Technical University of Mombasa

Faculty of Applied and Health Sciences

DEPARTMENT OF **PURE AND APPLIED SCIENCES**

DIPLOMA IN NAUTICAL SCIENCES
(DNSC 13M)

ACH 2123 : APPLIED SCIENCE

SPECIAL/SUPPLEMENTARY : EXAMINATIONS

SERIES: OCTOBER 2013

TIME: 2 HOURS

INSTRUCTIONS:

You should have the following for this paper
- *Answer booklet*

This paper consists of ***FIVE*** questions.
Answer Question **ONE (compulsory)** and any other **TWO** questions
*This paper consists of **3 PRINTED** pages*

Question ONE

a) Using suitable examples where possible, discuss each of the following :
   i) Electromagnetism
   ii) Basic solution
   iii) Electromagnetic radiation
   iv) Atom
   v) Allotrope

(10marks)

b) Differentiate between
   i) Potential and kinetic energy **(3marks)**
   ii) Work done and force **(3marks)**
   iii) A 60kg woman climbs a flight of 30 stairs each 20cm high. What is her P.E at the top? **(4marks)**
   iv) X,Y and Z represent elements of atomic numbers 9, 19 and 34.
      (a) Write the electronic configurations for the element X, Y and Z **(4marks)**
      (b) Predict the type of bonding which you would expect to occur between:
         1. X and Y
         2. X and Z
         3. Y and Z

(6marks)

Question TWO

a) A body of mass 12Kg is slowed down from 12mls to 4 mls in 2m. What work is done by the force? What is the force? **(7marks)**

b) Give FOUR properties of :
   1. Acid **(4marks)**
   2. Base **(4marks)**

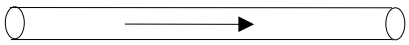
Question THREE

a) Explain how heat is transferred through the following mechanism:
   i) Conduction **(3marks)**
   ii) Convection **(3marks)**
   iii) Conduction **(3marks)**

b) i) State Ohm's law in **(2marks)**
   ii) When a portable radio is playing, the current in the radio is 0.3A. If the resistance of the radio is 30.0Ω, what is the voltage supplied by the radio battery? **(4marks)**

Question FOUR

a) The following diagram shows the current direction in a straight conductor.



Draw the magnetic field lines around the conductor.

(4marks)

b) Describe the determination of specific heat capacity by the:
   (i) Electrical method **(5marks)**
   (ii) Method of mixtures **(6marks)**

Question FIVE

a) Describe the charging of a material by :
   i) Contact **(3marks)**
   ii) Induction **(3marks)**

b) Using suitable examples; describe
   i) Ionic bond **(3marks)**
   ii) Metallic bond **(3marks)**
   iii) Co-ordinate bond **(3marks)**