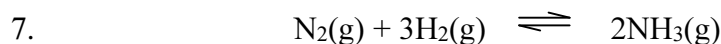


CHEMISTRY SAMPLE TEST 1

1. A sample of N_2 gas occupies 4.48 L volume under standard conditions (1 atm, $0^\circ C$). What is the mass of the sample? The atomic mass of N is 14 amu.
- A: 5.6 g B: 56 g C: 2.8 g D: 28 g E: 22.4 g
2. Which properties are characteristic for the nonmetals?
1. high electrical conductivity
 2. large ionization energy
 3. high electronegativity
 4. low electron affinity
- A: 1,2 B: 2,3 C: 3,4 D: 2,4 E: 1,2,3
3. Concerning $1.2 \times 10^{24} CO_2$ molecules, which statements are true? The molar mass is 44 g/mol.
1. it is 12 moles.
 2. it occupies 1.2×22.4 L volume under standard conditions.
 3. it has a mass of 88 grams.
 4. it consists of 3.6×10^{24} atoms.
- A: 1,3 B: 1,4 C: 2,3 D: 2,4 E: 3,4
4. Which of the following substances contain covalent bonds only?
1. $BaCl_2(aq)$
 2. $CCl_4(l)$
 3. $HCl(g)$
 4. $NH_4Br(aq)$
- A: 1,2,3,4 B: 1,2,4 C: 2,3 D: 1,3 E: 2,3,4
5. Which of the following atoms are isotopes of each other?
- X*: 11 protons, 11 electrons, 12 neutrons
Y: 11 protons, 10 electrons, 12 neutrons
V: 11 protons, 11 electrons, 13 neutrons
W: 12 protons, 12 electrons, 12 neutrons
- A: *X* and *Y* B: *X* and *W* C: *Y* and *V* D: *V* and *W* E: *X* and *V*
6. An aqueous solution is prepared by dissolving 1.6 g NaOH in 250 mL final volume. What is the molar concentration of the solution? The molar mass of NaOH is 40 g/mol
- A: 6.4 mol/L
B: 1.6 mol/L
C: 16 mol/L
D: 0.16 mol/L
E: 64 mol/L



The reaction is exothermic towards product formation. Which of the following changes of conditions will shift the equilibrium of the reaction to the right?

1. increase the pressure.
2. increase the concentration of NH_3 .
3. increase the concentration of H_2 gas.
4. decreasing the temperature.

A: 1,3,4 B: 2,3 C: 2,4 D: 2,3,4 E: 1,2,3,4

8. When two elements, X (atomic number 13) and Y (atomic number 8), react the compound formed will be:

A: XY B: X_3Y_2 C: XY_2 D: X_2Y E: X_2Y_3

9. Which is the most basic solution?

- A: $\text{pH}=11$
- B: $\text{pOH}=12$
- C: $\text{pOH}=2$
- D: $[\text{OH}^-]=10^{-4} \text{ mol/L}$
- E: $[\text{H}^+]=10^{-4} \text{ mol/L}$

10. Which set contains only polar molecules?

- A: NH_3 , H_2O , SO_2
- B: SO_3 , H_2S , H_2O
- C: HCl , CO_2 , NH_3
- D: Cl_2 , SO_2 , CO_2
- E: CCl_4 , H_2O , NH_3

11. In any reaction where a calcium atom changes to calcium ion, the calcium atom

1. has lost an electron.
2. has become an anion.
3. has been oxidized.
4. has achieved noble gas electron configuration.

A: 1,2 B: 2,3 C: 3,4 D: 2,4 E: 2,3,4

12. What is the oxidation number of Cr in $\text{K}_2\text{Cr}_2\text{O}_7$

A: -6 B: +6 C: +12 D: -12 E: +2

13. Which group has the greatest first ionization energy?

- A: halogens
- B: carbon family
- C: oxygen family
- D: alkali metals
- E: alkaline earth metals

14. Water solutions of the following five compounds have the same molar concentrations. Arrange them in the order of increasing pH.

A: CH_3COOH , HCl , NaCl , NH_3 , KOH

B: KOH , NH_3 , NaCl , CH_3COOH , HCl

C: HCl , CH_3COOH , NaCl , NH_3 , KOH

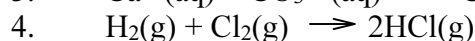
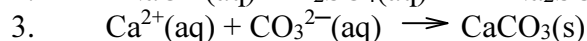
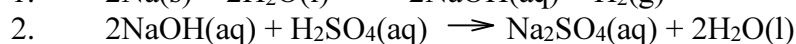
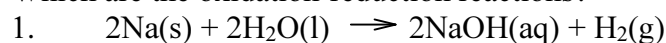
D: HCl , CH_3COOH , NH_3 , KOH , NaCl

E: CH_3COOH , HCl , KOH , NaCl , NH_3

15. How many grams of solid potassium chloride are needed to prepare 200 mL solution with 15 % m/m concentration? The density of the solution is 1.2 g/mL.

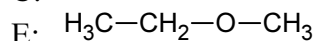
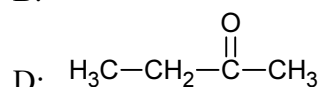
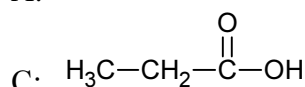
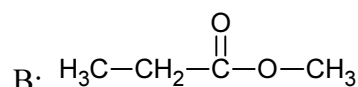
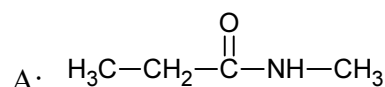
A: 25 g B: 0.25 g C: 360 g D: 36 g E: 0.09 g

16. Which are the oxidation-reduction reactions?

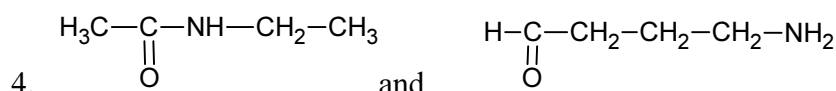
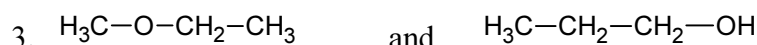
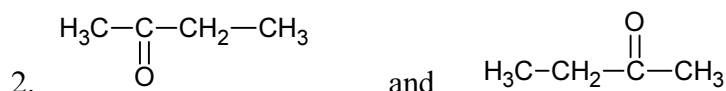
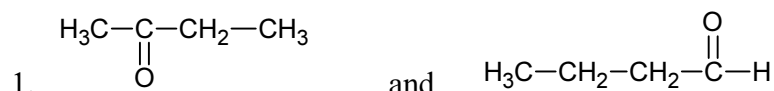


A: 1,2,3,4 B: 1,2 C: 3,4 D: 1,3 E: 1,4

17. Choose the compound with an ester group.

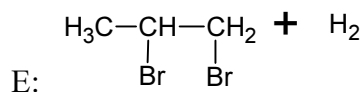
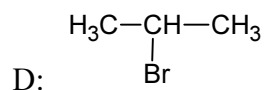
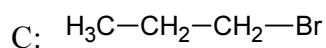
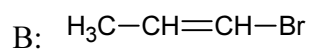
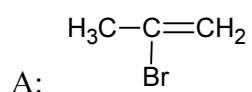


18. Which pairs are structural isomers?

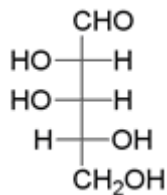


A: 1,2 B: 2,3 C: 1,3,4 D: 2,3,4 E: 1,2,3,4

19. The main product in the following reaction is:



20. Which statements are true for the following molecule in its open chain form?



1. It is an aldopentose.
2. It has 4 chiral carbon atoms.
3. It is a monosaccharide.
4. It is a D-sugar.

A: 1,3

B: 2,4

C: 3,4

D: 1,2,3

E: 1,3,4