

Uganda Martyrs University



FACULTY OF EDUCATION
SEMESTER ONE EXAMINATIONS 2022/23
DIPLOMA IN EDUCATION (PRIMARY) YEAR ONE

Module 1

INTEGRATED SCIENCE

Paper Two: ATOMIC STRUCTURE; PERIODIC TABLE; ACIDS, BASES, SALTS; FORCE AND MOTION

DATE: 12/01/2023

3hrs

Time: 2:00 pm- 5:00 pm

Instructions

Attempt four (4) questions in this paper by answering one question from each section.

SECTION A

ATOMIC STRUCTURE

Attempt one question from this section

1.a) An atom is made up of electrons, protons and neutrons

i) State where the particles are located. 03 marks

ii) Why is the nucleus positively charged? 02 marks

iii) Why is an atom said to be neutral? 02 marks

b) i) Define the term 'radio activity' 02 marks

ii) Name three radioactive emissions. 03 marks

iii) Why do some nucleus undergo radioactivity? 02 marks

c) Describe briefly applications of radio activity in :

i) Medicine 02 marks

ii) Industries 02 marks

iii) Archeology and geology 02 marks

d) Using s, p, d and f systems, write electronic configurations of the following elements

i) Magnesium 01 mark

ii) Phosphorus 01 mark

ii) Alum
iii) Chlor
c) State

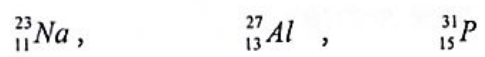
- iii) Nickel 01 mark
- iv) Sulphur 01 mark
- v) Manganese 01 mark

Atomic numbers of sulphur, magnesium, phosphorus, nickel and manganese are 16,12,15,28 and 25 respectively.

Total = 25 marks

- 2.a) State Dalton's Atomic theory. 02 marks
- b) Describe briefly how electrons were discovered. 03 marks
- c) Define the following terms:
 - i) Atomic numbers 02 marks
 - ii) Isotopes 02 marks
 - iii) Mass number 02 marks

d) Some atoms of some elements are presented as below



- ii) State the number of electrons and protons in each of the atom above. 06 marks
- ii) Determine the number of neutrons in the nucleus of each of the above atoms. 06 marks
- e) State the contribution of Dalton's Atomic theory to the science world. 02 marks

Total = 25 marks

SECTION B

THE PERIODIC TABLE

Attempt only one question from this section

- 3a) Fluorine belongs to group VII of the periodic table
 - i) Name three other elements in this group. 03 marks
 - ii) Give three uses of chlorine. 03 marks
- b) Write balanced equation for reaction between the following
 - i) Chlorine and hydrogen. 02 marks

- ii) Aluminum and bromine. 02 marks
- iii) Chlorine and sodium. 02 marks
- c) State the block to which each of the following elements belongs
- i) Sodium, atomic number 11 02 marks
- ii) Phosphorus, atomic number 15 02 marks
- iii) Iron, atomic number 26 02 marks
- d) i) Define the term allotropy. 02 marks
- ii) State two crystalline allotropes of carbon. 02 marks
- iii) Which one of the two allotropes of carbon conducts electricity? Briefly explain why it conducts electricity. 03 marks

Total = 25 marks

4. a) State any four characteristics of transition elements. 04 marks
- b) Of what importance is
- i) Iron 01 mark
- ii) Copper 01 mark
- c) A part from copper and iron, state other two transition elements you know. 02 marks
- d) Nitrogen is an element of group V of periodic table. One of its important compounds is ammonia.
- i) Name the process by which Ammonia is produced in large scale. 02 marks
- ii) Write equation for formation of ammonia on large scale. 02 marks
- iii) State any three uses of ammonia. 03 marks
- e) Carbon, an element of group iv forms two oxides.
- i) Name the two oxides of carbon. 02 marks
- ii) Describe how the acidic oxide can be tested; include equation(s) for the reaction(s) that took place. 06 marks
- iii) Briefly explain why cooking has to be done in an open place when using charcoal. 02 marks

Total = 25 marks

SECTION C

ACIDS, SALTS AND BASES

Attempt One question from this section.

5. a) Define the following terms

i) Salt 02 marks

ii) Alkali 02 marks

iii) Base 02 marks

b) i) State any four properties of bases. 04 marks

ii) State any two uses of bases. 02 marks

iii) 0.00622M sodium hydroxide solution was placed in a cup and its pH measured, Determine pH of the solution, Ionic product of water, $K_w = 1.0 \times 10^{-14} \text{ mol}^2 \text{dm}^{-6}$. 06 marks

c) State any:

(i) four uses of acids. 04 marks

(ii) three applications of salts. 03 marks

Total = 25 marks

6. a) Define the following terms

i) An acid 02 marks

ii) An alkali 02 marks

iii) A strong acid 02 marks

b) Give an example of

i) A weak acid and name its source. 02 marks

ii) An alkali 01 mark

c) Outline three properties of acids. 03 marks

d) Level of acidity or alkalinity can be measured using pH scale.

i) Draw a well labeled pH scale indicating neutral pH, acidic range and alkaline range. 04marks

ii) Determine pH of 0.00824M hydrochloric acid solution. 04 marks

e) State any five uses of acids. 05 marks

Total = 25 marks

SECTION D

MOTION AND FORCE

Answer one question from the section.

7. a) i) Define the term friction. 02 marks

ii) State two laws of friction 04 marks

b) Define the following terms

- i) Force 02 marks
- ii) Work 02 marks
- iii) Power 02 marks
- iv) Energy 02 marks
- c) i) State Newton's laws of motion 06 marks
- ii) A body starts from rest and accelerates at 20ms^{-2} for 10 seconds.
Determine the final velocity. 03 marks
- iii) Determine the distance covered in c(ii) above. 02 marks

Total = 25 marks

8. a) Define the following terms:

- i) Velocity 02 marks
- ii) Acceleration 02 marks
- iii) Speed 02 marks
- iv) Displacement 02 marks
- b) A body starts from rest and accelerated at 25ms^{-2} for 20 seconds after which it moves at constant velocity for 8 seconds before it was brought to rest in 15 seconds.
 - i) Determine the maximum velocity attained. 03 marks
 - ii) Calculate the acceleration in the last part of the journey. 03 marks
- c) (i) Define the terms Power and work. 02 marks
- (ii) Force of 80N was used to drag a brick along frictionless ground of 7 meters for 1 minute (60 seconds). Determine work done and power required. 06 marks
- d) (i) State the principle of moments. 01 mark
- (ii) A uniform meter rule of 150g was placed on a pivot 70cm from end A of a meter rule and 30cm from end B. Determine the mass placed at the end B of the meter rule required to balance the meter rule. 04 marks

Total = 25 marks

The End