



國立清華大學命題紙

九十三年學年度 微機電系統工程系(所) 乙 組碩士班入學考試

科目 化學 科號 2503 共 2 頁第 2 頁 \*請在試卷【答案卷】內作答

- 6) The energy of a photon that has a wavelength of 9.0 m is \_\_\_\_\_ J.  
A)  $4.5 \times 10^{25}$       B)  $2.2 \times 10^{-26}$       C)  $6.0 \times 10^{-23}$       D)  $4.5 \times 10^{-25}$
- 7) In the Bohr model of the atom, \_\_\_\_\_.  
A) electron energies are quantized  
B) electrons can have any energy  
C) electrons travel in circular paths called orbitals  
D) electron paths are controlled by probability
- 8) The \_\_\_\_\_ quantum number defines the shape of an orbital.  
A) azimuthal      B) psi      C) spin      D) principal
- 9) The \_\_\_\_\_ subshell contains only one orbital.  
A) 4s      B) 3d      C) 1p      D) 6f
- 10) How many quantum numbers are necessary to designate a particular orbital in an atom?  
A) 4      B) 5      C) 3      D) 2
- 11) Which ion in the isoelectronic series below has the smallest radius in a crystal?  
A)  $\text{Al}^{3+}$       B)  $\text{Na}^+$       C)  $\text{F}^-$       D)  $\text{N}^{3-}$
- 12) The list that correctly indicates the order of metallic character is \_\_\_\_\_.  
A)  $\text{F} > \text{Cl} > \text{S}$   
B)  $\text{P} > \text{N} > \text{O}$   
C)  $\text{P} > \text{S} > \text{Se}$   
D)  $\text{Na} > \text{K} > \text{Rb}$
- 13) Which alkali metal reacts with oxygen to form the oxide,  $\text{M}_2\text{O}$ ?  
A) Li      B) Cs      C) Rb      D) Na
- 14) Oxides of most nonmetals combine with water to form \_\_\_\_\_.  
A) hydrogen gas  
B) a base  
C) water  
D) an acid
- 15) Of the following chemical forms, \_\_\_\_\_ are not commonly found in ceramics.  
A) nitrates      B) silicates      C) aluminates      D) oxides
- 16) Which one of the following substances is more likely to dissolve in benzene ( $\text{C}_6\text{H}_6$ )?  
A)  $\text{CCl}_4$       B)  $\text{CH}_3\text{CH}_2\text{OH}$       C) HBr      D)  $\text{NH}_3$

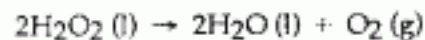
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九十三年學年度 微機系統工程 系(所) 乙 組碩士班入學考試

科目 化學 科號 2503 共 1 頁第 3 頁 \*請在試卷【答案卷】內作答

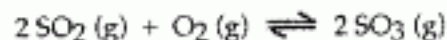
- 17) The phenomenon used to differentiate colloids and true solutions is called the \_\_\_\_\_ effect.  
 A) Osmotic                      B) Tyndall                      C) Henry                      D) van't Hoff

- 18) The reaction below is first order in  $[H_2O_2]$ :



A solution originally at 0.600 M  $H_2O_2$  is found to be 0.075 M after 54 min. The half-life for this reaction is \_\_\_\_\_ min.

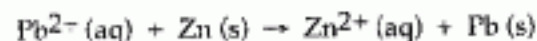
- A) 18                      B) 28                      C) 54                      D) 6.8
- 19) Consider the following equilibrium.



The equilibrium cannot be established when \_\_\_\_\_ is/are placed in a 1.0-L container.

- A) 0.25 mol  $SO_2(g)$  and 0.25 mol  $O_2(g)$   
 B) 0.75 mol  $SO_2(g)$   
 C) 0.50 mol  $O_2(g)$  and 0.50 mol  $SO_3(g)$   
 D) 1.0 mol  $SO_3(g)$
- 20) Of the following, which is the strongest acid?  
 A) HF                      B) HClO                      C) HCl                      D) HI

- 21) The standard cell potential ( $E^\circ_{cell}$ ) for the reaction below is +0.63 V. The cell potential for this reaction is \_\_\_\_\_ V when  $[Zn^{2+}] = 1.0 M$  and  $[Pb^{2+}] = 2.0 \times 10^{-4} M$ .



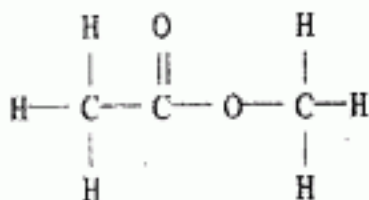
- A) 0.52                      B) 0.74                      C) 0.85                      D) 0.63
- 22) The octane number of straight-run gasoline is about \_\_\_\_\_.  
 A) 50                      B) 75                      C) 93                      D) 0
- 23) How many hydroxyl groups are in a glycerol molecule?  
 A) 0                      B) 1                      C) 2                      D) 3

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24) The compound below is a(n) \_\_\_\_\_.



- A) amine
- B) carboxylic acid
- C) aldehyde
- D) ester

25) How many isomers of  $\text{C}_2\text{H}_2\text{Cl}_2$  are polar?

- A) none
- B) 1
- C) 2
- D) 3