

SCIENCE 1206

Sample Midyear Examination

Name: _____
Teacher: _____

Part 1	_____/50
Part 2	_____/20
Part 3	_____/30
Total	_____/100

Part 1: 50 Multiple Choice, 1 mark each

Total 50 Marks

Instructions: Place the correct answer on the answer sheet provided.

- Chemical bonding in which electrons are shared from one atom to another is called:
A. Binary
B. Molecular
C. Ionic
D. Metallic
- Ionic compounds are formed from which of the following combinations of elements?
A. Group IA with Group IIIA
B. Group VIIA with Group VIIIA
C. Group IIIB with Group VIIA
D. Group IIIB with Group IA
- The group of the periodic table which contains only elements which exist as diatomic or binary molecules (never alone) in the free state is Group...
A. Group IIIB
B. Group VIIA
C. Group VIA
D. Group VIIIA
- Which of the following observations would not necessarily indicate a chemical reaction?
A. heat is released
B. colour is changed
C. precipitate is formed
D. solutions are mixed
- When a piece of zinc is dropped into a solution of lead(II)acetate, it is classified as which of the following chemical reactions:
A. simple composition
B. decomposition
C. single replacement
D. double replacement
- In the following **balanced** equation, the products are:
$$\underline{3} \text{CaS} + \underline{2} \text{Al(OH)}_3 \longrightarrow \underline{\quad} \underline{\quad} + \underline{\quad} \underline{\quad}$$

A. $\text{AlS} + 3 \text{CaOH}$
B. $\text{Al}_2\text{S}_3 + 2 \text{Ca(OH)}_2$
C. $3 \text{Al}_2\text{S}_3 + 2 \text{Ca(OH)}$
D. $\text{Al}_2\text{S}_3 + 3 \text{Ca(OH)}_2$

7. The product in the reaction between lithium and nitrogen is:
- LiN_2
 - Li_2N
 - LiN
 - Li_3N
8. Which is **TRUE** concerning the reaction between zinc and copper(II)sulfate?
- the reaction type is a double replacement.
 - the coefficients (numbers) for the balanced equation are 1, 1, 1, 1.
 - the products are sulfur and zinc cupride.
 - the evidence for a chemical reaction is the formation of gas.
9. In the following reaction find the missing reactant from the choices below.
- $$\text{Na}_2\text{CO}_3 + \text{----?----} \longrightarrow \text{H}_2\text{CO}_3 + \text{Na}_3\text{PO}_4$$
- PO_4
 - H_2PO_4
 - $\text{H}_2(\text{PO}_4)_2$
 - H_3PO_4
10. Which of the following equations is **CORRECTLY** balanced?
- $\text{N}_2 + 2 \text{H}_2 \longrightarrow \text{H}_2\text{CO}_3 + \text{Na}_3\text{PO}_4$
 - $\text{C}_2\text{H}_2 + 2 \text{O}_2 \longrightarrow 2 \text{CO}_2 + \text{H}_2\text{O}$
 - $\text{Br}_2 + \text{KI} \longrightarrow \text{I}_2 + 2 \text{KBr}$
 - $2 \text{H}_2\text{O}_2 \longrightarrow 2 \text{H}_2\text{O} + \text{O}_2$
11. The name of $\text{H}_3\text{PO}_4(\text{aq})$ is:
- phosphoric acid
 - hydrophosphoric acid
 - hydrogen phosphate
 - phosphic acid
12. Ionic compounds exist in what phase of matter at room temperature?
- solid
 - liquid
 - gas
 - plasma
13. When methane (CH_4) is burned in the air, it is classified as which of the following reactions:
- simple composition or synthesis
 - decomposition
 - single replacement
 - hydrocarbon combustion
14. Aluminum reacts with oxygen in the air to form a coating. This reaction is an example of:
- simple composition or synthesis
 - decomposition
 - single replacement
 - hydrocarbon combustion
15. Which of the following is a heterogeneous mixture:
- pepsi
 - sand and water
 - windshield wash
 - salt water

16. The metals in Groups IA, IIA, IIIA:
- gain electrons when they form ions
 - have a charge that is found by subtracting the atomic number from 8
 - all have ions with a +1 charge
 - they lose electrons when they form ions
17. What is the formula for hydrosulfuric acid?
- $\text{H}_2\text{S}_{2(\text{aq})}$
 - $\text{H}_2\text{SO}_{2(\text{aq})}$
 - $\text{HSO}_{2(\text{aq})}$
 - $\text{H}_2\text{S}_{(\text{aq})}$
18. The atomic number of an element equals the:
- number of neutrons in the nucleus
 - sum of the protons and neutrons
 - number of protons in the nucleus
 - sum of the protons and the electrons
19. When an aluminum atom loses its electrons, the charge of the resulting ion is:
- 2+
 - 2-
 - 3+
 - 5-
20. How many valence electrons does an atom of an element in Group VIIA have?
- 7
 - 4
 - 6
 - 8
21. Which of these statements is **false**?
- protons have a positive charge and are found in the nucleus
 - electrons have a negative charge and are found in the nucleus
 - neutrons are neutral
 - in an atom, the number of protons and the number of electrons are the same
22. A selenide ion has:
- 34 electrons and 36 protons
 - 34 electrons and 32 protons
 - 34 protons and 36 electrons
 - 34 protons and 32 electrons
23. The chlorine used to purify your drinking water was made by electrolyzing molten NaCl to produce liquid sodium and chlorine gas. The balanced equation for this reaction is:
- $2 \text{NaCl} \longrightarrow 2 \text{Na} + \text{Cl}_2$
 - $\text{NaCl} \longrightarrow \text{Na} + \text{Cl}$
 - $2 \text{NaCl} \longrightarrow \text{Na} + \text{Cl}_2$
 - $8 \text{NaCl} \longrightarrow 8 \text{Na} + \text{Cl}_8$
24. Which of the following types of products must be accompanied by Materials Safety Data Sheet when sold by a supplier?
- a controlled product
 - any ingredient which falls under the Hazardous Product Act
 - any product the supplier believes may be harmful
 - all of the above

25. The pair of elements which react to form an ionic compound is:
- A. Sr and Zn
 - B. Fe and S
 - C. As and F
 - D. Be and Ne
26. In most food webs, hawks are best classified as:
- A. scavengers
 - B. predators
 - C. primary consumers
 - D. producers
27. If all bacteria on earth were eliminated, all other living things would die off because:
- A. bacteria release nutrients from dead organisms for recycling
 - B. bacteria are at the beginning of every food chain
 - C. bacteria are responsible for returning oxygen to the atmosphere
 - D. bacteria are important producers
28. Through which level of a pyramid of energy does the greatest amount of energy flow?
- A. decomposers
 - B. producers
 - C. primary consumers
 - D. secondary consumers

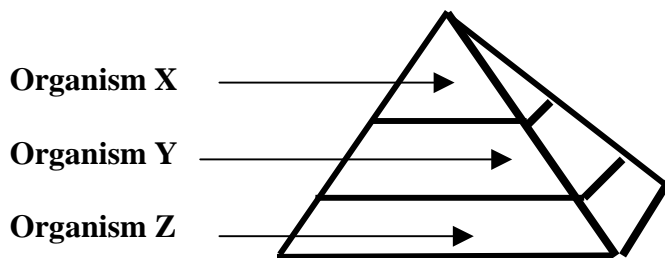
Use the following information to answer **questions 29, 30, and 31**.

Deer flies lay their eggs on grass. Grazing deer inhale some of the eggs, which cling to the membranes of the nose and hatch into worm-like larvae called maggots. These maggots feed on the material in the deer's head which may cause the deer to die.

29. The deer are:
- A. producers
 - B. primary consumers
 - C. secondary consumers
 - D. tertiary consumers
30. The deer fly maggots are:
- A. producers
 - B. primary consumers
 - C. secondary consumers
 - D. tertiary consumers
31. The grass → deer → maggot relationship represents a/an:
- A. energy cycle
 - B. food chain
 - C. parasite web
 - D. food web
32. When energy flows through a food web it:
- A. increases at each higher trophic level
 - B. is constant at each trophic level
 - C. decreases at each higher trophic level
 - D. is never lost as heat

33. In which way are a food chain and a food web different?
- food chains indicate the source of food and energy for a particular animal, and food webs do not
 - food chains show a single organism at each trophic level, but a food web may show several
 - there is a producer at the base of a food chain, but there is a top carnivore at the base of a food web
 - food chains indicate the direction of nutrient movement through the biotic environment, while a food web indicates the direction of energy movement

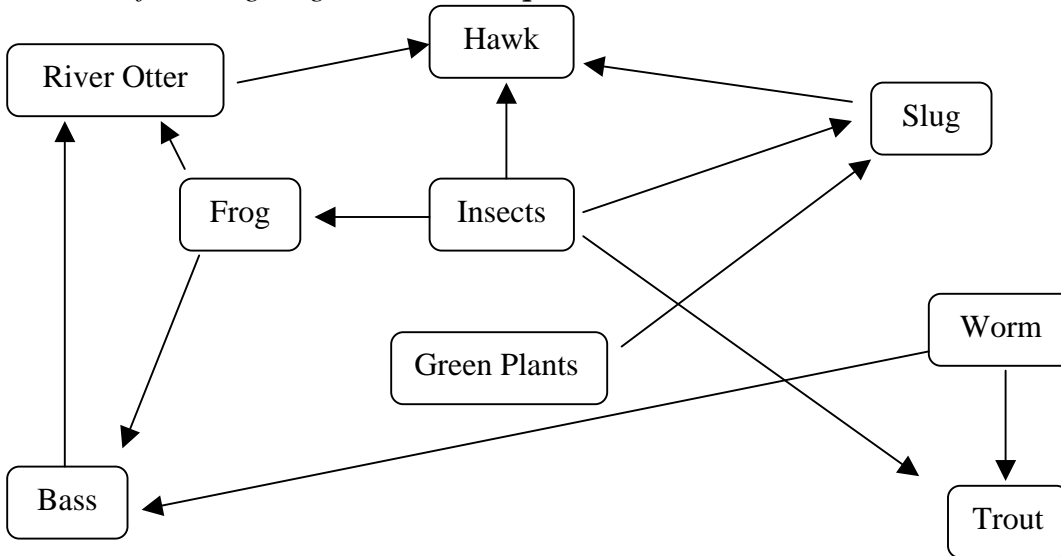
Use the diagram to answer questions 34 and 35.



34. According to the diagram:
- organism X eats organism Y, and organism Y eats organism X
 - organism X eats organism Y, and organism Y eats organism Z
 - organism Z eats organism Y, and organism Y eats organism X
 - no predator-prey relationship is shown.
35. Which of the following sets of organisms could be substituted for X, Y, and Z respectively?
- snake, frog, hawk
 - hawk, snake, frog
 - frog, hawk, snake
 - frog, snake, hawk
36. When a population stops growing and the current population can survive successfully with the available resources, this is called the environment's:
- lag phase
 - growth phase
 - carrying capacity
 - maximum stationary phase
37. The number of individuals of a species in an area at a specific time is referred to as:
- community
 - population
 - colony
 - habitat association
38. All of the following are density-independent factors influencing populations except:
- food supply
 - temperature
 - precipitation
 - humidity
39. Elephants require a certain population size to support a normal rate of reproduction. This limitation on population growth rate is:
- a density – independent factor
 - a density – dependent factor
 - an abiotic factor
 - none of the above

40. Which of the following factors prevents a population from reaching its biotic potential?
- A. unlimited availability of food
 - B. increased rate of reproduction
 - C. decreased predation
 - D. limited living space
41. Without the presence of denitrifying bacteria, which of the following processes would be directly affected?
- A. conversion of nitrogen gas into ammonium ions
 - B. conversion of ammonium ions into nitrates
 - C. conversion of nitrates into nitrogen gas
 - D. conversion of nitrogen gas into nitrates
42. An autotroph is another name for:
- A. producer
 - B. consumer
 - C. omnivore
 - D. herbivore
43. Which portion of an ecosystem would contain the greatest amount of biomass?
- A. producers
 - B. primary consumers
 - C. secondary consumers
 - D. tertiary consumers
44. Which of the following is considered a biotic factor for an ecosystem?
- A. the mineral content of the water
 - B. the bacterial population of the soil
 - C. the acid level in the lake
 - D. the seasonal change in temperatures
45. At the top of the pyramid of numbers, you would expect to find:
- A. bald eagles
 - B. snowshoe hares
 - C. shrews
 - D. moss plants
46. Which of the following terms describes the competition between killer whales for seals as food?
- A. Interspecific
 - B. Specific
 - C. Non-specific
 - D. Intraspecific
47. Which of the following statements describes the relationship between plants and animals?
- A. plants produce oxygen, animals consume oxygen
 - B. both consume carbon dioxide
 - C. plants produce carbon dioxide, animals consume oxygen
 - D. animals produce oxygen, plants consume carbon dioxide
48. Where is the carbon from the atmosphere captured to begin the carbon cycle?
- A. fossil fuels
 - B. respiration
 - C. photosynthesis
 - D. in the soil

Use the following diagram to answer questions 49 and 50.



49. The diagram shows the feeding relationship among organisms that live in a lake in western Ontario. Which of the following situations best describes the effect on the trout population if all the bass were removed from the lake by recreational fishing?
- A. the trout population would increase
 - B. the trout population would decrease
 - C. the trout population would disappear
 - D. the trout population would not change
50. Which of the animals would be most affected by the application of insecticide to the lake?
- A. trout
 - B. worms
 - C. hawks
 - D. none of the animals would be affected

Part 2: Chemistry Problems**Total 20 Marks**

Instructions: Place the correct answer in the space provided.
Answer ALL questions.

1. (a) Write the correct formula for each compound name in the space provided. (5 marks)

i) cobalt (II) nitrite _____

ii) diphosphorus pentachloride _____

iii) lithium nitride _____

iv) ammonium sulfate _____

v) nitric acid _____

(b) Write the correct name for each formula in the space provided. (5 marks)

i) Ca_3PO_4 _____

ii) N_2O _____

iii) Cu_2CrO_4 _____

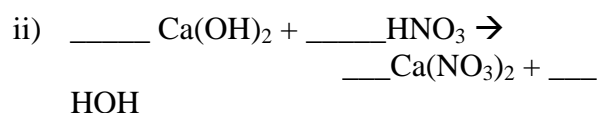
iv) CH_4 _____

v) MgS _____

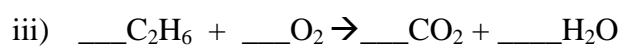
2. For the following equations: (a) balance the equation
(b) identify the type of reaction (10 marks)



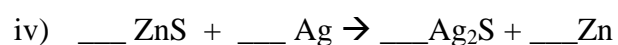
i) Type: _____



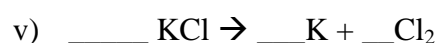
ii) Type: _____



iii) Type: _____



iv) Type: _____



v) Type: _____

4. a) Distinguish between biotic and abiotic factors. (1 mark)

b) Identify 2 biotic factors and state their impact on an ecosystem (2 marks)

c) Identify 2 abiotic factors and state their impact on an ecosystem. (2 marks)

5. a) With the aid of diagrams, distinguish between a pyramid of energy and a pyramid of biomass. (4 marks)

b) Why is there a limit on the number of trophic levels in an energy pyramid. (1 mark)

6. Using DDT as an example, illustrate with a diagram and explain the process of bioamplification. (5 marks)

7. Define the term fertilizer and give the disadvantages of excessive fertilizer use. (5 marks)

8. a) Define succession. (1 marks)

- b) List and explain the steps of primary succession. Give examples for each step. (4 marks)
