

科目 普通化學 類組別 A-1、A-5、B-5、B-6 共 4 頁第 3 頁 *請在試卷答案卷(卡)內作答

28. From the following five sets of d electron configurations, pick up a set that both have the possibility of a distinction between high-spin and low-spin arrangements in octahedral complexes.
(A) d^1, d^3 (B) d^3, d^5 (C) d^5, d^7 (D) d^6, d^8 (E) d^8, d^{10}
29. How many chiral carbon atoms are there in the open chain form of glucose?
(glucose: $\text{HOCH}_2[\text{CH}(\text{OH})]_4\text{CHO}$)
(A) 2 (B) 3 (C) 4 (D) 5 (E) 6
30. How many different tripeptides can be made from the two amino acids, serine and phenylalanine? (Both amino acids should present in the tripeptides.)
(A) 2 (B) 4 (C) 6 (D) 8 (E) 10
31. For a strand of a DNA molecule has the sequence of bases ACC, what must be the sequence on the complementary strand and the total number of H bonds?
(A) TGG, 8 H bonds (B) TGG, 7 H bonds (C) CAA, 8 H bonds (D) CAA, 7 H bonds (E) GTT, 7 H bonds
32. In Taiwan, liquid butane, C_4H_{10} , is commonly stored in a cylindrical can and used as a fuel. Suppose 3.00 L of butane gas at 27°C and 735 Torr is removed from the cylinder. How much heat must be added to vaporize this much butane if the heat of vaporization is 21.3 kJ/mol?
(A) 1.16 J (B) 24.8 J (C) 2.51 kJ (D) 27.9 kJ (E) 294 kJ
33. The wavelengths of visible region are within
(A) $10^{-7} \sim 10^{-6}$ m
(B) $10^{-6} \sim 10^{-5}$ m
(C) $10^{-5} \sim 10^{-4}$ m
(D) $10^{-4} \sim 10^{-3}$ m
(E) $10^{-3} \sim 10^{-2}$ m
34. For a 2p electron in beryllium, what is total number of all possible values of the four quantum numbers (i.e., how many sets of $[n, l, m_l, m_s]$)?
(A) 4 (B) 6 (C) 8 (D) 9 (E) 12
35. Given the Rydberg constant and Planck's constant, $R_H = 2.18 \times 10^{-18}$ J and $h = 6.63 \times 10^{-34}$ J·sec. From the following, select the range of the wavelength of light that corresponds to the transition of the electron from the $n = 4$ to $n = 2$ state of the hydrogen atom.
(A) $2.5 \times 10^{-9} \sim 7.5 \times 10^{-9}$ m
(B) $7.5 \times 10^{-9} \sim 2.5 \times 10^{-8}$ m
(C) $2.5 \times 10^{-8} \sim 7.5 \times 10^{-8}$ m
(D) $7.5 \times 10^{-8} \sim 2.5 \times 10^{-7}$ m
(E) $2.5 \times 10^{-7} \sim 7.5 \times 10^{-7}$ m
36. Balance the reaction of gasoline combustion:
 $\text{C}_8\text{H}_{18}(l) + a\text{O}_2(g) \rightarrow b\text{CO}_2(g) + c\text{H}_2\text{O}(l)$
 $c =$ (A) 3 (B) 6 (C) 9 (D) 12 (E) 18
37. Balance the titration of hydrogen peroxide with permanganate ion:
 $\text{MnO}_4^-(aq) + a\text{H}_2\text{O}_2(aq) + b\text{H}^+(aq) \rightarrow c\text{Mn}^{2+}(aq) + d\text{O}_2(g) + e\text{H}_2\text{O}(l)$
 $b =$ (A) 1 (B) 2 (C) 3 (D) 4 (E) 5
38. Balance the redox reaction of oxalate with permanganate ion:
 $\text{MnO}_4^-(aq) + a\text{C}_2\text{O}_4^{2-}(aq) + b\text{H}^+(aq) \rightarrow c\text{Mn}^{2+}(aq) + d\text{CO}_2(g) + e\text{H}_2\text{O}(l)$
 $b =$ (A) 8 (B) 10 (C) 12 (D) 14 (E) 16
39. Sodium oxalate ($\text{Na}_2\text{C}_2\text{O}_4$, fw 134.0) is a substance used to standardize $\text{KMnO}_4(aq)$ (fw 158.0). If a 25.00-mL sample of a $\text{KMnO}_4(aq)$ is required to titrate 0.2680 g sodium oxalate in acidic solution, what is the molarity of the KMnO_4 solution?
(A) 0.016 M (B) 0.0160 M (C) 0.01600 M (D) 0.0320 M (E) 0.03200 M