STUDY GUIDE FOR SEMESTER1 FINAL EXAM

Sections covered:

1. General concepts of science
2. Units of measure
3. Atomic structure
4. Energy, Temperature and Heat
    a. You need to be able to convert between units of measure for temperature.
5. Change in physical State
6. Periodic Table of elements

<u>40-50 multiple choice questions and two short answer questions: Total 100 points</u>.

A. Sample of Multiple-Choice Questions

1. The study of matter and changes in matter best describes the science of

a. biology. b. physics. c. microbiology. d. chemistry.

2. The state of matter in which a material has definite shape and definite volume is the state.

a. liquid b. solid c. gaseous d. vaporous

3. The state of matter in which a material has a definite volume but no definite shape is the state.

a. gaseous b. liquid c. elemental d. solid

5. The particles in a solid are

a. packed closely together. b. very far apart.

c. free to move independently. d. able to slide past each other.

6. The unit m3 is used to express

a. length. b. mass. c. volume. d. density.

7. write the order of the abbreviations for units of length in order from smallest to largest

m, cm, mm, km.

8. A sample contains several pure substances that are not chemically combined. The sample is a(n)

a. element. b. compound. c. mixture. d. Both (a) and (b)

9. Ice cream melting is an example of

a. a chemical change. b. a physical change. c. energy. d. an exothermic process.

10. The energy transferred between objects at different temperatures is

a. chemical energy. b. heat. c. potential energy. d. temperature.

11. A measure of the average kinetic energy of the particles in an object is

a. heat. b. endothermic. c. exothermic. d. temperature.

12. The temperature 295 K equals

a. 18°C. b. 22°C. c. 273°C. d. 568°C.

13. The number of significant figures in the measurement 0.000 305 kg is

a. 3. b. 4. c. 5. d. 6.

14. Which of the following descriptions is not a characteristic of the nucleus of an atom?

a. positively charged b. contains uncharged particles

c. accounts for most of the atom's volume d. accounts for most of the atom's mass

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16. A neutral atom of 29

a. has an atomic number of 29. b. contains a total of 43 electrons, protons, and neutrons.

c. contains 15 protons and 14 neutrons. d. Both (a) and (c)

17. A neutral atom of $_{14}Si^{29}$

a. has an atomic number of 29.

b. contains a total of 43 electrons, protons, and neutrons.

c. contains 15 protons and 14 neutrons.

d. Both (a) and (c)

18. Which statement is not true?

a. Some elements exist as molecules.

b. Some elements exist as atoms.

c. Molecules are composed only of a single type of atom.

d. All molecules of a given substance are the same.

19. Pure substances can be

a. elements.

b. compounds.

c. mixtures.

d. Both (a) and (b)

20. Which of the following atoms contains the most neutrons?

a. Ca

b. Sc

c. Ti

d. Cr

21. Each of the three isotopes of hydrogen, hydrogen-1, hydrogen-2, and hydrogen-3,

a. contains one neutron and one proton.

b. contains at least one neutron.

c. has one proton in its nucleus.

d. is equally abundant.

22. An electron that is found in the outermost shell of an atom and determines the atom's chemical properties is called a(n)

a. valence electron.

b. paired electron.

c. p electron.

d. octave electron.

23. The periodic law states that the physical and chemical properties of elements are periodic functions of their atomic

a. masses.

b. numbers.

c. radii.

d. structures.

24. Refer to a periodic table. In which period is calcium?

a. Period 2

b. Period 4

c. Period 6

d. Period 8

25. Refer to a periodic table. In which group is calcium?

a. Group 1

b. Group 2

c. Group 17

d. Group 18

26. An element that has the electron configuration $[Ne]3s^2 3p^5$ is in which period?

a. Period 2

b. Period 3

c. Period 5

27. Elements in the s- or p-blocks of the periodic table are called

a. alloys. b. main-group elements. c. metals. d. transition metals.

28. Elements in Group 18 have

a. very low reactivity. b. good conductivity.

c. very high reactivity. d. metallic character.

29. Nonmetallic elements in Group 17 that react with metals to form salts are

a. alkali-metals. b. halogens. c. lanthanides. d. noble gases.

30. The outer shell electron configuration of an alkaline-earth metal has

a. one electron in the s orbital. b. two electrons in the s orbital.

c. one electron in the p orbital. d. two electrons in the p orbital.

31. The alkali metals are found on Earth only in compounds because they

a. have small atoms. b. are very reactive elements.

c. are rare elements. d. are metallic elements.

32. A metal is expected to be a(n)

a. nonconductor. b. insulator. c. conductor. d. fluid at room temperature.

33. An element found in Groups 3–12 of the periodic table is classified as a(n)

a. alkali metal. b. alloy. c. transition metal. d. actinide.

34. An element that has an outer shell electron configuration consisting of two electrons in the d orbital and one electron in the s orbital is in which group?

a. Group 1 b. Group 2 c. Group 3 d. Group 5

35. Lanthanide elements are found in the –block of the periodic table.

a. s b. p c. d d. f

36. Using a periodic table, find the identity of the element that has an atomic mass of 40.078 amu.

a. C b. Ca c. Cr d. Cu

37. A sample of matter whose particles are close together and cannot move past each other is

a. a solid. b. a liquid. c. a gas. d. viscous.

38. Fluids are materials that will flow from one place to another. Which of the following is a fluid?

a. solid b. liquid c. gas d. Both (b) and (c)

39. If particles have little attraction for each other and can freely move throughout the container, the particles are part of a

a. solid. b. liquid. c. gas d. Both (b) and (c)

40. A liquid becomes a gas during

a. evaporation. b. condensation. c. sublimation. d. deposition.

41. All changes of state are

a. physical changes. b. chemical changes. c. evaporation. d. endothermic.

42. Which of the following processes might occur when an object is heated?

a. condensation b. melting c. deposition d. freezing

43. Which of the following is most likely to have a high boiling point?

a. NaCl b. CO_2 c. CH_4 d. H_2O

Some other multiple questions to think about

I. Which element of the following is a representative of a transition element?
II. Identify two elements with similar chemical properties
III. Which one of the following reacts violently with water to produce hydrogen gas?
IV. Which of the following are alkali metals?
V. Identify the halogen among following elements
VI. Which one of the following is a noble gas?
VII. What are the Celsius, Fahrenheit and Kelvin value for melting and boiling temperatures of water?

Sample Short Answer Questions (5 points each)– Need to write COMPLETE answers for full points.

A. Why do we feel colder when wet and hit by wind? –
B. Sketch the temperature vs. time curve for heating ice until after water. Make sure to label X and Y axis and the sections of the graph
C. What will happen to the kinetic energy of molecules when the temperature is increased.
D. Define kinetic and potential energy. What happens to the potential energy of water molecules while the water is being boiled at boiling temperature?
E. Why do some liquids evaporate faster? Compare evaporation rates of acetone, alcohol and water.