

科目 普通化學 類組別 A-1、A-5、B-5、B-6 共 4 頁第 1 頁 *請在試卷答案卷(卡)內作答

選擇題(每題 2.5 分，答錯不倒扣)

- Which of the following is equivalent to 4×10^{-6} cm?
(A) 0.4 mm (B) $4 \mu\text{m}$ (C) 40 nm (D) $40 \text{ \AA}$ (E) 40 pm
- Express the following operation with the appropriate number of significant figures:
 $32.4 + 1.325 + 81 =$
(A) 114.725 (B) 114.7 (C) 115 (D) 1.1×10^2 (E) 1.10×10^2
- Give the complete chemical symbol for the nuclide that contains 18 protons, 18 electrons, and 22 neutrons.
(A) $^{18}_{18}\text{Ar}$ (B) $^{40}_{18}\text{Ar}$ (C) $^{40}_{22}\text{Ar}$ (D) $^{40}_{22}\text{Ca}$ (E) $^{22}_{18}\text{Ca}$
- Which of the following species has equal numbers of neutrons and protons?
(Their atomic numbers are shown in the parenthesis.)
(A) $^{24}\text{Mg}^{2+}$ (12) (B) $^{35}\text{Cl}^{-}$ (17) (C) ^{47}Cr (24) (D) $^{60}\text{Co}^{3+}$ (27) (E) ^{90}Sr (38)
- Which of the following is tetraphosphorus decasulfide?
(A) P_4S_{10} (B) P_4S_{12} (C) $\text{P}_3(\text{SO}_3)_8$ (D) $\text{P}_3(\text{SO}_3)_{10}$ (E) $\text{P}_3(\text{SO}_3)_{12}$
- Which one of the following reactions will have a positive value of ΔH° ?
(A) $\text{C}(\text{graphite}) \rightarrow \text{C}(\text{diamond})$
(B) $3\text{C}(\text{graphite}) + 4\text{H}_2(\text{g}) \rightarrow \text{C}_3\text{H}_8(\text{g})$
(C) $\text{C}(\text{graphite}) + \text{O}_2(\text{g}) \rightarrow \text{CO}_2(\text{g})$
(D) $\text{C}_6\text{H}_{12}\text{O}_6(\text{s}) + 6\text{O}_2(\text{g}) \rightarrow 6\text{CO}_2(\text{g}) + 6\text{H}_2\text{O}(\text{l})$
(E) None of the above.
- Among the four quantum numbers, n and l together govern
(A) the shape of an orbital
(B) the energy of an orbital
(C) the spin properties of the electron
(D) the spatial orientation of the orbital
(E) the magnetic property of the orbital
- Which element in the following has the largest first ionization energy?
(A) Li (B) Na (C) K (D) Be (E) B
- Which element in the following has the lowest electron affinity (i.e., the easiest in accepting an electron)?
(A) O (B) S (C) He (D) Ne (E) Ar
- Which element in the following has the largest atomic radius?
(A) Li (B) Be (C) B (D) Na (E) Mg
- What is the formal charge on the oxygen atom in H_3O^+ ?
(A) +1 (B) 0 (C) -1 (D) -2 (E) -3
- What is the bond order of the He_2^+ ion?
(A) -1/2 (B) 0 (C) 1/2 (D) 1 (E) 3/2
- Which of the following interactions is the weakest?
(A) London forces (B) dipole-dipole forces (C) hydrogen bonding (D) ion-dipole forces (E) ionic bonding
- Which of the following properties is decreasing upon increasing the intermolecular attractive forces?
(A) Vapor pressure (B) Heat of vaporization (C) Freezing point (D) Surface tension (E) Critical temperature.
- What is the osmotic pressure at 27°C of a 1.0 mM sucrose ($\text{C}_{12}\text{H}_{22}\text{O}_{11}$, fw = 342) solution?
(A) 0.025 atm (B) 2.2×10^{-3} atm (C) 0.22 atm (D) 8.4 atm (E) 0.76 atm