2nd Semester Chemistry-575 Final Exam Review

Multiple Choice

Identify the choice that best completes the statement or answers the question.

- 1. How many moles of tungsten atoms are in 4.8×10^{25} atoms of tungsten?
 - a. 8.0×10^2 moles

c. 1.3×10^{-1} moles

b. 8.0×10^1 moles

- d. 1.3×10^{-2} moles
- 2. How many moles of FeO are needed to react completely with 1 mol of Al? $2Al(s) + 3FeO(s) \rightarrow 3Fe(s) + Al_2O_3(s)$
 - a. 1.0 mol

c. 2.0 mol

b. 1.5 mol

- d. 3.0 mol
- 3. Which of the following sets of empirical formula, molar mass, and molecular formula is correct?
 - a. CH, 78 g, C₁₃H₁₃

c. CaO, 56 g, Ca₂O₂

b. CH₄N, 90 g, C₃H₁₂N₃

- d. C₃H₈O, 120 g, C₃H₈O₂
- 4. The combined gas law is written
 - a. P1V1/T1 = P2V2/T2
 - b. P1T1/V1 = P1T2/V2

- c. P1V1T1 = P2V2T2
- d. T1V1/P1 = T2V2/P2
- _ 5. If a balloon containing 3000 L of gas at 39°C and 99 kPa rises to an altitude where the pressure is 45.5 kPa and the temperature is 16°C, the volume of the balloon under these new conditions would be calculated using the following conversion factor ratios:
 - a. 2678 L

c. 6046 L

b. 1489 L

- d. 3361 L
- 6. How is the ideal gas law usually written?
 - a. $\frac{PV}{nT} = R$

c. PV = nRT

b. $\frac{PV}{T} = nR$

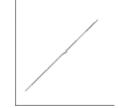
- d. $P = \frac{nRT}{V}$
- 7. A sample of 0.50 moles of neon gas has a pressure of 120 kPa at 20 deg C. What volume does this gas occupy? (R=8.31 kPa-L/mol-K)
 - a. 0.69 L

c. 5.2 L

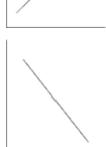
b. 2.3 L

d. 10.1 L

8. Which of the following graphs best represents the relationship between volume (y-axis) and temperature (x-axis)? Assume the pressure is held constant.



a.

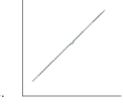


b.



c. d.

9. Which graph correctly represents the relationship of pressure (y-axis) vs. Kelvin temperature (x-axis)?



a.



b.



d.

- 10. What instrument is normally used to measure atmospheric pressure?
 - thermometer a.

c. vacuum

b. barometer

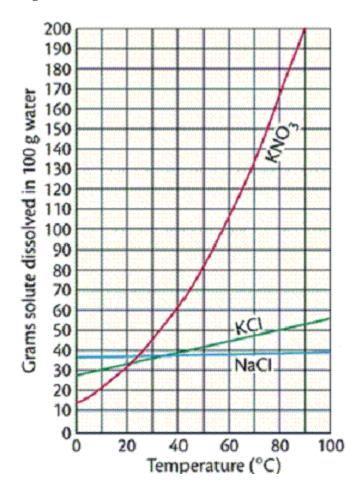
- d. manometer
- 11. Cloudy weather usually occurs under low pressure weather systems. When low pressure moves into an area, you would expect the level of mercury in a barometer to
 - a. rise

stay constant

fall b.

d. rise, fall, then rise again

Figure 4B-2



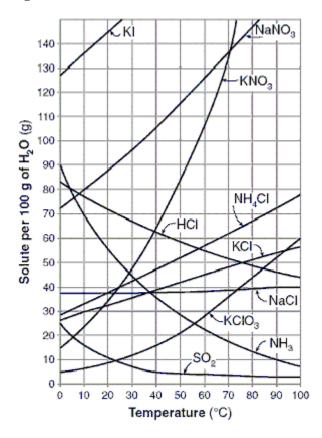
____ 12. (Use Figure 4B-2.) Which substance has the lowest solubility at 0°C?

a. KNO₃

c. NaCl

b. KCl

Figure 4B-3



- ____ 13. (Use Figure 4B-3.) A solution that contains 80 grams COMPLETELY DISSOLVED of NH₄Cl in 100 grams of water at 40°C is
 - a. unsaturated.

c. supersaturated.

- b. saturated.
- 14. Which type of solute will dissolve in the non-polar solvent, hexane?
 - a. nonpolar

c. ionic

b. polar

d. metal

- 15. What is the molarity of a solution that contains 6 moles of solute in 2 liters of solution?
 - a. 6*M*

c. 7M

b. 12*M*

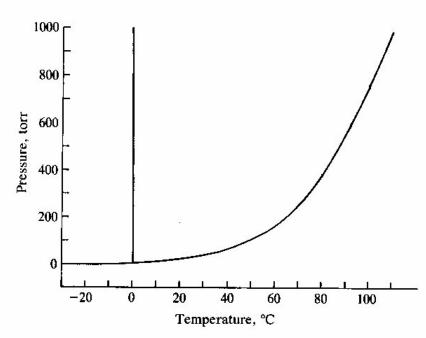
d. 3*M*

- 16. What is the molarity of a solution containing 56 grams of solute in 959 mL of solution? (molar mass of solute = 26 g/mol)
 - a. 1.5 M

c. 2.1 M

b. 2.2 M

d. 0.0022 M

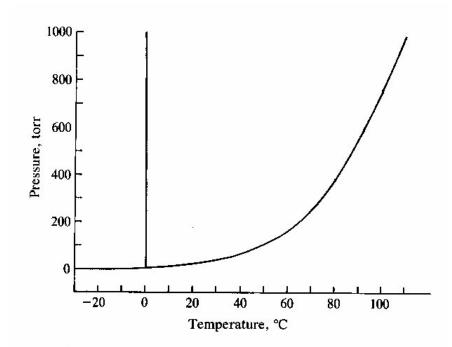


___ 17.

If a sample is at 400 torr of pressure and a temperature of -10 degrees, the sample would be a

- a. solid
- b. liquid

- c. gas
- d. plasma



18.

If a sample is at 200 torr of pressure and a temperature of 40 degrees C is heated to 100 deg C, the sample would

- a. freeze
- b. melt

- c. condense
- d. boil

19. What is the amount of heat required to raise the temperature of 200.0 g of aluminum by 10°C? (specific heat of aluminum = $0.21 \frac{\text{cal}}{\text{g}^{\circ}\text{C}}$)

a. 420 cal

c. 42,000 cal

b. 4200 cal

d. 420,000 cal

__ 20. A 312 gram sample of lead absorbs 1500 joules of energy. What will be the change in temperature? (Specific heat of lead = 0.13 J/g deg C)

a. 0.62 ° C

c. 37 ° C

b. 12 ° C

d. 61,000 ° C

21. Which statement below describes the energy flow in the following phase changes?

Example A: Solid ice changing into liquid water

Example B: Water vapor changing into liquid water

- a. Example A: The solid ice absorbs energy from the surroundings
- b. Example B: The water vapor absorbs energy from the surroundings
- c. Example A: The solid ice releases energy to the surroundings
- d. Energy is not transferred during phase changes

22. Classify the chemical reaction below:

$$2Cl_2(g) + 7O_2(g) + 130 \text{ kcal} \rightarrow 2Cl_2O_7(g)$$

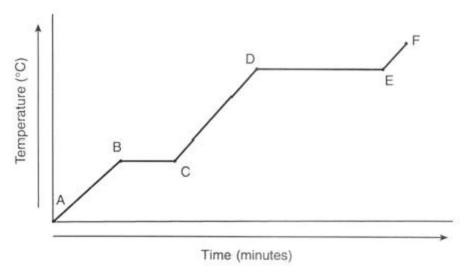
a. endothermic

c. energy neutral

b. exothermic

d. both endo and exothermic

___ 23.



What section of the graph shows the sample boiling?

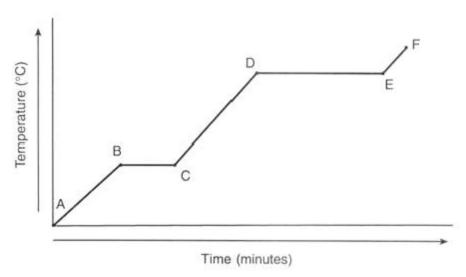
a. a-b

c. c-d

b. b-c

d. d-e

24.

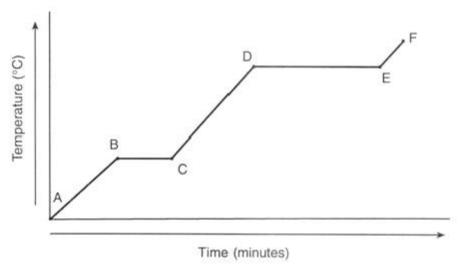


What section of the graph can both liquid and solid exisst at the same time?

- a-b a.
- b. b-c

- c-d d-e c. d.

25.

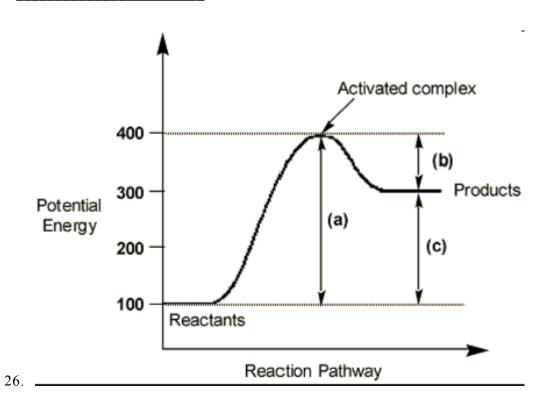


In what section of the graph is the potential energy of the sample increasing?

a. a-b c-d

b-c b.

d. e-f



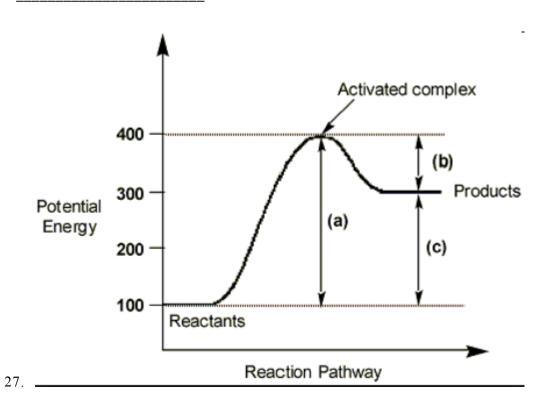
Would this reaction be classified as endothermic or exothermic?

a. endothermic

c. neither endothermic or exothermic

b. exothermic

d. neutral



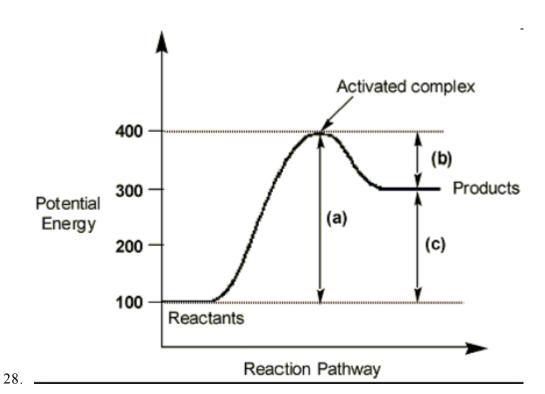
What is the change in potential energy (Heat of rection VH) for the forward reaction?

a. +100

c. -100

b. +200

d. -200



What is the activation energy of the forward reaction?

a. +100

c. -100

b. +300

d. -300

29. Strong bases are associated with ______ ions, while strong acids are associated with _____ ions.

a. H+, OH-

c. H₃O⁺, H⁺

b. OH-, H+

d. H⁺, Cl⁻

30. Which of the following is the correct relationship between pOH and OH- concentration?

a. As pOH increases, OH⁻ increases
b. As pOH increases, OH⁻ decreases
c. OH⁻ never changes
d. there is no relationship