MASSACHUSETTS CHEMISTRY · 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 **An atom has 11 protons and 12 neutrons. The element is**

- A sodium
- B magnesium
- C neon
- D aluminum

Understand It with Pulse | Flag a mistake

2 **Magnesium forms Mg^{2+} and chlorine forms Cl^{-}. The formula of the ionic compound formed is**

- A $MgCl$
- B $MgCl_2$
- C Mg_2Cl
- D $MgCl_3$

Understand It with Pulse | Flag a mistake

3 **Using whole number atomic masses (H = 1, O = 16), the molar mass of water, in grams per mole, is _____**

ANSWER _____

Understand It with Pulse | Flag a mistake

4 **A gas at 100 kPa occupies 6 L. At the same temperature, at 200 kPa, its volume, in liters, is _____**

ANSWER _____

Understand It with Pulse | Flag a mistake

5 **A neutral atom has 8 protons. The number of electrons it has is**

A 6

B 8

C 10

D 16

Understand It with Pulse | Flag a mistake

6 **Carbon dioxide has a central carbon atom bonded to two oxygen atoms and no lone pairs. The shape of the molecule is**

A bent

B trigonal planar

C tetrahedral

D linear

Understand It with Pulse | Flag a mistake

7 **Molarity is defined as moles of solute per**

A gram of solution

B liter of solvent

C liter of solution

D mole of solvent

Understand It with Pulse | Flag a mistake

8 **A gas at 100 kPa and 300 K is heated to 600 K at constant volume. Its new pressure, in kilopascals, is ____**

ANSWER _____

Understand It with Pulse | Flag a mistake

9 **The element in group 2 and period 4 is**

A potassium

B calcium

C strontium

D argon

Understand It with Pulse | Flag a mistake

10 **Which of these molecules can form hydrogen bonds with other molecules of the same kind**

A CH_4

B CO_2

C NH_3

D O_2

Understand It with Pulse | Flag a mistake

11 **In a chemical reaction, the reactant that runs out first is the**

A excess reactant

B catalyst

C product

D limiting reactant

Understand It with Pulse | Flag a mistake

12 **At standard temperature and pressure, the volume, in liters, of 2 mol of gas is ____**

ANSWER _____

Understand It with Pulse | Flag a mistake

13 **Going across a period from left to right, ionization energy generally**

A increases

B decreases

C stays the same

D falls to zero

Understand It with Pulse | Flag a mistake

14 **The reaction $CaCO_3 \rightarrow CaO + CO_2$ is a**

- A synthesis reaction
- B combustion reaction
- C single replacement reaction
- D decomposition reaction

Understand It with Pulse | Flag a mistake

15 **Which solution is more concentrated**

- A more solute in the same volume of solution
- B less solute in the same volume of solution
- C more solvent with the same solute
- D the same solute in more water

Understand It with Pulse | Flag a mistake

16 **Using c = 4.2 J per gram per degree Celsius, the heat, in joules, absorbed by 100 g of water warmed by 10 degrees Celsius is ____**

ANSWER _____

Understand It with Pulse | Flag a mistake

17 **In the Bohr model of the atom, electrons are described as**

A orbiting inside the nucleus

B occupying energy levels around the nucleus

C mixed with protons in shells

D fixed in the nucleus

Understand It with Pulse | Flag a mistake

18 **In the balanced equation $4Al + 3O_2 \rightarrow 2Al_2O_3$, the coefficient of aluminum is ____**

ANSWER _____

Understand It with Pulse | Flag a mistake

19 **The percent by mass of oxygen in carbon dioxide, to one decimal place, is _____**

ANSWER _____

Understand It with Pulse | Flag a mistake

20 **At equilibrium, the forward and reverse reaction rates are**

A both zero

B forward only

C equal, while concentrations stay constant

D reverse only

Understand It with Pulse | Flag a mistake

21 **Which of these is a heterogeneous mixture**

A salt dissolved in water

B sand and water

C air

D sugar dissolved in water

Understand It with Pulse | Flag a mistake

22 **Metallic bonding is best described as**

A shared pairs between two atoms

B electrons transferred to a nonmetal

C hydrogen bonds between molecules

D a sea of delocalized electrons around metal ions

Understand It with Pulse | Flag a mistake

23 **A compound contains 12 g of carbon (1 mol) and 2 g of hydrogen (2 mol). The number of hydrogen atoms per carbon atom in its empirical formula is ____**

ANSWER _____

Understand It with Pulse | Flag a mistake

24 **Entropy increases when a solid**

A freezes

B condenses

C crystallizes

D melts

Understand It with Pulse | Flag a mistake

25 **Going down a group, electronegativity generally**

A increases

B stays the same

C becomes zero

D decreases

Understand It with Pulse | Flag a mistake

26 **In a water molecule, the oxygen atom has this many lone pairs of electrons**

A 0

B 2

C 1

D 4

Understand It with Pulse | Flag a mistake

27 **In the reaction $2Mg + O_2 \rightarrow 2MgO$,**
the mass, in grams, of magnesium oxide formed from 2 mol of magnesium is ____

ANSWER _____

Understand It with Pulse | Flag a mistake

28 **A gas occupies 6 L at 546 K. At constant pressure, at 273 K, its volume, in liters, is ____**

ANSWER _____

Understand It with Pulse | Flag a mistake

29 **Which particles are found in the nucleus of an atom**

A protons and neutrons

B electrons and protons

C electrons only

D neutrons only

Understand It with Pulse | Flag a mistake

30 **The strongest intermolecular force among these substances is found in**

A CH_4

B HCl

C HF

D CO_2

Understand It with Pulse | Flag a mistake

31 **Using atomic masses (Na = 23, Cl = 35.5), the molar mass of sodium chloride, in grams per mole, is ____**

ANSWER _____

Understand It with Pulse | Flag a mistake

32 **Gas pressure is caused by gas particles**

- A colliding with the walls of the container
- B bonding to the container
- C freezing in place
- D dissolving in the container

Understand It with Pulse | Flag a mistake

33 **Sulfur has atomic number 16. The number of electrons in S^{2-} is ____**

ANSWER _____

Understand It with Pulse | Flag a mistake

34 **The total number of atoms in one formula unit of $Ca(OH)_2$ is ____**

ANSWER _____

Understand It with Pulse | Flag a mistake

35 **The concentration of a solution increases when**

A more solvent is added

B solute is removed

C solvent evaporates

D the solution is cooled

Understand It with Pulse | Flag a mistake

36 **A gas occupies 4 L at 273 K. At constant pressure, at 546 K, its volume, in liters, is ____**

ANSWER _____

Understand It with Pulse | Flag a mistake

37 **Iron-56 has atomic number 26. The number of neutrons in iron-56 is ____**

ANSWER _____

Understand It with Pulse | Flag a mistake

38 **In the balanced equation $H_2 + Cl_2 \rightarrow 2HCl$, the coefficient of hydrogen chloride is ____**

ANSWER

Understand It with Pulse | Flag a mistake

39 **A balanced chemical equation conserves**

A mass

B volume only

C temperature

D pressure

Understand It with Pulse | Flag a mistake

40 **Hess law states that the total enthalpy change of a reaction is**

- A always zero
- B dependent on the path taken
- C changed by a catalyst
- D the sum of the enthalpy changes of its steps

Understand It with Pulse | Flag a mistake

41 **A sample has mass 120 g and density 3 g per cm³. Its volume, in cm³, is _____**

ANSWER _____

Understand It with Pulse | Flag a mistake

42 **The total number of hydrogen atoms in $2H_2O$ is _____**

ANSWER _____

Understand It with Pulse | Flag a mistake

43 **In the reaction $CaCO_3 \rightarrow CaO + CO_2$, the mass, in grams, of calcium oxide formed from 1 mol of calcium carbonate is ____**

ANSWER _____

Understand It with Pulse | Flag a mistake

44 **Removing a product from a system at equilibrium shifts equilibrium toward the**

A reactants

B products

C catalyst

D neither side

Understand It with Pulse | Flag a mistake

45 **Using whole number atomic masses (C = 12, O = 16), the molar mass of carbon dioxide, in grams per mole, is ____**

ANSWER _____

Understand It with Pulse | Flag a mistake

46 **In the balanced equation $4Fe + 3O_2 \rightarrow 2Fe_2O_3$, the coefficient of iron is _____**

ANSWER _____

Understand It with Pulse | Flag a mistake

47 **A reaction has a percent yield of 80%. What does that tell you about the actual yield compared with the theoretical yield?**

A larger than the theoretical yield

B equal to the theoretical yield

C 80% of the theoretical yield

D unrelated to the theoretical yield

Understand It with Pulse | Flag a mistake

48 **A gas at 100 kPa occupies 12 L at 300 K. At 200 kPa and 600 K, its volume, in liters, is _____**

ANSWER _____

Understand It with Pulse | Flag a mistake

49 **An atom has mass number 27 and 14 neutrons. The number of protons in the atom is _____**

ANSWER _____

Understand It with Pulse | Flag a mistake

50 **The total number of ions in two formula units of NaCl is _____**

ANSWER _____

Understand It with Pulse | Flag a mistake

ANSWER KEY

1. A
2. B
3. 18
4. 3
5. B
6. D
7. C
8. 200
9. B
10. C
11. D
12. 44.8
13. A
14. D
15. A
16. 4200
17. B
18. 4
19. 72.7
20. C
21. B
22. D
23. 2
24. D
25. D
26. B
27. 80
28. 3
29. A
30. C
31. 58.5
32. A
33. 18
34. 5
35. C
36. 8
37. 30
38. 2
39. A
40. D
41. 40
42. 4
43. 56
44. B
45. 44
46. 4
47. C
48. 12
49. 13
50. 4

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