***King Abdul Aziz University***

**Faculty of science**

**Chemistry department**

**Model (B)**

**Chem.110**

**Final exam of 1st term 1432-1433H**

**Time: 120minutes**

|  |  |
| --- | --- |
| **Student name:** |  |
| **Student number** |  |
| **Section** |  |

**Useful information**

***Speed of light, c = 3.0×108 m/s***

***Planck’s const., h = 6.63×10-34 J.s***

***Avogadro’s No., NA = 6.022×1023 mol-1***

***Rydberg const. for H atom, RH = 2.18×10-18 J***

***Gas constant, R= 0.082 L atm K-1 mol-1***

With the best wishes

***General Chemistry Team work***

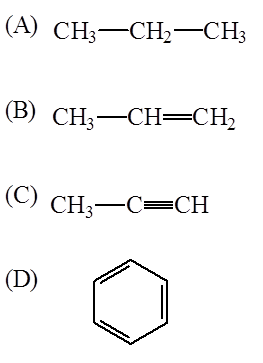
**Directions:** For each of the following questions, choose the letter that **best** answers the question and place it on your answer sheet.

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1. The correct order of radius in the following is

* 1. Cl- <Cl
  2. Fe+2 **>** Fe
  3. **O-2 > O**
  4. Fe +2< Fe+3

2. All the following compounds are aliphatic except? **(D)**

1. CH3-CH2-CH3
2. CH3-CH2=CH2
3. CH3-C≡ CH
4. 

3. Which of these elements has the greatest electronegativity?

* 1. 51Sb
  2. 31Ga
  3. 55Cs
  4. **33As**

4. The cobalt(III) ion, Co3+, has how many 3d electrons?

* 1. 0
  2. **6**
  3. 7
  4. 5

5. Which one of these elements (period 4) is a transition element?

* 1. Br
  2. As
  3. Ca
  4. **Sc**

6.The diameter of a circuit is 59 X 105 cm. What is this diameter when expressed in micrometers?

1. 59 × 1011μm
2. **59** × **109μm**
3. 59 × 105μm
4. 59 × 107μm

7.How many milliliters in 1.4381 L?

1. 14.38 mL
2. **1438.1 mL**
3. 143.81 mL
4. 14381.0 mL

8. Bromine is a red liquid at 25° C. Its density is 3.12 g/cm3. What is the volume of 46.5 g of liquid bromine?

1. 12.9 cm3
2. 15.9 cm3
3. **14.9 cm3**
4. 17.9 cm3

9. Which of the following is a SI base unit?

1. Gram
2. **meter**
3. hour
4. all of the above

10. Which of the following element is in the halogen group?

1. O
2. **I**
3. B
4. S

11. The correctly drawn Lewis formula for CBr4 will have \_\_\_\_\_\_\_\_\_\_.

1. 4 single bonds and 20 nonbonding electrons
2. **4 single bonds and 24 nonbonding electrons**
3. 4 single bonds and 18 nonbonding electrons
4. 4 single bonds and 16 nonbonding electrons

12. Which one of the following molecules would exhibit resonance?

1. O2
2. H2S
3. **SO2**
4. CH4

13. Which of these molecules has an expanded of the octet rule?

1. NF3
2. **SF6**
3. PH3
4. Br2

14. If the initial pressure of a 2.00 L gas sample is 2.50 atm, what will the pressure be if the volume is changed to 6.00 L at constant temperature?

1. 0.600 atm
2. **0.833 atm**
3. 1.50 atm
4. 3.75 atm

15 .Propane burns in air according to the equation: C3H8(g) + 5O2(g) → 3CO2(g) + 4H2O(g) What volume of CO2 would be formed if 4.00 L of propane burns, assuming that all of the gases are under the same conditions?

1. 24.0 L
2. **12.0 L**
3. 3.00 L
4. 4.80 L

16. The correct order in the first ionization energy is:

* 1. Si > O > N > C
  2. O > N > C > Si
  3. **N > O > C > Si**
  4. C > N > O > Si

17. The general formula of an alkane is

* 1. C2nH2n
  2. **CnH2n+2**
  3. CnH2n
  4. CnH2n-2

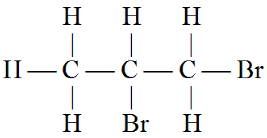
18. The functional group in this compound CH3CH2CH2CH2NH2is

* 1. Ketone
  2. **Amine**
  3. Aldehyde
  4. Ether

19. An amino acid is a compound that contains at least

1. One amino group and one amide group.
2. **One carboxylic acid group and one amino group.**
3. Two amino groups and one carboxylic acid group.
4. One hydroxyl group and one methyl group.

20. Which of these is the systematic name for the compound represented below?



* 1. 2,3-dibromopentane
  2. **1,2-dibromopropane**
  3. 1,2-dibromopentane
  4. 2,3-dibromopropane

21. How many bonds around carbon atom in, CO32-?

1. 1
2. 2
3. **4**
4. 5

22. The formal charge on phosphorous atom in, PI3?

* 1. + 2
  2. **0**
  3. +4
  4. +5

23. The type of bond in CaCl2 Compound can be classified as

1. Polar covalent bond
2. **Ionic bond**
3. Hydrogen bond
4. nonpolar Covalent bond

24. How many total valence electrons are present in, H3PO3?

1. 12
2. **26**
3. 32
4. 30

25. The electron configuration 1s22s22p6applies to all of the following species except:

1. Na+
2. Ne
3. **Ca2+**
4. F–

26. If the pH of a solution is 7, the solution will be:

1. Acidic
2. Alkaline
3. **Neutral**
4. None of these

27. Fill in the blanks: 3.00 moles of oxygen gas (O2) have a weight of ---------- g , and occupy volume of ---------- L at STP.

1. 96.0 g , 1.00 L
2. **96.0 g , 67.2 L**
3. 64.0 g , 22.4 L
4. 64.0 g , 3.00 L

28. The reaction in which increased pressure has no effect on the equilibrium reaction is

1. N2(g) + 3 H2(g) ⇄ 2 NH3(g)
2. **CO(g) + H2O(g) ⇄ CO2(g) + H2(g)**
3. 2 H2(g) + CO(g) ⇄ CH3OH(ℓ)
4. CaCO3(s) ⇄CaO(s) + CO2(g)

29. The equilibrium constant for the following reaction: N2(g) + 3H2(g) 2NH3(g) is 70 at 350oC. A system at equilibrium has [N2] = 0.100 M and [H2] = 0.200 M. What is the [NH3]?

* 1. 0.371
  2. **0.237**
  3. 0.195
  4. 0.302

30. Kp will be equal to Kc if \_\_\_\_\_.

* 1. ∆n = 1
  2. RT = 0
  3. **∆n = 0**
  4. ∆n = ∞

31. Which pair of Atomics would be most likely to form an ionic compound?

1. K and Cu
2. Na and Zn
3. Cs and Ca
4. **K and Cl**

32. Give the number of protons (p), electrons (e), and neutrons (n) in -.

1. 8 p, 10 n, 8 e
2. **8 p, 8 n, 10 e**
3. 8 p, 10 n, 8 e
4. 10 p, 8 n, 8 e

33. What is the mass of 0.39 mol nickel (Ni) metal?

1. 24.01 g
2. **23.01 g**
3. 24.51 g
4. 25.51 g

34. How many grams of Cl2 can be prepared from the reaction of 18.4 g of MnO2 with excess HCl according to the chemical equation?

MnO2 + 4HCl → MnCl2 + Cl2 + 2H2O

1. 12.02 g
2. **15.02 g**
3. 11.02 g
4. 16.02 g

35.Calculate the molarity of a solution of 6 g of ethanol (C2H5OH) in 508 mL of solution.

1. 1.24 M
2. **0.26 M**
3. 0.3 M
4. 2.24 M

36. Select the correct equilibrium constant expression for the reaction:

CH4(g) + 2O2 (g) ⇄ CO2(g) + 2H2O(g)

1. Keq = [CH4][O2]2/ [CO2][H2O]2
2. **Keq = [CO2][ H2O]2 / [CH4][O2]2**
3. Keq = [CH4][ O2] / [CO2][H2O]
4. Keq = [CO2][ H2O] / [CH4][O2]

37. Select the solution below that is the most basic.

1. [H+] = 1.0 × 10–6 M
2. [H+] = 1.0 × 10–8 M
3. **[H+] = 1.0 × 10–10 M**
4. [H+] = 1.0 × 10–4 M

38. Consider the following system at equilibrium:

CH4(g) + 2H2O(g) ⇄ CO2(g) + 4H2(g)

What change will cause the equilibrium to shift to form more CO2?

1. add a catalyst
2. **decrease [H2]**
3. decrease [H2O]
4. decrease the volume of the reaction vessel

39. Consider the following system at equilibrium:

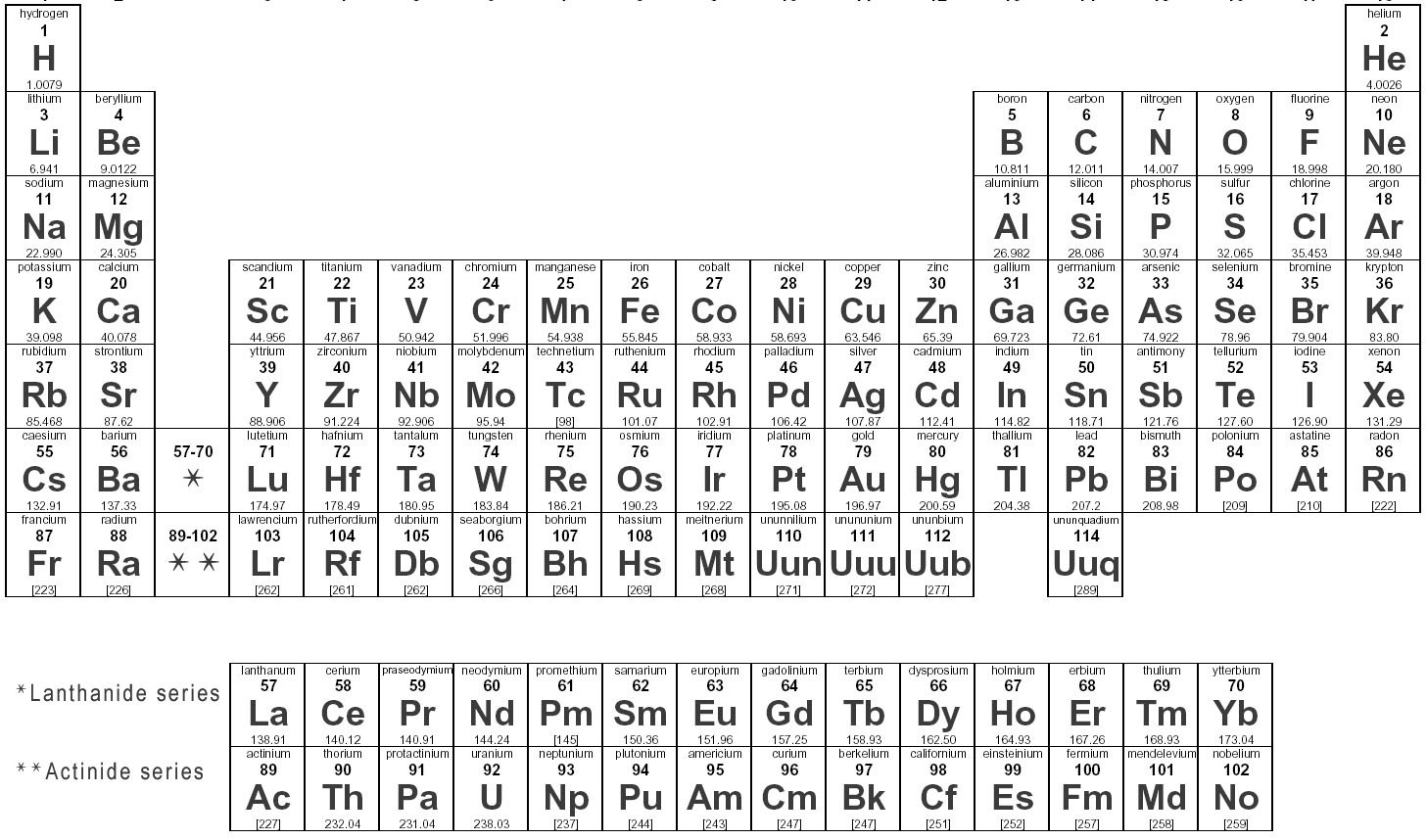
C2H2(g) + H2(g) ⇄ C2H6(g) Exothermic

What change will be observed if the temperature of the reaction mixture at equilibrium were decreased?

1. The concentration of C2H6 will decrease.
2. **The concentration of both C2H2 and H2 will decrease.**
3. The concentration of both C2H2 and H2 will increase.
4. There will be no change in the equilibrium concentrations.

40. Calculate the pH of a solution that has [H3O+] = 1.0 × 10–6M.

1. pH = 1.00
2. **pH = 6.00**
3. pH = 14.00
4. pH = 7.00

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