

CH 121

General and Inorganic Chemistry Exam 2 June 3, 2002

Name: _____
(please print)

SSN: * * * - * * - _____
(last 4 digits)

Each question is worth 1 point.

Circle your answer clearly, otherwise no credit will be given.

Circle only one answer. If you circle two or more, you will receive no credit.

- A precipitate will form when an aqueous solution of lead(II) nitrate is added to an aqueous solution of
 - NaCl
- A white solid is either NaCl or NaNO₃. If an aqueous solution is prepared, which reagent will allow you to distinguish between the two compounds?
 - AgNO₃
- The solution which results from the reaction NaOH(aq) and HCl(aq) is the same as the result of the reaction of
 - Na₂CO₃(aq) and HCl(aq).
- Which equation below best represents the balanced, net ionic equation for the reaction of a solution of barium nitrate with a solution of potassium carbonate?
 - $\text{Ba}^{2+}(\text{aq}) + \text{CO}_3^{2-}(\text{aq}) \rightarrow \text{BaCO}_3(\text{s})$
- How many milliliters of 0.123 M NaOH solution contain 25.0 g of NaOH (molar mass = 40.00 g/mol)?
 - 5080 mL.
- In the photographic process, silver bromide is dissolved by adding sodium thiosulfate.

$$\text{AgBr}(\text{s}) + 2\text{Na}_2\text{S}_2\text{O}_3(\text{aq}) \rightarrow \text{Na}_3\text{Ag}(\text{S}_2\text{O}_3)_2(\text{aq}) + \text{NaBr}(\text{aq})$$

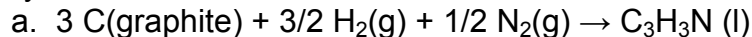
If you want to dissolve 0.250 g of AgBr (molar mass = 187.8 g/mol), how many milliliters of 0.0138 M Na₂S₂O₃ should you add?

 - 193 mL
- Equal masses of two substances, A and B, each absorb 25 joules of energy. If the temperature of A increases by 4 degrees and the temperature of B increases by 8 degrees, one can say that
 - the specific heat of A is double that of B.
- How many grams of lead will absorb the same amount of energy as 15.0 g Ag when each metal is heated from 20.0 °C to 35.0 °C?

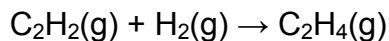
<u>Substance</u>	<u>Specific Heat (J/g•K)</u>
Lead	0.129
Silver	0.237

 - 27.6 g
- How much energy is required to change the temperature of 2.00 g of aluminum from 20.0 °C to 25.0 °C? The specific heat of aluminum is 0.902 J/g•K.
 - 9.0 J
- The standard state of an element or compound is determined at a pressure of _____ and a temperature of _____.
 - 1 atm, 298 K

11. Which equation represents the standard enthalpy of formation for acrylonitrile, C_3H_3N ?



12. Calculate the standard enthalpy change for the reaction



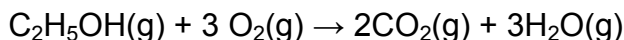
based on the following standard enthalpies of formation:

$$\Delta H^\circ_f[C_2H_2(g)] = +226.7 \text{ kJ/mol}$$

$$\Delta H^\circ_f[C_2H_4(g)] = +52.3 \text{ kJ/mol}$$

c. -174.4 kJ

13. The standard molar enthalpy change is -1277.3 kJ for the combustion of ethanol



Calculate the standard molar enthalpy of formation for ethanol based on the following standard enthalpies of formation:

$$\Delta H^\circ_f [CO_2(g)] = -393.5 \text{ kJ/mol}$$

$$\Delta H^\circ_f [H_2O(g)] = -241.8 \text{ kJ/mol}$$

b. -235.1 kJ/mol

14. Which of the following has the longest wavelength?

b. red light

15. What is the energy of a mole of photons of orange light with a wavelength of 585 nanometers?

e. $2.05 \times 10^5 \text{ J/mol}$

16. What is the energy of a mole of photons of infrared radiation of wavelength $1.72 \times 10^{-3} \text{ cm}$?

a. $6.96 \times 10^3 \text{ J/mol}$

17. For a particular element, a photon of yellow light of wavelength of 585 nm resulted when an electron fell from the third energy level to the second energy level. From this information we can determine

e. the difference in energies between $n = 2$ and $n = 3$.

18. When $l = 4$, what set of orbitals is designated?

e. g

19. Which of the following sets of quantum numbers is not allowed?

c. $n = 2, l = 2, m_l = +1$

20. According to the Bohr atomic theory, when an electron moves from one energy level to another further from the nucleus

a. energy is absorbed