ALBERTA CHEMISTRY 20 · FINAL EXAM · 50 QUESTIONS

Final Exam — Practice Test

This practice test was made by AI and there may be mistakes. If a question or answer looks wrong, use the Flag a mistake button to let Brett know so he can fix it.

1 **Calcium forms a Ca^{2+} ion and chlorine forms a Cl^{-} ion. The formula of calcium chloride is**

- A $CaCl_2$
- B Ca_2Cl
- C $CaCl$
- D $CaCl_3$

Understand It with Pulse | Flag a mistake

2 **A gas pressure of 303.9 kPa is equivalent to Use 1.00 atm = 101.325 kPa.**

A 0.333 atm

B 3.00 atm

C 30.0 atm

D 0.0300 atm

Understand It with Pulse | Flag a mistake

3 **Which statement about an aqueous solution is correct?**

A Water is always the solute in an aqueous solution

B An aqueous solution must contain an ionic solute

C Water is the solvent in an aqueous solution

D An aqueous solution is always a strong electrolyte

Understand It with Pulse | Flag a mistake

4 **The mass of 0.250 mol of sodium chloride, NaCl (molar mass 58.44 g/mol), is**

A 14.6 g

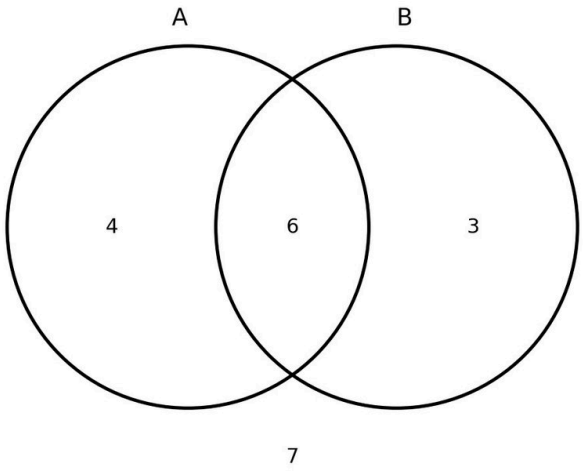
B 7.31 g

C 29.2 g

D 234 g

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5 **In the Venn diagram below, set A is substances that conduct electricity when molten and set B is substances with a high melting point. A substance is ionic if it is in both sets. How many of the substances in the diagram are ionic?**



Question 5

In the Venn diagram below, set A is substances that conduct electricity when molten and set B is substances with a high melting point. A substance is ionic if it is in both sets. How many of the substances in the diagram are ionic?

A) 3

B) 4

C) 6

D) 7

A 3

B 4

C 6

D 7

Understand It with Pulse

Flag a mistake

6 **A gas sample is cooled to a temperature of -23°C. Its temperature, in kelvin, is _____**

ANSWER _____

Understand It with Pulse | Flag a mistake

7 **A 100 mL sample of 2.0 mol/L hydrochloric acid is diluted with water to a final volume of 500 mL. The concentration of the diluted acid is**

A 0.10 mol/L

B 1.0 mol/L

C 0.40 mol/L

D 10 mol/L

Understand It with Pulse | Flag a mistake

8 **Use the atomic masses N = 14.01, H = 1.01, O = 16.00 g/mol. The percent by mass of nitrogen in NH_4NO_3 is**

- A 17.5%
- B 35.0%
- C 52.5%
- D 70.0%

Understand It with Pulse | Flag a mistake

9 **The total number of atoms in one formula unit of ammonium nitrate, NH_4NO_3, is ____.**

ANSWER _____

Understand It with Pulse | Flag a mistake

10 **An automobile tire has a gas pressure of 210 kPa at 20°C. After driving, the temperature of the air in the tire rises to 50°C while the volume stays constant. The new pressure in the tire is**

- **A** 232 kPa
- **B** 191 kPa
- **C** 525 kPa
- **D** 210 kPa

Understand It with Pulse | Flag a mistake

11 **A solution that contains undissolved solute, and in which the rate of dissolving equals the rate of crystallizing, is best described as**

- **A** unsaturated
- **B** dilute
- **C** concentrated
- **D** saturated

Understand It with Pulse | Flag a mistake

12 **$2\ H_2(g) + O_2(g) \rightarrow 2\ H_2O(l)$**
The number of moles of $O_2(g)$ required to react completely with 6.0 mol of $H_2(g)$ is

A 1.5 mol

B 3.0 mol

C 6.0 mol

D 12 mol

Understand It with Pulse | Flag a mistake

13 **Aluminum forms an Al^{3+} ion, and the sulfate ion is SO_4^{2-}. In the formula of aluminum sulfate, the total number of oxygen atoms is ____.**

ANSWER _____

Understand It with Pulse | Flag a mistake

14 **A sample of gas occupies 3.0 L at a pressure of 150 kPa and a temperature of 27°C. Use R = 8.314 L· kPa/(mol· K). The amount of gas, to the nearest thousandth of a mole, is ____**

ANSWER _____

Understand It with Pulse | Flag a mistake

15 **A student must prepare 500.0 mL of 0.250 mol/L NaOH(aq) from solid sodium hydroxide, molar mass 40.00 g/mol. The mass of NaOH(s) required, to the nearest hundredth of a gram, is ____ g.**

ANSWER _____

Understand It with Pulse | Flag a mistake

16 **$2\ Al(s) + 3\ Cl_2(g) \rightarrow 2\ AlCl_3(s)$**
If 4.00 mol of Al(s) and 4.00 mol of $Cl_2(g)$ are mixed and allowed to react as completely as possible, then

A. $Cl_2(g)$ is the limiting reactant and 2.67 mol of $AlCl_3(s)$ forms

B. Al(s) is the limiting reactant and 4.00 mol of $AlCl_3(s)$ forms

C. $Cl_2(g)$ is the limiting reactant and 4.00 mol of $AlCl_3(s)$ forms

D. Al(s) is the limiting reactant and 2.67 mol of $AlCl_3(s)$ forms

Understand It with Pulse | Flag a mistake

17 **The total number of valence electrons in a molecule of carbon dioxide, CO_2, is ____.**

ANSWER _____

Understand It with Pulse | Flag a mistake

18 **A sample of gas occupies 600 mL at 20°C. The gas is heated at constant pressure to 80°C. The new volume of the gas, to the nearest millilitre, is ____**

ANSWER _____

Understand It with Pulse | Flag a mistake

19 **A student dissolves 5.85 g of NaCl(s), molar mass 58.44 g/mol, in enough water to make 500 mL of solution. The concentration of the solution, to the nearest hundredth, is ____ mol/L.**

ANSWER _____

Understand It with Pulse | Flag a mistake

20 **A 0.500 mol sample of an unknown gas has a mass of 32.0 g. The molar mass of the gas, in g/mol, to the nearest whole number, is ____**

ANSWER _____

Understand It with Pulse | Flag a mistake

21 **A sulfur atom has 6 valence electrons. The number of electrons a sulfur atom gains when it forms its most common ion is ____.**

ANSWER _____

Understand It with Pulse | Flag a mistake

22 **A gas is collected over water at 25°C. The total pressure of the collected gas is 101.3 kPa, and the vapour pressure of water at 25°C is 3.17 kPa. The pressure of the dry gas is**

A 3.17 kPa

B 98.1 kPa

C 101.3 kPa

D 104.5 kPa

Understand It with Pulse | Flag a mistake

23 **Hydrochloric acid and ethanoic acid solutions are both 0.10 mol/L. The HCl(aq) conducts electricity much better than the ethanoic acid mainly because**

A ethanoic acid does not dissolve in water

B HCl ionizes completely, producing a higher concentration of ions

C ethanoic acid has a larger molar mass than HCl

D HCl contains more hydrogen atoms per molecule than ethanoic acid

Understand It with Pulse | Flag a mistake

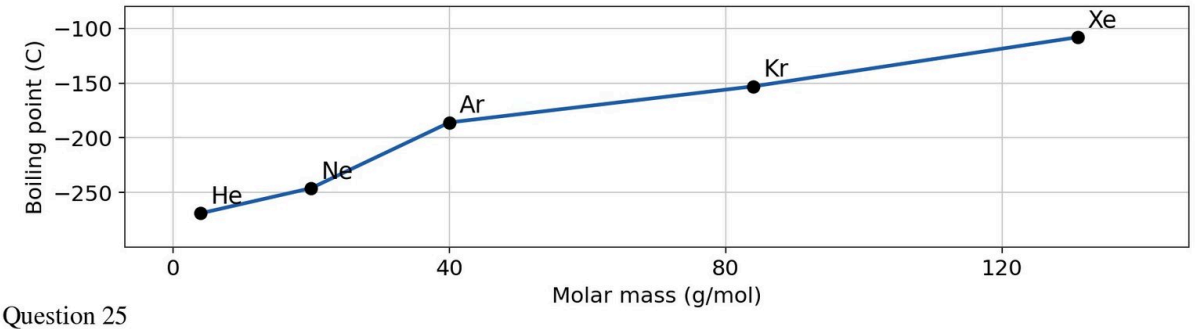
24 **A compound has an empirical formula of CH_2O (empirical formula mass 30.03 g/mol) and a molar mass of 180.16 g/mol. Its molecular formula is**

- **A** $C_2H_4O_2$
- **B** $C_3H_6O_3$
- **C** $C_6H_{12}O_6$
- **D** $C_{12}H_{24}O_{12}$

Understand It with Pulse | Flag a mistake

25

The graph below plots the boiling point of each noble gas against its molar mass. Which noble gas has the strongest London dispersion forces?



Question 25

The graph below plots the boiling point of each noble gas against its molar mass. Which noble gas has the strongest London dispersion forces?

A) *He*

B) *Ar*

C) *Kr*

D) *Xe*

A He

B Ar

C Kr

D Xe

Understand It with Pulse

Flag a mistake

26 When the value R = 8.314 L· kPa/(mol· K) is used in the ideal gas law, the temperature must be in ____ and the pressure in ____.

- A Degrees Celsius and kilopascals
- B Kelvin and kilopascals
- C Kelvin and atmospheres
- D Degrees Celsius and atmospheres

Understand It with Pulse | Flag a mistake

27 A 250.0 mL sample of 0.100 mol/L solution is to be prepared by diluting a 1.50 mol/L stock solution. The volume of stock solution required, to the nearest tenth of a millilitre, is ____ mL.

ANSWER _____

Understand It with Pulse | Flag a mistake

28 $Zn(s) + 2\ HCl(aq) \rightarrow ZnCl_2(aq) + H_2(g)$

A student reacts 13.0 g of Zn(s) (65.38 g/mol) with excess HCl(aq) and collects 0.175 mol of $H_2(g)$. The percent yield, to the nearest whole percent, is ____ %

ANSWER _____

Understand It with Pulse | Flag a mistake

29 **In the compound SnF_2, each tin ion has a charge of 2+. The correct name of this compound is**

A tin difluoride

B tin fluoride

C tin(I) fluoride

D tin(II) fluoride

Understand It with Pulse | Flag a mistake

30 **A sealed spray can is left in a hot vehicle, and its internal pressure increases. According to the kinetic molecular theory, this happens because the gas particles**

A Collide with the walls more often and with greater force

B Expand so that each particle takes up more space

C Are attracted to each other more strongly

D Increase in number as the temperature rises

Understand It with Pulse | Flag a mistake

31 **A student dissolves 1.5 mol of solute in enough water to make 500 mL of solution. The concentration of the resulting solution is**

- A 0.33 mol/L
- B 0.75 mol/L
- C 3.0 mol/L
- D 1.5 mol/L

Understand It with Pulse | Flag a mistake

32 **Use the atomic masses Mg = 24.31, N = 14.01, O = 16.00 g/mol. The molar mass of $Mg(NO_3)_2$ is**

- A 148.33 g/mol
- B 86.32 g/mol
- C 124.33 g/mol
- D 196.35 g/mol

Understand It with Pulse | Flag a mistake

33 **The correct name of N_2O_4 is**

- A nitrogen tetroxide
- B dinitrogen tetroxide
- C dinitrogen oxide
- D nitrogen(IV) oxide

Understand It with Pulse | Flag a mistake

34 **A gas pressure of 1520 mmHg is equivalent to Use 760 mmHg = 1.00 atm.**

- A 0.500 atm
- B 1.00 atm
- C 2.00 atm
- D 4.00 atm

Understand It with Pulse | Flag a mistake

35 **The titration curve below shows the pH as sodium hydroxide solution is added to an acid. At what volume of base added is the equivalence point reached?**

A 20 mL

B 30 mL

C 40 mL

D 50 mL

Understand It with Pulse | Flag a mistake

36 **Use the atomic masses H = 1.01, S = 32.07, O = 16.00 g/mol. The percent by mass of oxygen in H_2SO_4 is**

A 32.7%

B 49.0%

C 81.6%

D 65.2%

Understand It with Pulse | Flag a mistake

37 **A potassium atom forms its most common ion by**

- A losing 1 electron
- B gaining 1 electron
- C losing 2 electrons
- D gaining 7 electrons

Understand It with Pulse | Flag a mistake

38 **A syringe contains 1.5 L of gas at 27°C. At constant pressure, the gas is heated to 327°C. The new volume of the gas is**

- A 18 L
- B 0.75 L
- C 1.7 L
- D 3.0 L

Understand It with Pulse | Flag a mistake

39 **Which of the following 0.10 mol/L solutions conducts electricity only slightly?**

- A HCl(aq)
- B NaOH(aq)
- C $KNO_3(aq)$
- D $CH_3COOH(aq)$

Understand It with Pulse | Flag a mistake

40 **$C_3H_8(g) + 5\ O_2(g) \rightarrow 3\ CO_2(g) + 4\ H_2O(g)$**
The number of moles of $CO_2(g)$ produced when 2.50 mol of $C_3H_8(g)$ burns completely is

- A 2.50 mol
- B 5.00 mol
- C 10.0 mol
- D 7.50 mol

Understand It with Pulse | Flag a mistake

41 **The shape of an ammonia molecule, NH_3, is**

- A trigonal pyramidal
- B tetrahedral
- C bent
- D trigonal planar

Understand It with Pulse | Flag a mistake

42 **Oxygen makes up 21% of the air in a room, and the total air pressure is 101.3 kPa. The partial pressure of oxygen in the room is**

- A 80.0 kPa
- B 21.3 kPa
- C 101.3 kPa
- D 482 kPa

Understand It with Pulse | Flag a mistake

43 **A solution has a hydronium ion concentration of 2.5×10^{-3} mol/L. The pH of the solution, to the nearest hundredth, is _____**

ANSWER

Understand It with Pulse | Flag a mistake

44 **$Mg(s) + 2\ HCl(aq) \rightarrow MgCl_2(aq) + H_2(g)$**
A student reacts 4.86 g of Mg(s) (24.31 g/mol) with excess HCl(aq) and collects 0.180 mol of $H_2(g)$. The percent yield of the reaction is

A 45.0%

B 90.0%

C 80.0%

D 111%

Understand It with Pulse | Flag a mistake

45 **The correct name of the hydrate $CuSO_4 \cdot 5H_2O$ is**

- **A** copper(II) sulfate pentahydrate
- **B** copper(I) sulfate pentahydrate
- **C** copper sulfate pentahydrate
- **D** copper(II) sulfite pentahydrate

Understand It with Pulse | Flag a mistake

46 **At SATP (25°C and 100 kPa), the molar volume of any gas is 24.8 L/mol. The volume occupied by 2.50 mol of a gas at SATP is**

- **A** 56.0 L
- **B** 9.92 L
- **C** 62.0 L
- **D** 24.8 L

Understand It with Pulse | Flag a mistake

47 **The two major gases released by the combustion of fossil fuels that are responsible for acid deposition are**

- **A** carbon dioxide and oxygen
- **B** methane and carbon monoxide
- **C** ozone and hydrogen
- **D** sulfur dioxide and nitrogen oxides

Understand It with Pulse | Flag a mistake

48 **$2\ NaN_3(s) \rightarrow 2\ Na(s) + 3\ N_2(g)$**
An airbag uses the decomposition of $NaN_3(s)$ (65.0 g/mol). The volume of $N_2(g)$ produced at STP when 65.0 g of $NaN_3(s)$ decomposes completely is

- **A** 22.4 L
- **B** 11.2 L
- **C** 33.6 L
- **D** 44.8 L

Understand It with Pulse | Flag a mistake

49 **Which of the following molecules is polar?**

A $CHCl_3$

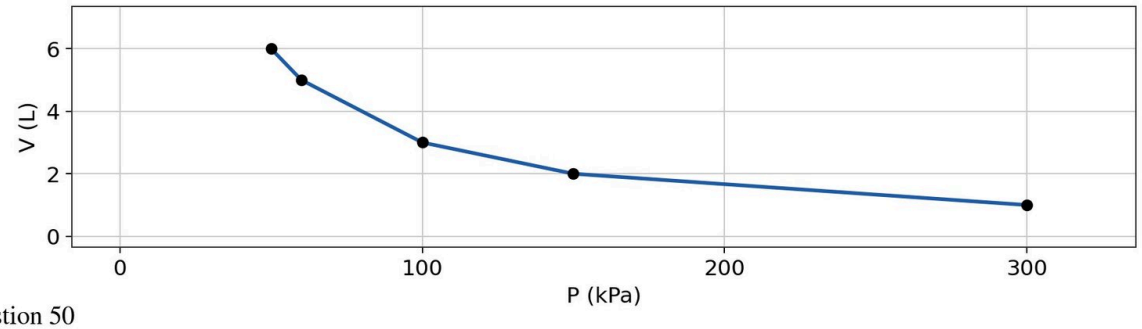
B CCl_4

C BF_3

D CH_4

Understand It with Pulse | Flag a mistake

50 **The volume-pressure graph below is for a fixed amount of gas at constant temperature. What is the volume of the gas when its pressure is 100 kPa?**



Question 50

The volume–pressure graph below is for a fixed amount of gas

at constant temperature. What is the volume of the gas when its pressure is 100 kPa?

A) 1.0 L

B) 2.0 L

C) 3.0 L

D) 6.0 L

A 1.0 L

B 2.0 L

C 3.0 L

D 6.0 L

Understand It with Pulse

Flag a mistake

ANSWER KEY

1. A
2. B
3. C
4. A
5. C
6. 250
7. C
8. B
9. 9
10. A
11. D
12. B
13. 12
14. 0.180
15. 5.00
16. A
17. 16
18. 723
19. 0.20
20. 64
21. 2
22. B
23. B
24. C
25. D
26. B
27. 16.7
28. 88
29. D
30. A
31. C
32. A
33. B
34. C
35. B
36. D
37. A
38. D
39. D
40. D
41. A
42. B
43. 2.60
44. B
45. A
46. C
47. D
48. C
49. A
50. C

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