

國立中山大學 113 學年度

碩士班暨碩士在職專班招生考試試題

科目名稱：普通化學【海資系碩士班選考】

—作答注意事項—

考試時間：100 分鐘

- 考試開始鈴響前不得翻閱試題，並不得書寫、劃記、作答。請先檢查答案卷（卡）之應考證號碼、桌角號碼、應試科目是否正確，如有不同立即請監試人員處理。
- 答案卷限用藍、黑色筆(含鉛筆)書寫、繪圖或標示，可攜帶橡皮擦、無色透明無文字墊板、尺規、修正液（帶）、手錶(未附計算器者)。每人每節限使用一份答案卷，請衡酌作答。
- 答案卡請以 2B 鉛筆劃記，不可使用修正液（帶）塗改，未使用 2B 鉛筆、劃記太輕或污損致光學閱讀機無法辨識答案者，後果由考生自負。
- 答案卷（卡）應保持清潔完整，不得折疊、破壞或塗改應考證號碼及條碼，亦不得書寫考生姓名、應考證號碼或與答案無關之任何文字或符號。
- 可否使用計算機請依試題資訊內標註為準，如「可以」使用，廠牌、功能不拘，唯不得攜帶書籍、紙張（應考證不得做計算紙書寫）、具有通訊、記憶、傳輸或收發等功能之相關電子產品或其他有礙試場安寧、考試公平之各類器材入場。
- 試題及答案卷（卡）請務必繳回，未繳回者該科成績以零分計算。
- 試題採雙面列印，考生應注意試題頁數確實作答。
- 違規者依本校招生考試試場規則及違規處理辦法處理。

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題號：452001

※本科目依簡章規定「不可以」使用計算機(混合題)

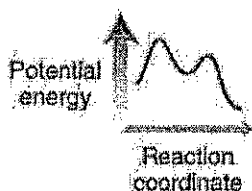
共 2 頁第 1 頁

單選題(每題 4 分)

1. How many protons, neutrons and electrons does ^{127}I have? (A) 53 protons, 74 neutrons, 54 electrons (B) 53 protons, 74 neutrons, 53 electrons (C) 53 protons, 74 neutrons, 52 electrons (D) 53 protons, 127 neutrons, 54 electrons (E) 53 protons, 53 neutrons, 54 electrons
2. If an acid, HA, is 10 % dissociated in a 1.0M solution, what is K_a for this acid? (A) 1.1×10^{-2} (B) 9.1×10^{-2} (C) 8.1×10^{-1} (D) 9.0×10^{-2} (E) 6.3×10^{-2}
3. Which of the following has a zero dipole moment? (A) NH_3 (B) NO_2 (C) SO_2 (D) H_2O_2 (E) PF_5
4. Calculate the ΔH° for the reaction $\text{C}_4\text{H}_4(\text{g}) + 2\text{H}_2(\text{g}) \rightarrow \text{C}_4\text{H}_8(\text{g})$, using the following data:
 $\Delta H^\circ_{\text{combustion}}$ for $\text{C}_4\text{H}_4(\text{g}) = -2341 \text{ KJ/mol}$
 $\Delta H^\circ_{\text{combustion}}$ for $\text{H}_2(\text{g}) = -286 \text{ KJ/mol}$
 $\Delta H^\circ_{\text{combustion}}$ for $\text{C}_4\text{H}_8(\text{g}) = -2755 \text{ KJ/mol}$
 (A) -128 KJ (B) -158 KJ (C) 158 KJ (D) 128 KJ (E) 64 KJ
5. Which one belong to noble gas? (A) H_2 (B) O_2 (C) He (D) N_2
6. The electron configuration of a nitrogen atom?
 (A) $1\text{S}^2 2\text{S}^2 2\text{P}^2$ (B) $1\text{S}^2 2\text{S}^2 2\text{P}^1$ (C) $1\text{S}^2 2\text{S}^2 2\text{P}^3$ (D) $1\text{S}^2 2\text{S}^2 2\text{P}^4$ (E) $1\text{S}^2 2\text{S}^2 2\text{P}^6$
7. Which is the main force between molecule NaCl? (A) Ion-dipole interaction (B) Van-der waals interaction (C) London-dispersion force (D) Dipole-dipole interaction (E) Ionic bonding
8. How many chiral centers of following compound? (A) 8 (B) 7 (C) 6 (D) 5 (E) 4



9. The energy diagram of reaction is: (A) a two-step exothermic (B) a two-step endothermic (C) a one-step exothermic (D) a one-step endothermic (E) non-energy exchange



10. The molecular structure of BF_3 is? (A) bent line (B) linear (C) trigonal planar (D) tetrahedral (E) octahedral
11. The two molecules below are (A) diastereomer (B) cis-trans isomer (C) enantiomer (D) rotamer (E) unrelated



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共 2 頁第 2 頁

12. Which atom has the smallest radius? (A) Si (B) P (C) S (D) As (E) Se
13. Which one in the following is not affect by catalyst? (A) rate of the reaction (B) free energy of transition state (C) the ratio of the forward and reverse rate (D) entropy of the reaction (E) reaction mechanism
14. The formula of 4-ethyl-2,4-dimethylhexane is (A) C_9H_{18} (B) C_9H_{20} (C) $C_{10}H_{20}$ (D) $C_{10}H_{22}$ (E) $C_{11}H_{22}$
15. Which compound do you expect to have the highest standard molar entropy at 1 atm and 300 K? (A) $H_{2(g)}$ (B) $He_{(g)}$ (C) $N_{2O_{4(g)}}$ (D) $CH_{4(g)}$ (E) $C_{12}H_{24(l)}$
16. Which of the following statement is not SI unit? (A) Liter (B) Mole (C) Kilogram (D) Kelvin
17. Which of the following statement about the name of HNO_2 , H_2SO_3 , and $HClO_3$ is correct?
(A) HNO_2 : nitric acid, H_2SO_3 : sulfurous acid, $HClO_3$: chlorous acid
(B) HNO_2 : nitrous acid, H_2SO_3 : sulfurous acid, $HClO_3$: chloric acid
(C) HNO_2 : nitric acid, H_2SO_3 : sulfuric acid, $HClO_3$: hypochlorous acid
(D) HNO_2 : nitrous acid, H_2SO_3 : sulfuric acid, $HClO_3$: chloric acid
18. Which of the following ion with a charge of -1? (A) phosphate ion (B) chromate ion (C) sulfate ion (D) cyanide ion
19. Which of the following biological process DOES NOT involve hydrogen bonding? (A) DNA base pairing (B) lipid bilayer formation (C) cellulose fiber formation (D) α -helix formation (E) substrate binding in enzyme
20. Which is the sum of x,y and z in the following balance reaction? (A) 3 (B) 7 (C) 10 (D) 12 (E) 14



問答題 (每題 10 分)

1. Write down the functional group of the following organic compound (A)aldehydes (B) ketones (C) amides (D) esters (E) ethers (各 2 分)
2. Describe (A) the first law of thermodynamic and (B) the second law of thermodynamic (各 5 分)