臺北醫學大學 91 學年度第 1 學期 ~~期中~~ 期末 考試 (命試) 題紙

系級	科目	授課教師	考試日期	學號	姓名
呼吸一	普通化學	吳瑞裕	93年1月8日第 節		

※①請注意本試題共 5 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。
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Instructions: Please read this section before you start your Final Exam!!

1. Write your name and registration number in the spaces indicated above (on each page).
2. All answers for each question must be transferred to the answer sheet (the **last page** of this exam).

GOOD LUCK!!

1. Which of the following is *not* an example of spontaneous radioactive process?
   a. alpha-decay b. beta-decay c. positron production
   d. autoionization e. electron capture

2. Alpha particles are
   a. electrons b. protons c. neutrons
   d. helium nuclei e. x-rays

3. The element curium (Z = 242, A = 96) can be produced by positive-ion bombardment when an alpha particle collides with which of the following nuclei? Recall that a neutron is also a product of this bombardment.

   a. $^{249}_{98}Cf$ b. $^{241}_{94}Pu$ c. $^{241}_{95}Am$

   d. $^{239}_{92}U$ e. $^{239}_{94}Pu$

4. The half-life of a radioactive nuclide is
   a. that period of time in which 25% of the original number of atoms undergoes radioactive decay.
   b. the time at which the isotope becomes non-radioactive.
   c. that period of time in which 50% of the original number of atoms undergoes radioactive decay.
   d. the period of time it takes to reduce the radioactivity by 100%.
   e. none of these

5. The cesium-131 nuclide has a half-life of 30 years. After 90 years, about 6 g remain. The original mass of the cesium-131 sample is closest to
   a. 30 g b. 40 g c. 50 g
   d. 60 g e. 70 g

6. What radioactive nuclide is often used to date wooden artifacts?

   a. $^{8}_{4}Be$ b. $^{14}_{7}N$ c. $^{14}_{6}C$ d. $^{235}_{92}U$ e. $^{239}_{94}Pu$

7. Which of the following statements is(are) true? Oxidation and reduction
   a. cannot occur independently of each other
   b. accompany all chemical changes
   c. describe the loss and gain of electron(s), respectively
   d. result in a change in the oxidation states of the species involved
   e. a, c, and d are true.

8. In a lead storage battery, PbO_2 is found at the _____.
   a. cathode b. anode c. dry cell d. galvanic cell e. none of these

9. The speed at which most metals oxidize in air is slower than expected because
   a. a thin layer of the metal oxide forms on the metal surface thus inhibiting corrosion
   b. cathodic protection naturally occurs
   c. corrosion only occurs under water
   d. the concentration of oxygen in the atmosphere is not high enough
   e. none of these

10. In a car battery, which of the following is the electrolyte?
    a. $Pb(s)$ b. $PbO_2(s)$ c. $PbSO_4(s)$ d. $H_2SO_4(aq)$ e. none of these

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11. Which of the following is *not* true regarding the term *electrolysis*?
    a. Electrolysis is a process where electrical energy is used to produce a chemical change.
    b. Electrolysis involves forcing a current through a cell to produce a change that would otherwise not occur.
    c. The electrolysis of water produces hydrogen gas and oxygen gas.
    d. Electrolysis is used to recharge a lead storage battery.
    e. All of these are true.

12. Chemists believe that chemical reactions occur because the molecules involved in the reaction _____.
    a. spontaneously break apart then recombine
    b. are always unstable
    c. exist only below a certain maximum temperature
    d. collide with each other with enough energy to break chemical bonds
    e. are moving so fast that the chance of interaction is very small

13. Which of the following statements is(are) typically true for a catalyst?
    a. The concentration of the catalyst will decrease as a reaction proceeds.
    b. The catalyst provides a new pathway for the reaction.
    c. The catalyst speeds up the reaction.
    d. two of these
    e. none of these

14. Given the reaction $A(g) + B(g) \rightleftharpoons C(g) + D(g)$. You have the gases A, B, C, and D at equilibrium. Upon adding gas A, the value of K
    a. increases because by adding A, more products are made, increasing the product-reactant ratio
    b. decreases because A is a reactant so the product-to-reactant ratio decreases
    c. does not change because A does not figure into the product-to-reactant ratio
    d. does not change as long as the temperature is constant
    e. depends on whether the reaction is endothermic or exothermic

15. Which of the following is an example of a homogeneous equilibrium?
    a. $MgCO_3(s) \rightleftharpoons MgO(s) + CO_2(g)$
    b. $NaCl(s) \rightleftharpoons Na^+(aq) + Cl^-(aq)$
    c. $3H_2(g) + N_2(g) \rightleftharpoons 2NH_3(g)$
    d. $C(s) + CO_2(g) \rightleftharpoons 2CO(g)$
    e. none of these

16. Choose the case that is *not* a conjugate acid-base pair.
    a. HCO_3^-, CO_3^{2-}
    b. H_3O^+, H_2O
    c. OH^-, O^{2-}
    d. H_3PO_4, HPO_4^{2-}
    e. $NH_2OH_2^+, NH_2OH$

17. In deciding which of two acids is the stronger, one must know
    a. the concentration of each acid solution
    b. the pH of each acid solution
    c. the equilibrium constant of each acid
    d. all of these
    e. both a and c

18. Which of the following is *true* for a buffered solution?
    a. The solution resists any change in its $[H^+]$.
    b. The solution will not change its pH very much even if a concentrated acid is added.
    c. The solution will not change its pH very much even if a strong base is added.
    d. Any H^+ ions added will react with a conjugate base of a weak acid already in solution.
    e. all of these

19. A weak acid, HF, is in solution with dissolved sodium fluoride, NaF. If HCl is added, which ion will react with the extra hydrogen ions from the HCl to keep the pH from changing?
    a. OH^- b. Na^+ c. F^- d. Na^+ e. none of these

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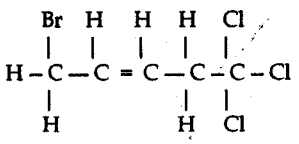
20. A student gave a molecule the following name:
2-ethyl-3-methyl-5-isopropylhexane
However, her professor pointed out that although the molecule could be drawn correctly from this name, the name violates the systematic rules. What is the correct (systematic) name of the molecule?
a. 3,4-dimethyl-6-isopropylheptane
b. 2-isopropyl-4,5-dimethylheptane
c. 3,4,6,7-tetramethyloctane
d. 1,2-diethyl-3,6,7-trimethylheptane
e. 2,3,5,6-tetramethyloctane

21. Ethane undergoes dehydrogenation. The product of this undergoes an addition reaction with hydrogen gas. The product of this is
a. ethylene b. propane c. butane
d. ethane e. none of these

22. Which of the following cannot form alkenes?
a. methane b. ethane c. propane
d. two of these e. all of these

23. Name the following:



a. 1,1,1-trichloro-5-bromo-3-pentene b. 5,5,5-trichloro-1-bromo-2-pentene
c. 1,1,1-trichloro-5-bromo-2-pentene d. 1,1,1-trichloro-5-bromo-3-pentyne

24. Which of the following has the greatest number of C -- O bonds?
a. ketone b. ester c. alcohol
d. amine e. aldehyde

25. Which of the following is found in beverages such as wine?
a. methanol b. ethanol c. propanol
d. isopropanol e. none of these

26. Which of the following is known as wood alcohol?
a. methanol b. ethanol c. propanol
d. isopropanol e. none of these

27. Teflon is an example of a
a. copolymer b. homopolymer c. dimer
d. two of these e. none of these

28. Consider the reaction $HNO_2(aq) + H_2O(l) \rightarrow H_3O^+(aq) + NO_2^-(aq)$. Which species is the conjugate base?
a. $HNO_2(aq)$ b. $H_2O(l)$ c. $H_3O^+(aq)$
d. $NO_2^-(aq)$ e. two of these

29. The freezing point of helium is approximately −270°C. The freezing point of xenon is −112°C. Both of these are in the noble gas family. Which of the following statements is supported by these data?
a. Helium and xenon form highly polar molecules.
b. As the molar mass of the noble gas increases, the freezing point decreases.
c. The London forces between the helium molecules are greater than the London forces between the xenon molecules.
d. The London forces between the helium molecules are less than the London forces between the xenon molecules.
e. none of these

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30. Order the intermolecular forces (dipole-dipole, London dispersion, ionic, and hydrogen bonding) from weakest to strongest.
a. dipole-dipole, London dispersion, ionic, hydrogen bonding
b. London dispersion, dipole-dipole, hydrogen bonding, ionic
c. hydrogen bonding, dipole-dipole, London dispersion, ionic
d. dipole-dipole, ionic, London dispersion, hydrogen bonding
e. London dispersion, ionic, dipole-dipole, hydrogen bonding

31. Which conditions of *P* and *T* are most ideal for a gas?
a. high *P*, high *T* b. high *P*, low *T* c. low *P*, high *T*
d. low *P*, low *T* e. depends on the gas

32. Which of the following has the lowest vapor pressure?
a. H_2O b. NaCl c. NH_3 d. O_2 e. CH_4

33. Which of following is a correct statement?
a. A solution of an element is an electrolyte.
b. Solutions of all electrolytes conduct electricity equally well.
c. A solution of a soluble ionic compound is an electrolyte.
d. Ethanol, C_2H_5OH, is a strong electrolyte.

34. As ice melts, what bonds, if any, are broken?
a. one of the hydrogen-oxygen bonds within a water molecule.
b. both of the hydrogen-oxygen bonds within a water molecule.
c. The hydrogen-hydrogen bond within a water molecule.
d. Hydrogen bonds between water molecules.
e. Ionic bonds between water molecules.

35. Which field of the 2003 Nobel Price in Chemistry awarded to?
a. conductive polymer b. mass spectrometric analyses of biological macromolecules
c. ion channel(s) in cell membrane d. quantum chemistry
e. electron transfer reactions

36. Which field of the 2003 Nobel Price in Medicine/Physiology awarded to?
a. Discovery of prion b. apoptosis (programmed cell death)
c. MRI (magnetic resonance imaging) d. signal transduction in nerve system
e. origin of retroviral oncogene

37. The condensation product of two amino acids is a(n)
a. peptide b. ketone c. ether d. ester e. alcohol

38. Which is the linkage of condensation of polysaccharide?
a. hydrophobic interaction b. peptide bonding c. glycosidic linkage
d. H-bonding e. none of thse

39. Which statement is false with respect to proteins?
a. primary structure refers to the sequence of nucleotides
b. secondary structure includes α-helixes
c. tertiary structure includes disulfide bonds
d. the overall shape of a protein is related to the tertiary structure
e. all are false

40. Which of the following is an incorrect designation for an atomic orbital?
a. 1*s* b. 4*f* c. 3*s* d. 2*d* e. 2*p*

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Answer Page:

Attention!! All answers must be clear and readable, or it will be treated as a wrong answer.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50

Total score: _____

Have a Happy Winter Break

and

Chinese New Year!!