TECHNICAL UNIVERSITY OF MOMBASA

Faculty of Engineering and Technology
Department of Mechanical & Automotive Engineering
UNIVERSITY EXAMINATION FOR:
Diploma Marine Engineering
EMR 2101 : MARINE ENGINEERING SCIENCE 1
END OF SEMESTER EXAMINATION
SERIES: DECEMBER 2016
TIME: 2 HOURS
DATE: Pick Date **Dec 2016**

Instruction to Candidates:

You should have the following for this examination

- *Answer booklet*
- *Non-Programmable scientific calculator*

This paper consists of **FIVE** questions. Attempt **ANY THREE** questions.
Maximum marks for each part of a question are as shown.
Do not write on the question paper.

Question ONE

a) Explain the following properties of salts;
   i) Action of Water
   ii) Action of Acids
   iii) Action of Alkalis
   iv) Action of Heat on salts **10 marks**

b) Differentiate between:
   i) Arrhenius Acid and Lewis Acid
   ii) Bronsted Base and Arrhenius Base
   iii) Mineral Acid and Organic Acid **10 marks**

Question TWO

1. **a)** Define the following;
   i) Boyles' law
   ii) Charles' law
   iii) Gas **6 marks**

b) Show that, PV= Constant **14 marks**

Question THREE

a) Write the conversion formulas from and to Kelvin Temperature scale for:
   i) Celsius
   ii) Fahrenheit
   iii)Rankine **6 marks**

b) Define the following;
   i) Coefficient of thermal conductivity
   ii) Heat Transfer Coefficient
   iii)Stefan- Boltzmann Law
   iv)Temperature **10 marks**

c) Differentiate Boyle's Law and Charles's Law by use of graphs only. **4 marks**

Question FOUR

a) Briefly explain Dalton's Atomic Theory**.** **10 marks**

b) State and explain the different Quantum Numbers. **10 marks**

Question FIVE

a) State the 3 types of forces that are responsible for Van der Waals bonding. **3 marks**

b) Explain the following types of chemical bonds;
   i) Covalent Bond
   ii) Dative Valency
   iii) Ionic Bond **15 marks**

c) What do you understand by the term "mean free path"? **2 marks**