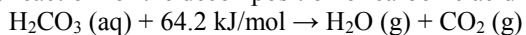


Chemistry Final Exam Practice Multiple Choice

- (1) Which of the following is equivalent to 836 mm Hg?
(a) 1.19 atm (b) 0.909 atm (c) 1.10 atm (d) 1.97 atm
- (2) A sample of nitrogen gas occupies a volume of 720 mL at a pressure of 1.40 atm. What volume will the gas occupy at a pressure of 2.10 atm?
(a) 480 mL (b) 1.08×10^3 mL (c) 245 mL (d) 2.12×10^3 mL
- (3) A sample of oxygen has a volume of 0.59 L at a temperature of 22 °C. What will be the volume of the gas at a temperature of 52 °C?
(a) 1.4 L (b) 0.54 L (c) 0.65 L (d) 0.25 L
- (4) A gas cylinder has a pressure of 3.00 atm at 400 K. At what temperature will the gas reach a pressure of 1.50 atm?
(a) 800 K (b) 200 K (c) 100 K (d) 600 K
- (5) A sample of hydrogen gas has a volume of 60.0 mL at a pressure of 0.500 atm and a temperature of 200 K. At what temperature will the volume be 80.0 mL at a pressure of 0.750 atm?
(a) 150 K (b) 200 K (c) 300 K (d) 400 K
- (6) Which of the following states the conditions of standard temperature and pressure (STP)?
(a) 0 K and 1.00 atm (c) 273 °C and 1.00 atm
(b) 273 K and 0 atm (d) 0 °C and 1.00 atm
- (7) Which of the following is the volume of a sample containing 0.500 mol of butane gas at STP?
(a) 11.2 L (b) 44.8 L (c) 22.4 L (d) 89.6 L
- (8) How many molecules of helium gas are contained in 28 L at STP?
(a) 4.2×10^{24} molecules (c) 3.0×10^{24} molecules
(b) 4.8×10^{23} molecules (d) 7.5×10^{23} molecules
- (9) What is the volume if 0.430 mol of argon gas have a pressure of 1.50×10^4 Pa at 300 K?
(a) 19.1 L (b) 9.63 L (c) 71.5 L (d) 21.5 L
- (10) What is the mass if a 500 mL sample of chlorine gas has a pressure of 2.00 atm at 15 °C?
(a) 6.00 g (b) 1.50 g (c) 3.00 g (d) 0.750 g
- (11) Nitrogen monoxide reacts with oxygen to produce nitrogen dioxide according to the following balanced chemical equation:
 $2\text{NO} + \text{O}_2 \rightarrow 2\text{NO}_2$. What volume of oxygen, at STP, would be required to produce 56.0 L of nitrogen dioxide?
(a) 56.0 L (b) 28.0 L (c) 112 L (d) 224 L

- (12) Which of the following is the volume of a 0.40 M solution containing 0.800 mol of potassium nitrate?
(a) 0.32 L (b) 2.0 L (c) 0.50 L (d) 1.0 L
- (13) Which of the following is the concentration of a solution containing 8.3 g of KI dissolved in 0.20 L?
(a) 0.25 M (b) 0.33 M (c) 0.80 M (d) 1.1 M
- (14) What would be the final concentration if 60 mL of water are added to 40 mL of 18.0 M sulphuric acid solution?
(a) 12 M (b) 27 M (c) 7.2 M (d) 5.4 M
- (15) Which of the following gives the concentration of each ion in a 0.20 M solution of aluminum chloride?
(a) $[Al^{3+}] = 0.20\text{ M}$ and $[Cl^-] = 0.20\text{ M}$ (c) $[Al^{3+}] = 0.20\text{ M}$ and $[Cl^-] = 0.60\text{ M}$
(b) $[Al^{3+}] = 0.60\text{ M}$ and $[Cl^-] = 0.20\text{ M}$ (d) $[Al^{3+}] = 0.050\text{ M}$ and $[Cl^-] = 0.15\text{ M}$
- (16) Which of the following is **INSOLUBLE** in water?
(a) Li_2CO_3 (b) $(NH_4)_3PO_4$ (c) PbI_4 (d) CaF_2
- (17) Which of the following gives the net ionic equation for the reaction of sodium carbonate with calcium nitrate?
(a) $Ca^{2+}(aq) + CO_3^{2-}(aq) \rightarrow CaCO_3(s)$ (c) $Na^+(aq) + NO_3^-(aq) \rightarrow NaNO_3(s)$
(b) $CaCO_3(s) \rightarrow Ca^{2+}(aq) + CO_3^{2-}(aq)$ (d) $NaNO_3(s) \rightarrow Na^+(aq) + NO_3^-(aq)$
- (18) A solution of calcium chloride is reacted with a solution of silver nitrate according to the following balanced chemical equation: $CaCl_2 + 2AgNO_3 \rightarrow Ca(NO_3)_2 + 2AgCl$. If 50 mL of 0.16 M calcium chloride reacts with 40 mL of silver nitrate, what is the concentration of the silver nitrate solution?
(a) 0.0889 M (b) 0.200 M (c) 0.400 M (d) 0.100 M
- (19) Which of the following is the pH of a solution with $[H^+] = 5.4 \times 10^{-3}\text{ M}$?
(a) 11.73 (b) 0.73 (c) 5.40 (d) 2.27
- (20) Which of the following is the pH of a 0.040 M solution of $Ba(OH)_2$?
(a) 1.40 (b) 1.10 (c) 12.60 (d) 12.90
- (21) What is the balanced equation for the reaction of chloric acid with potassium hydroxide?
(a) $HCl + KOH \rightarrow KCl + H_2O$ (c) $HClO_2 + KOH \rightarrow KClO_2 + H_2O$
(b) $HClO_3 + KOH \rightarrow KClO_3 + H_2O$ (d) $HCl_2 + KOH \rightarrow KCl_2 + H_2O$
- (22) Calculate the amount of energy required to melt 0.400 g of sulphur.
(a) 46.0 J (b) 21.4 J (c) 178 J (d) 560 J
- (23) Calculate the amount of energy required to increase the temperature of 5.00 g of iron from 20.0 °C to 60.0 °C.
(a) 135 J (b) 78.0 J (c) 45.0 J (d) 90.0 J

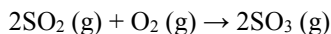
(24) The reaction for the decomposition of carbonic acid is given below.



Which of the following statements describes the enthalpy change for the decomposition of carbonic acid?

- (a) The reaction is exothermic and $\Delta H = -64.2 \text{ kJ/mol}$ (c) The reaction is exothermic and $\Delta H = +64.2 \text{ kJ/mol}$
(b) The reaction is endothermic and $\Delta H = -64.2 \text{ kJ/mol}$ (d) The reaction is endothermic and $\Delta H = +64.2 \text{ kJ/mol}$

(25) Use the heats of formation to calculate the heat of the following reaction:



- (a) -98.9 kJ/mol (b) -692.5 kJ/mol (c) -197.8 kJ/mol (d) 197.8 kJ/mol

(26) What is the nuclide symbol for Palladium-148?

- (a) ${}^{148}_{46}\text{Pd}$ (b) ${}^{46}_{148}\text{Pd}$ (c) ${}^{102}_{46}\text{Pd}$ (d) ${}^{148}_{102}\text{Pd}$

(27) Give the nuclide symbol that would complete the given reaction: ${}^{214}_{83}\text{Bi} \rightarrow {}^0_{-1}\text{e} + \underline{\hspace{1cm}}$

- (a) ${}^{214}_{82}\text{Pb}$ (b) ${}^{214}_{82}\text{Bi}$ (c) ${}^{214}_{84}\text{Po}$ (d) ${}^{213}_{84}\text{Po}$

(28) Give the nuclide symbol that would complete the given reaction: ${}^{235}_{92}\text{U} \rightarrow {}^4_2\text{He} + \underline{\hspace{1cm}}$

- (a) ${}^{231}_{90}\text{Th}$ (b) ${}^{235}_{90}\text{Th}$ (c) ${}^{239}_{94}\text{Pu}$ (d) ${}^{235}_{94}\text{Pu}$

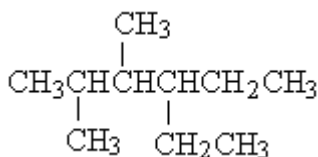
(29) The half-life of Thorium-234 is 24 days. What mass would remain of a 200 g sample after 120 days?

- (a) 12.5 g (b) 5.0 g (c) 6.25 g (d) 3.125 g

(30) The half-life of Silver-102 is 70 minutes. How long would it take for a 64 g sample to decay to 4.0 g?

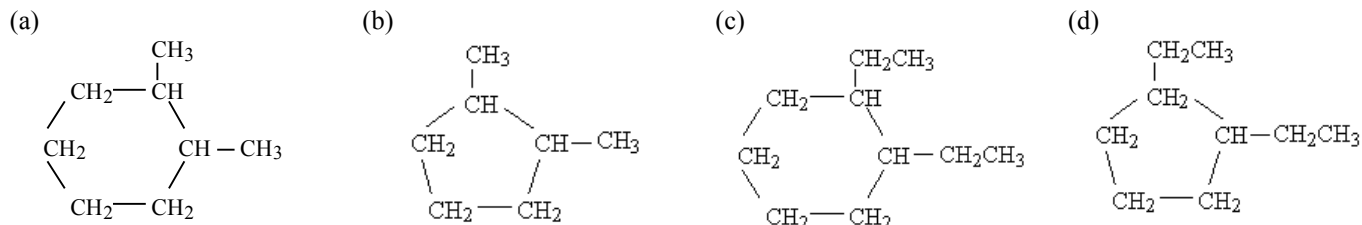
- (a) 70 minutes (b) 350 minutes (c) 210 minutes (d) 280 minutes

(31) Which of the following is the name of the compound shown below?

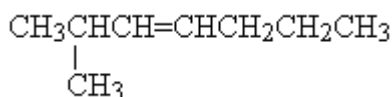


- (a) 3-ethyl-4,5-dimethylhexane
(b) 4-ethyl-2,3-dimethylhexane
(c) 4,5-ethyl-3-methylhexane
(d) 2,3-diethyl-4-methylhexane

(32) Which of the following is the correct structure for the compound 1,2-dimethylcyclopentane?

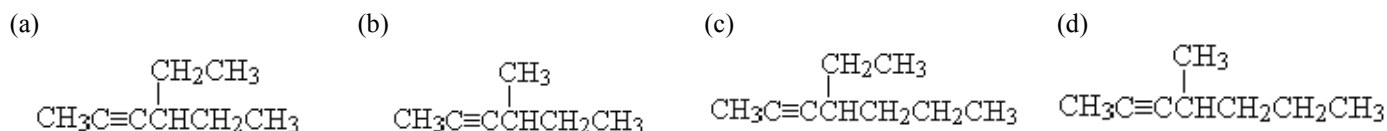


(33) Which of the following is the name of the compound shown below?

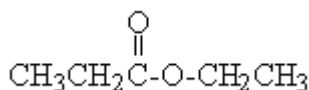


- (a) 2-methyl-3-septene
 (b) 2-methyl-3-septyne
 (c) 2-methyl-3-heptene
 (d) 2-methyl-3-heptyne

(34) Which of the following is the correct structure for the compound 4-methyl-2-hexyne?

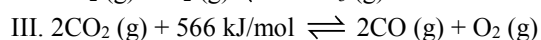
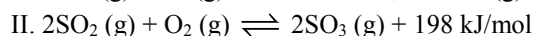
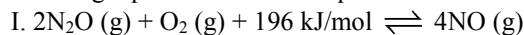


(35) Which of the following is the correct name for the compound shown below?



- (a) ethyl propanoate
 (b) ethyl ethanoate
 (c) propyl ethanoate
 (d) pentanoate

Use the following equilibria to answer questions 36–38.



(36) Which of the equilibria would shift right if temperature was increased?

- (a) I and III (b) I only (c) II and III (d) II only

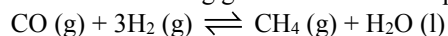
(37) Which of the equilibria would shift left if $[\text{O}_2]$ was increased?

- (a) I only (b) III only (c) I, II and III (d) I and II

(38) Which of the equilibria would shift right if volume is increased?

- (a) III only (b) I only (c) I and III (d) I and II

(39) Which of the following gives the correct K_{eq} expression for the equilibrium given below?



- (a) $K_{eq} = \frac{[\text{CH}_4][\text{H}_2\text{O}]}{[\text{CO}][\text{H}_2]^3}$ (b) $K_{eq} = \frac{[\text{CO}][\text{H}_2]^3}{[\text{CH}_4][\text{H}_2\text{O}]}$ (c) $K_{eq} = \frac{[\text{CH}_4]}{[\text{CO}][\text{H}_2]}$ (d) $K_{eq} = \frac{[\text{CH}_4]}{[\text{CO}][\text{H}_2]^3}$

(40) Consider the following equilibrium: $\text{HCONH}_2(\text{g}) \rightleftharpoons \text{NH}_3(\text{g}) + \text{CO}(\text{g})$. At equilibrium, $[\text{HCONH}_2] = 0.0062 \text{ M}$, $[\text{NH}_3] = 0.20 \text{ M}$, and $[\text{CO}] = 0.15 \text{ M}$. Determine K_{eq} .

- (a) 1.9×10^{-4} (b) 0.030 (c) 4.8 (d) 0.21