

臺北醫學大學 九十二 學年度第 一 學期期末考試題紙

系級	科目	授課教師	考試日期	學號	姓名
護一	普通化學	賴精二	93年1月8日第2節		

- ①請注意本試題共 4 張。如發現頁數不足及空白頁或缺印，應當場請求補齊，否則缺少部份概以零分計。
 ②每張試題卷務必填寫(學號)、(姓名)。可攜帶計算機

1. Select the "Best" answer (20%)

- () Which of the following carbohydrate is a pentose?
 (a) D- glucose (b) D-fructose (c) D-glyceraldehyde (d) D-ribose
- () Which of the following is a D-sugar?
 (a) $\begin{array}{c} \text{CHO} \\ | \\ \text{HO}-\text{C}-\text{H} \\ | \\ \text{CH}_2\text{O} \end{array}$ (b) $\begin{array}{c} \text{CH}_2\text{OH} \\ | \\ \text{C}=\text{O} \\ | \\ \text{H}-\text{C}-\text{OH} \\ | \\ \text{CH}_2\text{OH} \end{array}$ (c) $\begin{array}{c} \text{CHO} \\ | \\ \text{H}-\text{C}-\text{OH} \\ | \\ \text{HO}-\text{C}-\text{H} \\ | \\ \text{CH}_2\text{OH} \end{array}$ (d) $\begin{array}{c} \text{CH}_2\text{OH} \\ | \\ \text{C}=\text{O} \\ | \\ \text{H}-\text{C}-\text{H} \\ | \\ \text{CH}_2\text{OH} \end{array}$
- () Based on the answer of above problem, how many chiral carbon exist?
 (a) 1 (b) 2 (c) 3 (d) 4
- () Which of the following statements is not correct?
 (a) Cellulose is composed of linear chains of D-glucose units joined by β -1,4-glycosidic linkage .
 (b) Amylopectin is a branched polymer of D-glucose with α -1,4 linkages and α -1,6 linkages.
 (c) Glycogen is a branched polymer of D-glucose with β -1,4 linkages and α -1,6 linkages.
 (d) Lactose is formed from galactose and α -glucose
- () Which of the following statements is not correct?
 (a) The general formula of saturated fatty acids is $\text{CH}_3(\text{CH}_2)_n\text{COOH}$.
 (b) Cholesterol is a kind of lipid .
 (c) All phospholipids are in common having two fatty acid unit and phosphoric acid unit.
 (d) The general structure of sphingolipid(抱合脂質) consists of one long alkyl unit ,one fatty acid unit in ester linkage and a polar head alcohol
- () An essential amino acid is one that
 (a) must be included in the diet. (b) contains no sulfur. (c) occurs in all types of proteins.
 (d) is necessary for vitamin production. (e) the body can synthesize.
- () The force that maintain protein structure is
 (a) disulfide bridge(covalent bonding)
 (b) hydrogen bond (H-bond) arising from carbonyl group and amine group .
 (c) salt bridge (ionic bonding between $-\text{NH}_3^+$ and $-\text{COO}^-$)and dispersion force
 (d) all of the above forces plus ion-dipole force ($-\text{NH}_3^+ \cdots \text{H}_2\text{O}$; $-\text{OH} \cdots \text{H}_2\text{O}$) and London force(非極性倫敦引力).
- () Which of the *italicized H* atom in the following molecules will be unsplit(a singlet) in the NMR spectrum?
 $\begin{array}{c} \text{O} \\ || \\ \text{C} \end{array}$
 (a) $\text{CH}_3\text{CH}_2\text{CH}=\text{CH}_2$ (b) $\text{C}\textit{H}_3\text{CCH}_2\text{CH}_3$ (c) $\text{CH}_3\text{C}\textit{H}_2\text{C}\equiv\text{CH}$ (d) $\text{CH}_3\text{C}\textit{H}_2\text{CH}_2\text{OH}$
- () Which of the following will determine the magnetic field of atomic nuclei spin and the chemical shift (化學位移) in NMR spectra (核磁共振圖譜)?
 (a) electron (b) neutron (c) proton (d) the other atomic nuclei
- () On the basis of the solubility rules , all of the following method will separate K^+ from Ag^+ Except
 (a) Add chloride ions (b) Add sulfate ions
 (c) Add carbonate ions (d) Add sulfide

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2. Predict the product(s), write a balanced equation, and state whether it is a precipitation process, redox process, simple decomposition or acid-base reaction? (20%)



3. Describe the relationship and the difference between the following electromagnetic radiation and matter: (a) x-ray, (b) UV, (c) visible radiation, (d) IR, (e) microwave and radio wave. (10%)

4. Consider the reaction: $\text{H}_2(\text{g}) + 1/2 \text{O}_2 \rightarrow \text{H}_2\text{O}(\text{g})$; $\Delta H_{298}^\circ = -57.8 \text{ Kcal}$ find ΔH at 373°K if C_p value for $\text{H}_2(\text{g}) = 6.83 \text{ cal} / ^\circ\text{K}\cdot\text{mol}$, $\text{O}_2(\text{g}) = 6.96 \text{ cal} / ^\circ\text{K}\cdot\text{mol}$, $\text{H}_2\text{O}(\text{g}) = 8.02 \text{ cal} / ^\circ\text{K}\cdot\text{mol}$. (8%)

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5. A 1.000g sample of a compound was burned in an oxygen bomb calorimeter. It produced 42.0 kJ of heat. The temperature of the calorimeter and 2000 g of water was raised 4.645°C.

(a) How much heat is gained by the calorimeter? (4%)

(b) What is the mass of water equivalent of the heat absorbed by the calorimeter? (4%)

6. The piston is forced to move, which requires 560 J. The engine's cooling system has to carry away 2.2 kJ. If the system is defined to be gasoline and oxygen that react, what is the change in its internal energy? (6%)

7. What is the value of ΔH_{rx} for the reaction : $2 C_6H_6(l) + 15 O_2(g) \rightarrow 12 CO_2(g) + 6 H_2O(g)$; $C_6H_6(l) \Delta H_f^\circ = + 49.0$ kJ/mol ; $O_2(g) \Delta H_f^\circ = 0$; $CO_2(g) \Delta H_f^\circ = - 393.5$; $H_2O(g) \Delta H_f^\circ = - 241.8$ (6%)

8. Estimate ΔH_{rx} for the reaction $H_2(g) + Cl_2(g) \rightarrow 2 HCl(g)$

: Bond energy(B.E.) H-H 436 kJ ; Cl-Cl 243kJ ; H-Cl 431 kJ (8%)

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9. If the molar absorptivity (ϵ) for ion (II)-1, 10 phenanthroline complex is $12,000 \text{ liter}\cdot\text{mol}^{-1}\cdot\text{cm}^{-1}$ and the minimum detectable absorbance (A_s) is 0.01, then, for a 1.00 cm path length (l). How much is the minimum molar concentration (c) which can be detected? (6%)

10. Consider an atom traveling at 1% of the speed of light. The deBroglie wavelength is found to be 2.137×10^{-3} pm (a) To estimate its mass (b) Which element is this? (a) ^{31}P (b) ^{19}F (c) ^{40}Ca (d) ^{24}Mg (Hint : $h = 6.626 \times 10^{-34} \text{ kg}\cdot\text{m}^2\cdot\text{s}^{-1}$ / $m v$; $c = 3.0 \times 10^8 \text{ m/s}$) (8%)