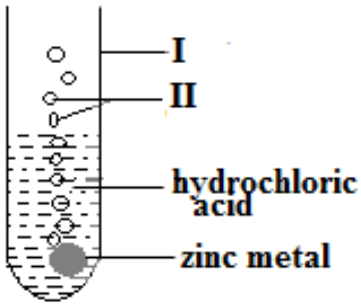
AGONA PORT D/A BASIC SCHOOL
END OF FIRST TERM EXAMINATION
INTEGRATED SCIENCE – J. H. S TWO (2)

This paper is in two parts: I and II. Answer Question 1 *in Part I and any other* ***four*** (4) *questions in Part II. Credit will be given for clarity of expression and orderly presentation of materials.*

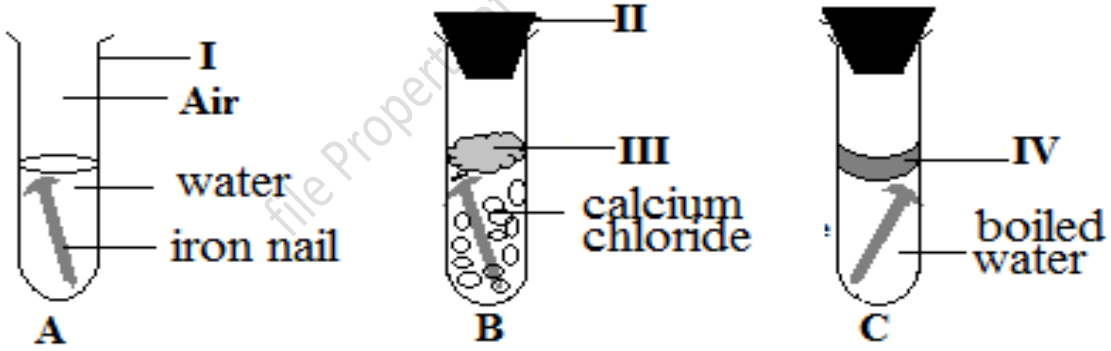
PART I
[40 marks]
Answer all questions in this part.

1. (a) In an experiment to investigate the reactivity of zinc, a piece of the metal was dropped into a test tube containing dilute hydrochloric acid. The experimental set-up is illustrated below. Study it carefully to answer the questions below.



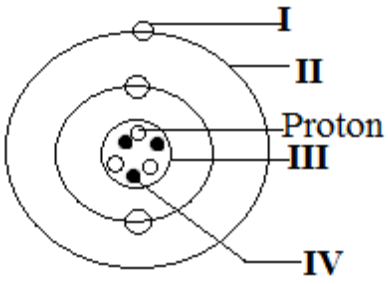
i) Name the parts labeled I and II.
ii) Write a balanced chemical equation for the reaction that occurred in the experiment.
iii) Name the gas evolved.
iv) List two (2) metals which cannot react in a similar way as the iron.
v) List two (2) metals which can react in a similar way as the iron.
vi) Name two (2) glass apparatus which could have been used instead of the part labeled I.

(b) Study the diagram below and use it to answer the questions that follow.



i) Name the parts labeled I, II, III and IV.
ii) If the set-up is left for some few days, what happens to the nails in test tubes A, B and C?
iii) Why was the water in set-up C boiled?
iv) What is the purpose of the part IV on the surface of the boiled water in test tube C?
v) What role does the calcium chloride play in test tube B?
vi) Give two (2) materials that can be used in place of the iron nails.

(c) The diagram below shows the structure of an atom. *Study it carefully and answer the questions that follow:*



i) Identify the parts labeled I, II, III and IV.
ii) How many electrons are in the atom?

iii) State the atomic number of the atom.

iv) State the valency of the atom.

v) What is the name of the element of this atom?

(d) *Use the table below to answer the questions that follow:*

Elements	Number of Protons	Number of neutrons
A	6	6
B	7	8
C	8	9

i. What is the mass number of A?

ii. What is the atomic number of B?

iii. How many electrons will one atom of element C contain?

iv. Which of the elements is positive charged, negative charged and neutral?

PART II
[60 marks]
*Answer **four (4)** questions only from this part.*

2. a) i) What is a chemical compound?
ii) Write a balanced chemical equation for the reaction between nitrogen and hydrogen.

b) i) What are alloys?
ii) Name three (3) effects of rusting of iron metals.

c) An atom Y has atomic number of 15. It gains three electrons in order to be stable.
What is the proton number and electron number:
i) before it gains electrons. ii) after gaining electrons
iii) Name the type of ion formed by the atom when it gains three electrons.

d) i) Name three (3) differences between a metal and a non-metal.
ii) Explain why although both iron and sodium are metals only iron metal is used to make hoes and cutlass.

3. a) i) What are ions?
ii) Name three (3) differences between ions and atoms.

b) i) How many hydrogen atoms are present in each of the following:
α) $C_6H_{12}O_6$ β) $3NH_3$

ii) Complete and balance the equation below?

α) H_2 + O_2 → ?
β) Na + Cl_2 → NaCl

c) i) What is corrosion of metals?
ii) Give three (3) uses of metals.

d) An atom has 16 protons and 17 neutrons.
i) Draw the structure of the atom.
ii) If the atom gains two extra electrons, what will be the charge of the ion formed?
iii) Write the name of the element and the symbol of the ion formed.

4. a) i) What are semi-metals?
ii) Give two (2) examples of metalloids?
iii) Explain how alloys are made.

b) A given atom of an element 'X' is represented as $^{35}_{17}X$
i) What is the mass number and the atomic number of the element X?
ii) Determine the number of electrons, number of protons and number of neutrons.
iii) State the possible name of the element.

c) (i) State two differences between protons and electrons.

(ii) Name the compound formed when the following elements combine:
x) nitrogen and hydrogen y) oxygen and hydrogen

d) Explain why gold and silver are preferred in the making of ornaments and jewellery.

5. a) i. What are metals?
ii) State the uses of the following alloys:
x) Brass z) Stainless steel

b) i. Carbon reacts with oxygen to produce carbon dioxide. Write a balanced chemical equation for the reaction.
ii. Balance the following simple chemical equation.
x) Mg + O_2 → ?
y) Zn + HCl → ?

c) Atoms X, Y and Z contain the following number of protons, number of neutrons and electrons shown in the table below:

Atom	Protons	neutrons	Electrons
X	17	18	18
Y	7	7	7
Z	11	12	10

Which atom carries
i) no charge (ii) negative charge (iii) Positive charge

d) i. Distinguish between reactive metals and non-reactive metals
ii. Explain how ions are formed.

6. a) i. What is rusting of iron metal?

   ii. State the composition of the following alloys:
   x) Brass y) Bronze z) Duralumin

   b) i. Name the sub-atomic particles of an atom and state the electrical charges on the sub-atomic particles.

   ii. Draw and label the structure of a sodium atom showing the distribution of its electrons.

   c) i. What is rust?
   ii. Write a balanced chemical equation for the reaction between iron and sulphur.

   d) i. Mention two chemical properties of metals.

   ii. Explain why duralumin is preferred to steel in the construction of aircraft bodies

OBJECTIVE QUESTIONS – [40 marks]

1. The electrons in the outermost shell of an atom are called…….
   A. core electrons B. innermost electrons
   C. valence electrons D. valency

2. An element whose surface remains shiny for a long time and does not easily react with chemicals is used to make…….
   A. hammers B. jewellery
   C. cars D. bridges

3. Gold is usually used to make jewellery because it is
   A. highly reactive with air B. expensive
   C. precious D. less reactive with air

4. Metals that are usually used to make ornaments have low…….
   A. conductivity B. ductility
   C. malleability D. reactivity

5. Which of the following gases is involved in the process of rusting?
   A. hydrogen B. carbon dioxide
   C. oxygen D. nitrogen

6. The correct name for the compound $CaCl_2$ is……
   A. calcium (I) chloride
   B. calcium (II) chloride
   C. calcium chloride
   D. calcium chlorine

7. When compounds are formed the combination takes place between…….
   A. neutrons B. charges
   C. atoms D. protons

8. Chlorine gas is an example of
   A. an atom B. an element
   C. a compound D. a molecule

9. Which of the following atoms has two (2) valence electrons?
   A. Li B. Na
   C. K D. Ca

10. Hydrogen is represented by the chemical symbol H_2. This symbol represents……
    A. two molecules of hydrogen
    B. two atoms of hydrogen.
    C. two elements of hydrogen
    D. two ions of hydrogen

11. Metals can be drawn into wires. This property is known as …
    A. ductility B. malleability
    C. lustre D. resistivity

12. Which of the following elements combine chemically with copper (II) to form copper (II) oxide?
    A. sodium B. silicon
    C. oxygen D. chlorine

13. The number of hydrogen atoms present in 1 molecule of water is……
    A. 4 B. 6 C. 2 D. 1

14. Two elements with the same number of electrons in their outermost shells are……..
    A. lithium and beryllium
    B. boron and carbon
    C. oxygen and sulphur

D. oxygen and silicon

15. An atom of an element has 4 protons and 5 neutrons in its nucleus. How many shells are occupied in the atom?
A. 1 B. 2 C. 3 D. 4

16. How many atoms are in $2NH_3$?
A. 4 B. 5 C. 6 D. 8

17. Which of the following compounds has its name written as only one word?
I – NaCl II – NH_3
III – CO_2 IV- CO
A. I only B. II only
C. III only D. IV only

18. Sodium atom has 11 protons and 12 neutrons in its nucleus. How many positively charge particles are in its atom?
A. 12 B. 23 C. 1 D. 11

19. A particle has the electron configuration of 2, 8, 8 and 17 protons in its nucleus. The particle is likely to be ……
A. an argon atom B. a calcium atom
C. a fluoride ion D. a chloride ion

20. The biggest problem associated with bridges constructed from iron is ……
A. the heavy weight of the bridges
B. the water vapour from the river that collects on it
C. finding a suitable paints for it.
D. the maintenance cost to prevent rusting

21. A non – metal which can conduct electricity is……
A. carbon B. nitrogen
C. phosphorus D. sulphur

22. Non – metals can break easily. This means that…
A. they have high tensile strength.
B. they are brittle
C. they are not brittle
D. have high tensile strength.

23. Which of the following is true about anions?
A. the number of protons becomes more than the number of electrons.
B. the neutron number becomes more than the proton number.
C. the number of electrons becomes more than the number of protons
D. the number of protons is the same as the number of electrons.

24. Which of the following substances is made up of only one kind of an atom?
A. Iron B. salt
C. steel D. water

25. Elements in a group in the Periodic Table all…….
A. have the same colour
B. have similar properties
C. have the same atomic number.
D. have the same properties.

26. Which of the following substances is a non-metal?
A. Diamond B. mercury
C. sodium D. potassium

27. The compound 2NaCl consists of ……
A. 2 atoms of sodium elements
B. 1 atom of chlorine element
C. 3 atoms of sodium elements
D. 1 atom of sodium element

28. Which of the following compounds is not a gas?
A. NH_3 B. CO_2
C. SO_2 D. NaCl

29. What is the chemical formula of the substance formed when Al^{3+} ions react with Cl^-?
A. AlCl B. Al_2Cl_3
C. $AlCl_3$ D. Al_3Cl

30. The central tiny portion of the atom consists of ….
A. protons and electrons
B. electrons and neutrons
C. protons and nucleus
D. neutrons and protons

31. Electrons, protons and neutrons are called sub-atomic particles because…….
A. they have charges
B. they are found outside the nuclues
C. they are found inside an atom.
D. they are located within the nucleus

32. The systematic name of the compound FeS is ….
A. Iron (I) sulphide B. Iron (II) sulphide
C. Iron (III) sulphide D. Iron (IV) sulphide

33. An atom must gain or lose electrons in order to
A. be reactive B. be unstable
C. form a neutron D. be fully filled

34. Potassium is needed by plant in the ……..
    A. making of protein for plant growth.
    B. production of flowers and fruits.
    C. formation of new cells
    D. making of chlorophyll

35. Which of the following is true about a chemical formula? A chemical formula shows ……
    A. the number of compounds of reactants.
    B. the type and number of atoms of the elements forming the compound.
    C. the different molecules of the products
    D. the different substances forming the products.

36. Which of the following alloys are used to construct bridges?
    A. stainless steel B. steel
    C. duralumin D. brass

37. The balanced chemical equation for the reaction between sulphur and oxygen is ……
    A. $2S + O_2 \rightarrow 2SO_2$
    B. $S + O_2 \rightarrow SO_2$
    C. $S + O \rightarrow SO_2$
    D. $S + 2O \rightarrow SO$

38. Which of the following elements exists as a single atom?
    A. oxygen B. carbon
    C. nitrogen D. hydrogen

39. Which of the following chemical formulae correctly represents calcium sulphide?
    A. CaS B. Ca_2S
    C. CaS_2 D. CS

40. Which of the following is true about the structure of an atom?
    A. An atom is conical in shape
    B. The mass of an atom is concentrated in the nucleus.
    C. Electrons move round the neutrons
    D. Atoms consists of four particles.