Equlibrium Questions 2016

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

____ 1.
When 30.0 mL of 0.10 M $AgNO_3$ is added to 30.0 mL of 0.10 M NaCl, aqueous $NaNO_3$ and solid AgCl are formed. How many moles of solid AgCl is produced?

a.	0.003	c.	0.006
b.	0.03	d.	0.06

____ 2. This sample contains the least number of particles.

a.	1.0 L of Ar at STP	c.	1.0 L of Ar at 25C and 760 mmHg
b.	1.0 L of H_2 at STP	d.	1.0L of H_2 at 0C and 900 mmHg

A 60.0 g sample of $CaCO_3$ is heated to 950 K in a 1.00 L evacuated container, where it reacts according to the following equation:

$$CaCO3(s) \Leftrightarrow CaO(s) + CO_2(g) + Energy \quad \text{(reaction is exothermic)}$$

The pressure in the vessel begins to increase as the reaction proceeds but settles at .05 ATM.

____ 3. Which of the following would be the Kp expression for the reaction listed?

a.
$$Kc = [CO_2]$$

c.
$$Kp = \frac{p(CO_2)}{p(CaCO_3)\, p(CaO)}$$

b.
$$Kc = \frac{[CO_2][CaO]}{[CaCO_3]}$$

d.
$$Kp = p(CO_2)$$

____ 4. What is the value of Kp at the established equilibrium described?

a.	.05	c.	.01
b.	.005	d.	.001

____ 5. The volume of the container is reduced in half, *at that moment*, what is the reaction quotient?

a.	.05	c.	0.1
b.	.025	d.	0.01

____ 6. The volume of the container is reduced in half *and allowed to return to equilibrium.* The new equilibrium constant will be

a.	larger	c.	same as original prior to compression
b.	smaller	d.	more information would be needed.

____ 7. The volume of the container is reduced in half and allowed to return to equilibrium. What will be the new pressure in the container?

a. pressure will be .05
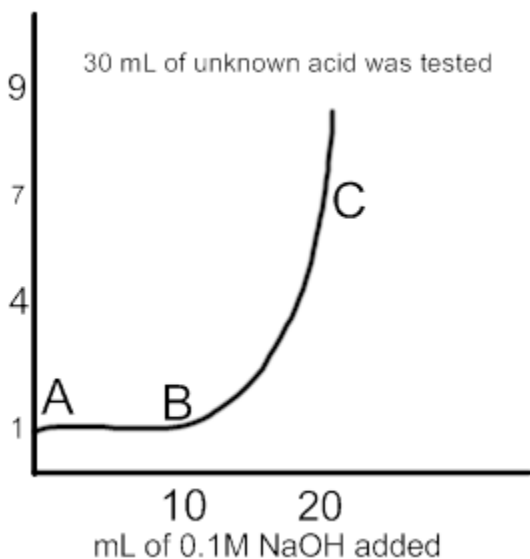b. Pressure will be 0.1
c. Slightly less then 0.08

    d.   Slightly more then 0.12

____   8.

After equilibrium is attained, the pressure of $CO_2(g)$ is .05atm. When the experiment is repeated using 120.0 g $CaCO_3$, what is the equilibrium pressure P?

    a.   .025 mm Hg $< P < .05$ c. $P = .05$
    b. $.05 < P < 0.1$ d. $P = 0.1$

____   9. I would like to reduce the pressure in the container. Which of the following would help accomplish this
    a.   Lower the temperature   c.   K is constant so it can not change
    b.   raise the temperature   d.   take out some of the reactant.

IBr(g) is in equilibrium with $I_2(g)$ and $Br_2(g)$ at 150 °C:
$$2 \text{ IBr}(g) \rightleftharpoons I_2(g) + Br_2(g) \quad K = 8.50 \text{ E–3}$$

____   10. This reaction is considered
    a.   reactant favored   c.   Goes to completion
    b.   product favored   d.   The extent of the reaction is high

____   11. Initially, a closed vessel at 150 °C has a partial pressure of IBr of 0.350 ATM and partial pressures of I_2 and Br_2 are each 0.350 ATM. What is the current reaction quotient.
    a.   1.0E-2   c.   100
    b.   1   d. $.350^2$

____   12. As this reaction approaches equilibrium how will the reaction behave?
    a.   shift to products   c.   this reaction is at equilibrium
    b.   shift to reactants   d.   reaction has already finished.

30 mL of unknown acid was tested

9

7   C

4

A   B

1

10   20
mL of 0.1M NaOH added

____   13. The concentration of the unknown acid is
    a.   0.6   c.   .12
    b.   0.066   d.   1.2

____ 14. The Ka value for the unknown acid is
    a. infinitely small   c. big
    b. infinitely large   d. small

____ 15. The unknown is a
    a. strong acid   c. strong base
    b. weak acid   d. weak base

____ 16. The graph is showing a starting pH of approximately 1... The actual pH data point when starting is
    a. exactly 1   c. slightly more then 1
    b. slightly less then 1   d. not determinable with information
                                                   provided.
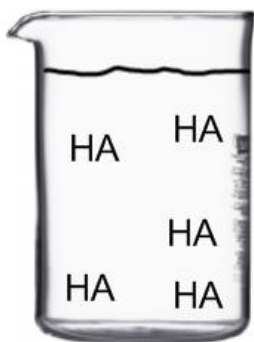
____ 17.

At which point does this beaker represent?
    a. A   c. C
    b. B   d. This is not the acid represented.
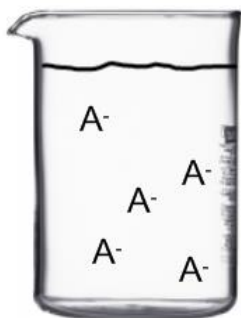
____ 18.

At which point does this beaker represent?
    a. A   c. C
    b. B   d. This picture does not exist

____ 19. At which point would this acid be considered a buffer?
    a. A the most acid is available to buffer
    b. B, strong acids and bases are available.
    c. C, most effective at equivalence
    d. none, the weak acid and conjugate weak base never exist.

_____ 20. A container has a liquid poured into it and sealed. The pressure is monitored over a period of time. Which of
the following graphs shows the correct representation of the vapor pressure in the enclosed container over
time.

a. A

b. B

c. C

d. D
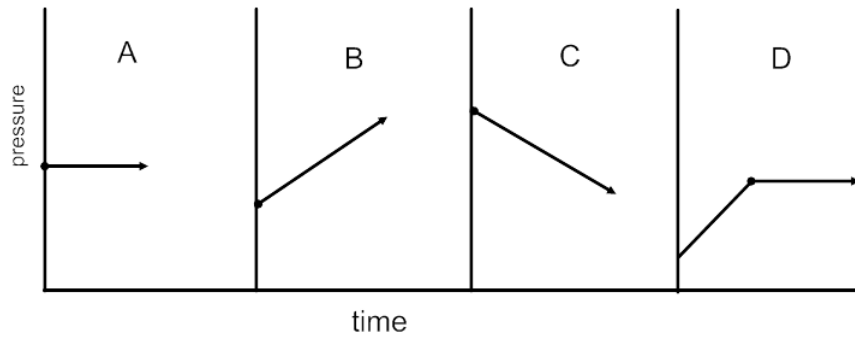
Equlibrium Questions 2016
Answer Section

MULTIPLE CHOICE

    1. ANS: A   PTS: 1
    2. ANS: D   PTS: 1
    3. ANS: D   PTS: 1
    4. ANS: A   PTS: 1
    5. ANS: C   PTS: 1
    6. ANS: C   PTS: 1
    7. ANS: A   PTS: 1
    8. ANS: C   PTS: 1
    9. ANS: B   PTS: 1
  10. ANS: A   PTS: 1
  11. ANS: B   PTS: 1
  12. ANS: B   PTS: 1
  13. ANS: B   PTS: 1
  14. ANS: B   PTS: 1
  15. ANS: A   PTS: 1
  16. ANS: C   PTS: 1
  17. ANS: D   PTS: 1
  18. ANS: C   PTS: 1
  19. ANS: D   PTS: 1
  20. ANS: D   PTS: 1