

Final Exam - Practice Problems

Use these questions in combination with your *past tests*, *quizzes*, and *practice tests* to prepare for the final exam.

MULTIPLE CHOICE. Choose the one alternative that best answers the question.

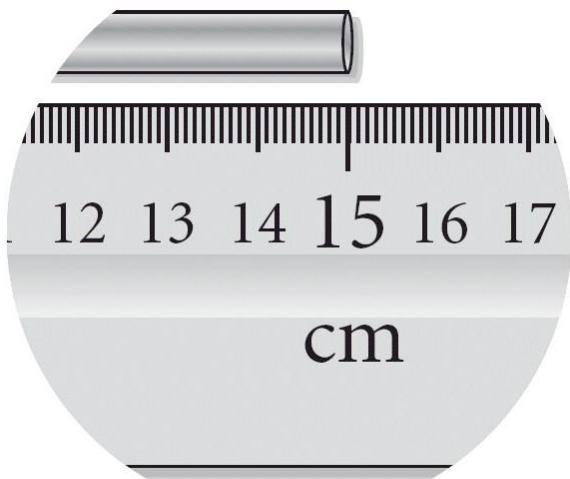
1) Choose the pure substance from the list below. 1) _____

- A) sugar water
- B) pomegranate juice
- C) a casserole
- D) methane
- E) tea

2) A physical change 2) _____

- A) occurs when propane is burned for heat.
- B) occurs when sugar is heated into caramel.
- C) occurs when ice melts.
- D) occurs when glucose is converted into energy within your cells.
- E) occurs when iron rusts.

3) Read the length of the metal bar with the correct number of significant figures. 3) _____



- A) 15 cm
- B) 15.000 cm
- C) 20 cm
- D) 15.00 cm
- E) 15.0 cm

4) If an object has a density of 8.65 g/cm^3 , what is its density in units of kg/m^3 ? 4) _____

- A) $8.65 \times 10^{-1} \text{ kg/m}^3$
- B) $8.65 \times 10^{-3} \text{ kg/m}^3$
- C) $8.65 \times 10^{-7} \text{ kg/m}^3$
- D) $8.65 \times 10^3 \text{ kg/m}^3$
- E) $8.65 \times 10^1 \text{ kg/m}^3$

5) Which one of these numbers contains 3 significant figures? 5) _____

- A) 408
- B) 400
- C) 3.5600
- D) 0.41
- E) 4×10^3

6) What element is defined by the following information? 6) _____
 $p^+ = 17$ $n^\circ = 20$ $e^- = 17$

- A) neon
- B) calcium
- C) oxygen
- D) rubidium
- E) chlorine

7) Which of the following does NOT describe a nonmetal? 7) _____

- A) Found in the upper right hand corner of the periodic table.
- B) Poor conductor of electricity
- C) Tend to gain electrons
- D) Nonmetals are generally unreactive.
- E) Poor conductor of heat.

8) What mass (in kg) does 5.84 moles of titanium (Ti) have? 8) _____

- A) 0.632 kg
- B) 0.122 kg
- C) 0.352 kg
- D) 0.280 kg
- E) 0.820 kg

9) What is the empirical formula for $C_4H_{10}O_2$? 9) _____

- A) CH_2O
- B) CHO
- C) C_2H_5O
- D) C_2H_4O
- E) CHO_2

10) Determine the name for P_4O_{10} . 10) _____

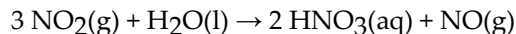
- A) phosphorus (II) oxide
- B) diphosphorus pentoxide
- C) phosphorus (IV) oxide
- D) phosphorus oxide
- E) tetraphosphorus decoxide

11) How many moles of PCl_3 contain 3.68×10^{25} chlorine atoms? 11) _____

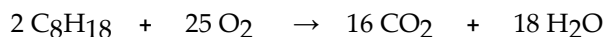
- A) 49.1 moles PCl_3
- B) 20.4 moles PCl_3
- C) 54.5 moles PCl_3
- D) 61.1 moles PCl_3
- E) 16.4 moles PCl_3

- 12) Determine the empirical formula for a compound containing C,H, and O. It contains 52.14% C and 34.73% O by mass. 12) _____
- A) C₂H₆O
 - B) CHO
 - C) C₄H₁₃O₂
 - D) CH₄O₃
 - E) CH₃O

- 13) According to the following balanced reaction, how many moles of NO are formed from 8.44 moles of NO₂ if there is plenty of water present? 13) _____



- A) 8.44 moles NO
 - B) 1.83 moles NO
 - C) 2.81 moles NO
 - D) 25.3 moles NO
 - E) 5.50 moles NO
- 14) Give the theoretical yield, in grams, of CO₂ from the reaction of 4.000 moles of C₈H₁₈ with 4.000 moles of O₂. 14) _____



- A) 176.0 g
 - B) 102.4 g
 - C) 112.7 g
 - D) 704.0 g
- 15) Determine the molarity of a solution formed by dissolving 468 mg of MgI₂ in enough water to yield 50.0 mL of solution. 15) _____
- A) 0.0337 M
 - B) 0.0107 M
 - C) 0.0936 M
 - D) 0.0651 M
 - E) 0.0297 M

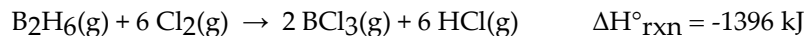
- 16) Which of the following pairs of aqueous solutions will form a precipitate when mixed? 16) _____
- A) Ba(C₂H₃O₂)₂ + Na₂SO₄
 - B) (NH₄)₂SO₄ + LiCl
 - C) LiOH + Na₂S
 - D) KNO₃ + NaOH
 - E) None of the above solution pairs will produce a reaction.

- 17) What volume will a balloon occupy at 1.0 atm, if the balloon has a volume of 7.6 L at 3.8 atm? 17) _____
- A) 35 L
 - B) 2.0 L
 - C) 29 L
 - D) 17 L
 - E) 5.0 L

- 18) A mixture of 10.0 g of Ne and 10.0 g Ar have a total pressure of 1.6 atm. 18) _____
What is the partial pressure of Ne?
A) 1.1 atm
B) 0.54 atm
C) 1.3 atm
D) 0.40 atm
E) 0.80 atm

- 19) Determine the specific heat capacity of an alloy that requires 59.3 kJ to 19) _____
raise the temperature of 150.0 g alloy from 298 K to 398 K.
A) 3.95 J/g°C
B) 4.38 J/g°C
C) 1.87 J/g°C
D) 2.29 J/g°C
E) 2.53 J/g°C

- 20) According to the following reaction, how much energy is evolved 20) _____
during the reaction of 32.5 g B₂H₆ and 72.5 g Cl₂? The molar mass of
B₂H₆ is 27.67 g/mol.



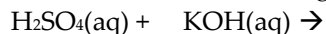
- A) 1640 kJ
B) 3070 kJ
C) 429 kJ
D) 238 kJ
E) 1430 kJ

- 21) Calculate the frequency of the green light emitted by a hydrogen atom 21) _____
with a wavelength of 486.1 nm.

- A) $1.46 \times 10^{14} \text{ s}^{-1}$
B) $6.86 \times 10^{14} \text{ s}^{-1}$
C) $4.33 \times 10^{14} \text{ s}^{-1}$
D) $1.62 \times 10^{14} \text{ s}^{-1}$
E) $6.17 \times 10^{14} \text{ s}^{-1}$

- 22) When a 9.55 g sample of NaOH(s) dissolves in 100.0 g of H₂O(l) in a 22) _____
coffee-cup calorimeter (constant pressure), the temperature rises from
23.6 °C to 47.4°C. Calculate the change in enthalpy for the dissolution
process: NaOH(s) → Na⁺(aq) + OH⁻(aq). Assume that the specific heat
capacity of the solution, C_s, is 4.18 J/g°C. The molar mass of NaOH is
40.00 g/mol.
A) - 10.9 kJ/mol
B) -56.0 kJ/mol
C) +45.6 kJ/mol
D) -45.6 kJ/mol
E) +22.8 kJ/mol

23) Complete and balance the following chemical equation.



24) For $n = 3$, what are the possible sublevels (l)?

- A) 0 B) 0, 1, 2, 3 C) 0, 1, 2 D) 0, 1

24) _____

25) Which element exhibits the greatest electronegativity?

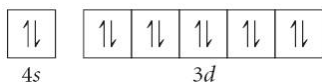
- A) Na
B) Nb
C) N
D) Np
E) Nd

25) _____

26) Choose the valence orbital diagram that represents the ground state of Zn.

26) _____

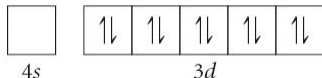
A)



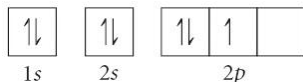
B)



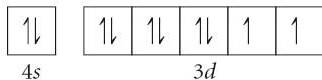
C)



D)



E)



27) Give the ground state electron configuration for Se.

27) _____

- A) $[\text{Ar}] 4s^2 3d^{10} 4p^4$
B) $[\text{Ar}] 4s^2 3d^{10} 4p^6$
C) $[\text{Ar}] 4s^2 3d^{10}$
D) $[\text{Ar}] 4s^2 4d^{10} 4p^4$
E) $[\text{Ar}] 3d^{10} 4p^4$

28) How many valence electrons does an atom of Si possess?

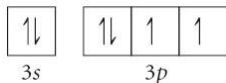
28) _____

- A) 2 B) 8 C) 0 D) 4 E) 6

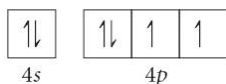
29) Choose the valence orbital diagram that represents the ground state of Se^{2-} .

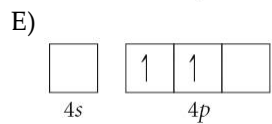
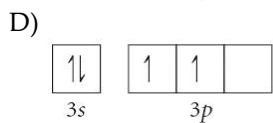
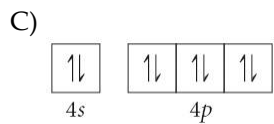
29) _____

A)



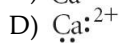
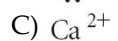
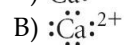
B)





30) Which of the following represents the Lewis structure for Ca^{2+} ?

30) _____



31) Naturally occurring chlorine is 75.78% ^{35}Cl , which has an atomic mass of 34.969 u, and 24.22% ^{37}Cl , which has an atomic mass of 36.966 u. Calculate the average atomic mass (average molar mass) of chlorine.

32) Draw the Lewis structure of H_2S .

33) Draw the Lewis structure of CS_2 .

