國立勤益技術學院九十四學年度四技轉學生招生考試試題					
系別	化學工程系	年級別	二	考試節次	第三節
考試科目	專業科目二：普通化學	准考證號碼			（考生自填）

一、選擇題：4分/題 (single-choice)，共計60分。

1. Which of the following atomic symbols is incorrect?

a) $^{14}_{6}$C b) $^{37}_{17}$Cl c) $^{32}_{15}$P d) $^{39}_{19}$K e) $^{14}_{8}$N

2. Which of the following are incorrectly paired?

a) Phosphorus, Pr b) Palladium, Pd c) Platinum, Pt d) Lead, Pb

e) Potassium, K

3. The correct name for FeO is

a) iron oxide b) iron (II) oxide c) iron (III) oxide d) iron monoxide

e) iron (I) oxide

4. Adipic acid contains 49.32% C, 43.84% O, and 6.85% H by mass. What is the empirical formula?

a) $C_3H_5O_2$ b) $C_3H_3O_4$ c) C_2HO_3 d) $C_2H_5O_4$ e) C_3HO_3

5. What is the sum of the coefficients of the following equation when it is balanced using smallest whole number integers?

$$NaNH_2 + NaNO_3 \rightarrow NaN_3 + NaOH + NH_3$$

a) 5 b) 6 c) 7 d) 8 e) 9

6. Which of the following compounds is soluble in water?

a) $Ni(OH)_2$ b) K_3PO_4 c) $BaSO_4$ d) $CoCO_3$ e) $PbCl_2$

7. In the reaction $N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$, N_2 is

a) oxidized. b) reduced. c) the electron donor. d) the reducing agent.

e) two of these

8. A 4.37 gram sample of a certain diatomic gas occupies a volume of 3.00-L at 1.00 atm and a temperature of 45°C. Identify this gas.

a) F_2 b) N_2 c) H_2 d) O_2 e) Cl_2

9. Consider the reaction $H_2(g) + (1/2)O_2(g) \rightarrow H_2O(l)$ $\Delta H° = -286$ kJ

Which of the following is true?

a) The reaction is exothermic. b) The reaction is endothermic.

c) The enthalpy of the products is less than that of the reactants.

d) Heat is absorbed by the system. e) Both a and c are true.

10. A given set of p orbitals consists of _____ orbitals.

a) 1 b) 2 c) 3 d) 4 e) 5

11. Which of the following molecules has a dipole moment?

a) CH_4 b) CCl_4 c) CO_2 d) SO_3 e) none of these

12. Which of the following substances would you expect to have the lowest boiling point?

a) diamond b) methane c) sodium nitrate, $NaNO_3$

d) glycerine, $C_3H_5(OH)_3$ e) copper

13. A solution of hydrogen peroxide is 30.0% H_2O_2 by mass and has a density of 1.11 g/cm^3. The molarity of the solution is:

a) 7.94 M b) 8.82 M c) 9.79 M d) 0.980 M e) none of these

14.Rank the following compounds according to increasing solubility in water.

I. $CH_3–CH_2–CH_2–CH_3$ II. $CH_3–CH_2–O–CH_2–CH_3$

III. $CH_3–CH_2–OH$ IV. $CH_3–OH$

a) I < III < IV < II b) I < II < IV < III c) III < IV < II < I

d) I < II < III < IV e) No order is correct.

15.How many atoms of hydrogen are present in 6.0 g of water?

a) 2.0×10^{23} b) 7.2×10^{24} c) 1.1×10^{24} d) 4.0×10^{23} e) 0.66

二. 問答題（含計算題），共計 40 分。

1.The electrolyte in automobile lead storage batteries is a 3.75 M sulfuric acid solution that has a density of 1.230 g / ml. Calculate the mass percent, molality, and normality of the sulfuric acid.(15%)

2. Predict the molecular structure from VSEPR for each of the following. (15%)

(a) SF_6

(b) NH_3

(c) SO_3

(d) H_2O

(e) XeF_4

3. Give the maximum number of electrons in an atom that can have there quantum numbers？(10%)

(a) n=4

(b) n=5, ml=+1

(c) n=5, ms=+1/2

(d) n=2, l=1

(e) n=3,l=0