

Student Name: _____ Student ID # _____

Instructor: Dr. Emad Akeer

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.**2 Points each**

- 1) A combination of sand, salt, and water is an example of a _____. 1) _____
A) compound
B) homogeneous mixture
C) pure substance
D) heterogeneous mixture
E) solid
- 2) Which one of the following has the element name and symbol correctly matched? 2) _____
A) N, neon
B) S, sodium
C) Tn, tin
D) Fe, iron
E) B, bromine
- 3) An element cannot _____. 3) _____
A) be separated into other substances by chemical means
B) be a pure substance
C) be part of a homogeneous mixture
D) interact with other elements to form compounds
E) be part of a heterogeneous mixture
- 4) Which one of the following is not an intensive property? 4) _____
A) mass
B) density
C) temperature
D) boiling point
E) melting point
- 5) Which one of the following is the highest temperature? 5) _____
A) 302 K
B) 38 °C
C) 96 °F
D) none of the above
E) the freezing point of water
- 6) How many significant figures are in the measurement 5000 g? 6) _____
A) 2 B) 4 C) 1 D) 5 E) 3

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- 15) Of the reactions below, which one is not a combination reaction? 15) _____
A) $C + O_2 \rightarrow CO_2$
B) $2N_2 + 3H_2 \rightarrow 2NH_3$
C) $CaO + H_2O \rightarrow Ca(OH)_2$
D) $2CH_4 + 4O_2 \rightarrow 2CO_2 + 4H_2O$
E) $2Mg + O_2 \rightarrow 2MgO$
- 16) The reaction used to inflate automobile airbags _____. 16) _____
A) violates the law of conservation of mass
B) is a decomposition reaction
C) produces sodium gas
D) is a combination reaction
E) is a combustion reaction
- 17) The formula of nitrobenzene is $C_6H_5NO_2$. The molecular weight of this compound is _____ 17) _____
amu.
A) 109.10 B) 123.11 C) 43.03 D) 107.11 E) 3.06
- 18) The mass % of C in methane (CH_4) is _____. 18) _____
A) 7.743 B) 133.6 C) 74.87 D) 92.26 E) 25.13
- 19) When aqueous solutions of _____ are mixed, a precipitate forms. 19) _____
A) K_2SO_4 and $CrCl_3$
B) NaI and KBr
C) $NiBr_2$ and $AgNO_3$
D) KOH and $Ba(NO_3)_2$
E) Li_2CO_3 and CsI
- 20) The net ionic equation for the reaction between aqueous sulfuric acid and aqueous sodium hydroxide is _____. 20) _____
A) $2H^+(aq) + SO_4^{2-}(aq) + 2Na^+(aq) + 2OH^-(aq) \rightarrow 2H_2O(l) + 2Na^+(aq) + SO_4^{2-}(aq)$
B) $H^+(aq) + OH^-(aq) \rightarrow H_2O(l)$
C) $H^+(aq) + HSO_4^-(aq) + 2Na^+(aq) + 2OH^-(aq) \rightarrow 2H_2O(l) + 2Na^+(aq) + SO_4^{2-}(aq)$
D) $H^+(aq) + HSO_4^-(aq) + 2OH^-(aq) \rightarrow 2H_2O(l) + SO_4^{2-}(aq)$
E) $SO_4^{2-}(aq) + 2Na^+(aq) \rightarrow 2Na^+(aq) + SO_4^{2-}(aq)$
- 21) Which one of the following is a correct expression for molarity? 21) _____
A) mol solute/kg solvent
B) mol solute/mL solvent
C) mol solute/L solvent
D) mmol solute/mL solution
E) μmol solute/L solution

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SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

2 Points each

22) Mass and volume are often referred to as _____ properties of substances. 22) _____

23) Gases do not have a fixed _____ as they are able to be _____. 23) _____

24) $1.035 \times 10^{-4} \text{ L} =$ _____ mL 24) _____

25) The solvent in an aqueous solution is _____. 25) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

You must show your calculations and units clearly for credit or partial credit.

26) There should be _____ significant figures in the answer to the following computation. **5 Points** 26) _____

$$\frac{(10.07 + 7.395)}{2.5}$$

- A) 1 B) 2 C) 3 D) 4 E) 5

27) An object will sink in a liquid if the density of the object is greater than that of the liquid. The mass of a sphere is 9.83 g. If the volume of this sphere is less than _____ cm^3 , then the sphere will sink in liquid mercury (density = 13.6 g/cm^3). **5 Points** 27) _____

- A) 0.723
B) 7.48
C) 134
D) 1.38
E) none of the above

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28) How many liters of air are in a room that measures 11.0 ft $\times$ 12.0 ft and has an 10.0 ft ceiling? 28) _____

1 in. = 2.54 cm (exactly); 1 L = 10³ cm³

5 Points

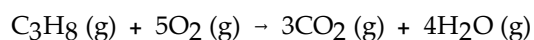
- A) 40.2 B) 3.74×10^4 C) 1.01×10^6 D) 139 E) 4.02×10^7

29) A certain mass of carbon reacts with 128 g of oxygen to form carbon monoxide. _____ grams of oxygen would react with that same mass of carbon to form carbon dioxide, according to the law of multiple proportions. 29) _____

5 Points

- A) 128 B) 25.6 C) 1280 D) 256 E) 64.0

30) The combustion of propane (C₃H₈) in the presence of excess oxygen yields CO₂ and H₂O: 30) _____



5 Points

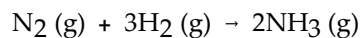
When 2.5 mol of O₂ are consumed in their reaction, _____ mol of CO₂ are produced.

- A) 6.0 B) 5.0 C) 1.5 D) 3.0 E) 2.5

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- 31) A compound that is composed of carbon, hydrogen, and oxygen contains 70.6% C, 5.9% H, and 23.5% O by mass. The molecular weight of the compound is 136 amu. What is the molecular formula? 31) _____
- 7.5 Points**
- A) C₈H₄O B) C₅H₆O₂ C) C₈H₈O₂ D) C₉H₁₂O E) C₄H₄O

- 32) Under appropriate conditions, nitrogen and hydrogen undergo a combination reaction to yield ammonia: 32) _____
- 5 Points**



If the reaction yield is 87.5%, how many moles of N₂ are needed to produce 3.00 mol of NH₃?

- A) 1.5 B) 2.32 C) 0.166 D) 1.71 E) 1.00

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33) What is the concentration (M) of a NaCl solution prepared by dissolving 9.3 g of NaCl in sufficient water to give 350 mL of solution? 33) _____
5 Points

- A) 0.16 B) 27 C) 18 D) 0.45 E) 2.7×10^{-2}

34) A 17.5 mL sample of an acetic acid ($\text{CH}_3\text{CO}_2\text{H}$) solution required 29.6 mL of 0.250 M NaOH for neutralization. The concentration of acetic acid was _____ M. 34) _____
7.5 Points

- A) 0.158 B) 0.423 C) 0.214 D) 6.88 E) 134

Answer Key

Testname: SPRING 2017 CHEM1411

- 1) D
- 2) D
- 3) A
- 4) A
- 5) B
- 6) C
- 7) C
- 8) D
- 9) C
- 10) B
- 11) A
- 12) D
- 13) E
- 14) D
- 15) D
- 16) B
- 17) B
- 18) C
- 19) C
- 20) B
- 21) D
- 22) extensive
- 23) volume, compressed
- 24) 0.1035
- 25) water
- 26) B
- 27) A
- 28) B
- 29) D
- 30) C
- 31) C
- 32) D
- 33) D
- 34) B