銘傳大學八十九學年度管理科學研究所碩士班招生考試

（甲組）第一節

普通化學 試題

單選題，共 40 題，每題 2.5 分。

1. Which of hydrogen halide acid is used to etch glass?
   (A) HF
   (B) HCI
   (C) HBr
   (D) HI
   (E) H_2O

2. What is the energy in eV of a laser beam with 355 nm wavelength? ($1cm^{-1}$ = 8065 meV)
   (A) 35 eV
   (B) 0.035eV
   (C) 0.35 eV
   (D) 3.5 eV
   (E) 350 eV

3. Which are the values of n and ι for orbitals in the 3d subshell?
   (A) 4, 1
   (B) 3, 2
   (C) 4, 3
   (D) 4, 2
   (E) 3, 3

4. The paramagnetism of O_2 is explained by
   (A) coordinate covalent bonding
   (B) resonance
   (C) molecular orbital theory
   (D) valence bond theory
   (E) ionic bond theory

5. Which molecular orbitals for homonuclear diatomic molecules are degenerate?
   (A) p molecular orbitals

(B) σ molecular orbitals
(C) π molecular orbitals and σ molecular orbitals
(D) d molecular orbitals
(E) π molecular orbitals

6. Which of the following compounds is a superconductor?
   (A) $YB_{a2}C_{u3}O_7$
   (B) Sugar
   (C) Glucose
   (D) Copper
   (E) $F_{e2}O_3$

7. The distribution of molecular speeds can be described by
   (A) the gas laws
   (B) Graham's law of diffusion.
   (C) Bolye's law
   (D) Maxwell equation
   (E) Dalton's law of partial pressures

8. Which one of the following sets of quantum number is acceptable?

	n	1	Ml	Ms
(A)	3	2	3	-1/2
(B)	4	3	-2	+1/2
(C)	5	0	1	+1/2
(D)	1	1	0	-1/2
(E)	1	0	1	+1/2

9. Which of the following should have the largest dipole moment?
   (A) $H_2(g)$
   (B) $CO_2(g)$
   (C) KCl(g)
   (D) $CH_4(g)$
   (E) $CH_3F(g)$

10. Which is the edge length of a face-centered cubic unit cell made up of atoms having radius of 0.156 nm
    (A) 2210 pm
    (B) 441 mm

(C) 634 nm
(D) 441 μm
(E) 441 pm

11. Which the following statement is correct? An ideal gas is assumed that:
    (A) molecules have negligibly volume.
    (B) molecules in the gaseous state exert only attractive force.
    (C) molecules have minimum volume.
    (D) molecules in the gaseous state exert only repulsion force.
    (E) Molecules in the gaseous state exert both attraction and repulsion force.

12. Which statement is correct? A catalyst:
    (A) increases the rate of the forward reaction, but does not alter the reverse rate.
    (B) increases the activation energy.
    (C) alters the free energy of the reactants.
    (D) alters the mechanism of reaction.
    (E) decreases the rate of reaction, but is not consumed.

13. Explosion of dynamite is a process for which:
    (A) ΔH is positive when explosion occurs in an open container.
    (B) ΔH and ΔS are negative.
    (C) ΔH is positive and ΔS is negative.
    (D) ΔH is negative at low temperature, but positive at high temperature.
    (E) ΔH is negative, and ΔS is positive.

14. How many atoms are in one body-centered cubic cell of a metal?
    (A) 1
    (B) 2
    (C) 3
    (D) 4
    (E) 5

15. The specific is defined as
    (A) the free-energy change when reactants in their standard states.
    (B) The temperature change when reaction is carried out under standard-state conditions.

(C) The measure of a fluid's temperature to conductivity.
(D) The amount of heat energy required to raise the temperature of one gram of the substance by one degree.
(E) The amount of entropy required to decrease the temperature of the substance by one degree.

16. Which of the following compounds contain hydrogen bonds in liquid phase?
(A) CH_4
(B) C_2H_6
(C) H_2O
(D) C_3H_6
(E) CO_2

17. Which of the following compounds is an acid?
(A) CO_3^{-2}
(B) HCO_3^{-1}
(C) NaCl
(D) H_2O
(E) H_2CO_3

18. Which transition could if a solid is heated at a pressure below the triple point pressure?
(A) condensation
(B) deposition
(C) melting
(D) sublimation
(E) evaporation

19. Which of the following molecules has the highest kinetic energy?
(A) H_2 at 0 K
(B) H_2O at 1000 K
(C) CO_2 at 100 K
(D) Ar at 10 K
(E) F_2 at 4K

20. Which of the following light has the highest frequency?
(A) X-ray

(B) UV
(C) Green
(D) Infrared
(E) Violet

21. The monomer used for synthesizing PE plastics is
(A) $(CH_3)_2C = CH_2$
(B) $H_2C = CH_2$
(C) $F_2C = CF_2$
(D) HClC = CClH
(E) $(CH_3)_2C = C(CH_3)_2$

22. A supercritical fluid refers to a substance
(A) above both its critical temperature and its critical pressure
(B) at it triple point
(C) that is in the liquid crystal state
(D) with a viscosity of zero
(E) below its critical temperature

23. Which of the following compounds is not an alkane?
(A) CH_4
(B) C_2H_6
(C) C_3H_8
(D) C_4H_{10}
(E) C_6H_{12}

24. Which one is not a basic component of DNA?
(A) Cytosine
(B) Guanine
(C) Adenine
(D) Thymine
(E) Ribose

25. The backbone of a strand of nucleic acid consists of
(A) phosphate and acetate units
(B) phosphate and sugar units
(C) phosphate and starch units
(D) amino acid and sugar units

(E) phosphate and amino acid units

26. Which of the following compounds is an acetone?
    (A) C_2H_4O
    (B) C_2H_4
    (C) CH_3COOH
    (D) CH_3CH_2COOH
    (E) C_2H_6

27. Which of the following elements has the largest radius?
    (A) Iron
    (B) Carcon
    (C) Mercury
    (D) Helium
    (E) Argon

28. Which of the following elements can be easily found in human blood?
    (A) Iron
    (B) Nickel
    (C) Gold
    (D) Silver
    (E) Mercury

29. Which of the following solutions is not an acid solution?
    (A) 1M H_2SO_4
    (B) 0.1M H_2SO_4
    (C) 0.01M H_2SO_4
    (D) 0.001M H_2CO_3
    (E) 0.1M H_2SO_4

30. Which of the following has the highest pH value?
    (A) 1N NaCl
    (B) 0.1N KCl
    (C) 1M NaOH
    (D) 1M HCO_3^{1-}
    (E) 0.1M H_2SO_4

31. Which of the following compounds has the highest reactivity?

(A) C_2H_2
(B) CH_4
(C) C_2H_6
(D) C_3H_8
(E) CH_3

32. Which one of the following statement of p-type silicon is incorrect?
(A) p-type silicon is a semiconductor.
(B) p-type silicon has a diamond-like structure.
(C) p-type represents a hole-doped semiconductor.
(D) B-doped silicon is a p-type semiconductor.
(E) the electrical conductivity of silicon increases as the temperature decreases

33. Which of the following compounds has the highest boiling point?
(A) $C_{16}H_{34}$
(B) $C_{12}H_{26}$
(C) C_2H_6O
(D) C_2H_6
(E) C_8H_{18}

34. Which of the following materials has the lowest melting point?
(A) quartz
(B) silicon
(C) mercury
(D) graphite
(E) diamond

35. Which of the following compounds is not soluble in water?
(A) methanol
(B) Ethanol
(C) Acetone
(D) Cyclohexane
(E) Hexanol

36. Which response includes all of the following species that have delocalized molecular orbitals: NO_3^-, NO_2^-, O_3
(A) none of them

(B) NO_3^-
(C) NO_3^-, No_2^-
(D) NO_2, O_3
(E) all of them

37. A protein that acts as a biochemical catalyst is called
(A) an enzyme
(B) a hormone
(C) RNA
(D) An antibody
(E) Bacteria

38. Which of the following molecule is commonly used for supercritical fluid extraction?
(A) Cl_2
(B) F_2
(C) N_2
(D) O_2
(E) CO_2

39. The electrical conductivity of a semiconductor is:
(A) increased as temperature increased
(B) decreased as temperature increased
(C) not changed as temperature changed
(D) a constant when temperature is below its curie temperature
(E) a constant when temperature is above its curie temperature

40. Phosphorus is an essential mineral element. It is an important atom in which one of the following
(A) amino acids
(B) protein
(C) polyethylene
(D) nylon
(E) DNA

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