha particles passed straight through the foil.

(C) Cathode rays were bent by an electric field.

(D) Gold atoms emitted light only at certain wavelengths.

12. Which pair are isotopes of the same element?

(A) $^{35}_{17}\mathrm{Cl}$ and $^{37}_{17}\mathrm{Cl}$

(B) $^{14}_{6}\mathrm{C}$ and $^{14}_{7}\mathrm{N}$

(C) $^{40}_{18}\mathrm{Ar}$ and $^{40}_{20}\mathrm{Ca}$

(D) $^{19}_{9}\mathrm{F}$ and $^{20}_{10}\mathrm{Ne}$

13. How many orbitals are in the $n = 3$ shell?

(A) 3 **(B)** 6 **(C)** 9 **(D)** 18

14. What is the ground-state electron configuration of Fe^{3+}?

(A) [Ar] $3d^5$

(B) [Ar] $4s^2\ 3d^3$

(C) [Ar] $4s^2\ 3d^6$

(D) [Ar] $3d^6$

15. How many unpaired electrons are in a ground-state chromium atom?

(A) 2 **(B)** 4 **(C)** 5 **(D)** 6

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