

國立屏東教育大學 101 學年度學士班轉學考試

普通化學(A) 試題

(化學生物系)

*注意事項：

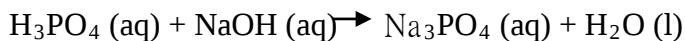
- (1) 本試題共 6 頁，答案請「橫式」書寫，並依規定上下翻頁，否則不予計分。
(2) 不必抄題，但請依序將題號標出，並寫在答案紙上。

選擇題(每題4分，共100分)

1. The correct name for N_2O_5 is _____.

- (A) nitrous oxide
- (B) nitrogen pentoxide
- (C) dinitrogen pentoxide
- (D) nitric oxide
- (E) nitrogen oxide

2. When the following equation is balanced, the coefficient of H_3PO_4 is _____.



- (A) 1
- (B) 2
- (C) 3
- (D) 4
- (E) 0

3. What is the empirical formula of a compound that contains 29% Na, 41% S, and 30% O by mass?
(Na=23, S=32, O=16)

- (A) $\text{Na}_2\text{S}_2\text{O}_3$
- (B) NaSO_2
- (C) NaSO
- (D) NaSO_3
- (E) $\text{Na}_2\text{S}_2\text{O}_6$

4. Combustion of a 1.031-g sample of a compound containing only carbon, hydrogen, and oxygen produced 2.265 g of CO_2 and 1.236 g of H_2O . What is the empirical formula of the compound? (C=12, O=16, H=1)

- (A) $\text{C}_3\text{H}_8\text{O}$
- (B) $\text{C}_3\text{H}_5\text{O}$
- (C) $\text{C}_6\text{H}_{16}\text{O}_2$
- (D) $\text{C}_3\text{H}_9\text{O}_3$
- (E) $\text{C}_3\text{H}_6\text{O}_3$

5. There are _____ oxygen atoms in 30 molecules of $\text{C}_{20}\text{H}_{42}\text{S}_3\text{O}_2$

- (A) 6.0×10^{23}
- (B) 1.8×10^{25}
- (C) 3.6×10^{25}
- (D) 1.2×10^{24}
- (E) 60

6. Which combination will produce a precipitate?

- (A) $\text{NaC}_2\text{H}_3\text{O}_2$ (aq) and HCl (aq)
- (B) NaOH (aq) and HCl (aq)
- (C) AgNO_3 (aq) and $\text{Ca}(\text{C}_2\text{H}_3\text{O}_2)_2$ (aq)
- (D) KOH (aq) and $\text{Mg}(\text{NO}_3)_2$ (aq)
- (E) NaOH (aq) and HCl (aq)

7. In which reaction does the oxidation number of hydrogen change?

- (A) HCl (aq) + NaOH (aq) $\rightarrow$ NaCl (aq) + H_2O (l)
- (B) 2Na (s) + $2 \text{H}_2\text{O}$ (l) $\rightarrow$ 2NaOH (aq) + H_2 (g)
- (C) CaO (s) + H_2O (l) $\rightarrow$ $\text{Ca}(\text{OH})_2$ (s)
- (D) 2HClO_4 (aq) + CaCO_3 (s) $\rightarrow$ $\text{Ca}(\text{ClO}_4)_2$ (aq) + H_2O (l) + CO_2 (g)
- (E) SO_2 (g) + H_2O (l) $\rightarrow$ H_2SO_3 (aq)

8. The second shell in the ground state of atomic argon contains _____ electrons.

- (A) 2
- (B) 6
- (C) 8
- (D) 18
- (E) 36

9. Which of the following traits characterizes the alkali metals?

- (A) very high melting point
- (B) existence as diatomic molecules
- (C) formation of dianions
- (D) the lowest first ionization energies in a period
- (E) the smallest atomic radius in a period

10. The molecular geometry of the CHCl_3 molecule is _____.

- (A) bent
- (B) trigonal planar
- (C) trigonal pyramidal
- (D) tetrahedral
- (E) T-shaped

11. A triatomic molecule cannot be linear if the hybridization of the central atoms is _____.

- (A) sp
- (B) sp^2
- (C) sp^3
- (D) sp^2 or sp^3
- (E) sp^2d or sp^3d^2

12. In which of the following molecules is hydrogen bonding likely to be the most significant component of the total intermolecular forces?

- (A) CH_4
- (B) $\text{C}_5\text{H}_{11}\text{OH}$
- (C) $\text{C}_6\text{H}_{13}\text{NH}_2$
- (D) CH_3OH
- (E) CO_2

13. A solution contains 28% phosphoric acid by mass. This means that _____.

- (A) 1 mL of this solution contains 28 g of phosphoric acid
- (B) 1 L of this solution has a mass of 28 g
- (C) 100 g of this solution contains 28 g of phosphoric acid
- (D) 1 L of this solution contains 28 mL of phosphoric acid
- (E) the density of this solution is 2.8 g/mL

14. The addition of hydrofluoric acid and _____ to water produces a buffer solution.

- (A) HCl
- (B) NaNO_3

- (C) NaF
- (D) NaCl
- (E) NaBr

15. Which halogen forms an oxyacid with the formula HXO_2 ?

- (A) bromine
- (B) fluorine
- (C) chlorine
- (D) iodine
- (E) astatine

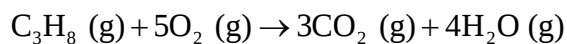
16. A separation process that depends on differing abilities of substances to form gases is called _____.

- (A) filtration
- (B) solvation
- (C) distillation
- (D) chromatography
- (E) All of the above are correct.

17. The correct name for N_2O_5 is _____.

- (A) nitrous oxide
- (B) nitrogen pentoxide
- (C) dinitrogen pentoxide
- (D) nitric oxide
- (E) nitrogen oxide

18. The combustion of propane (C_3H_8) produces CO_2 and H_2O :



The reaction of 2.5 mol of O_2 will produce _____ mol of H_2O .

- (A) 4.0
- (B) 3.0
- (C) 2.5
- (D) 2.0
- (E) 1.0

19. What are the respective concentrations (M) of Na^+ and SO_4^{2-} afforded by dissolving 0.500 mol Na_2SO_4 in water and diluting to 1.33 L?

- (A) 0.665 and 0.665
- (B) 0.665 and 1.33
- (C) 1.33 and 0.665
- (D) 0.376 and 0.752
- (E) 0.752 and 0.376

20. For a given arrangement of ions, the lattice energy increases as ionic radius _____ and as ionic charge _____.

- (A) decreases, increases
- (B) increases, decreases
- (C) increases, increases
- (D) decreases, decreases
- (E) This cannot be predicted.

21. The molecular geometry of the BCl_3 molecule is _____, and this molecule is _____.

- (A) trigonal pyramidal, polar
- (B) trigonal pyramidal, nonpolar
- (C) trigonal planar, polar
- (D) trigonal planar, nonpolar
- (E) trigonal bipyramidal, polar

22. Which statement about atmospheric pressure is false?

- (A) As air becomes thinner, its density decreases.
- (B) Air actually has weight.
- (C) With an increase in altitude, atmospheric pressure increases as well.
- (D) The warmer the air, the lower the atmospheric pressure.
- (E) Atmospheric pressure prevents water in lakes, rivers, and oceans from boiling away.

23. Gold and the platinum group metals are found in nature in metallic form because

- (A) they are solids at room temperature.
- (B) they are highly reactive.
- (C) they are soluble in water.
- (D) they are relatively inert.
- (E) they are relatively abundant.

24. How many d electrons are in the cobalt ion of $\text{K}_3[\text{Co}(\text{CN})_6]$?

- (A) 3
- (B) 5
- (C) 6
- (D) 7
- (E) 4

25. Isooctane is assigned an octane number of 100, whereas _____ is assigned an octane number of 0.

- (A) methane
- (B) propane
- (C) benzene
- (D) heptane
- (E) nitrous oxide