TECHNICAL UNIVERSITY OF MOMBASA

Faculty of Applied & Health Sciences

DEPARTMENT OF MATHEMATICS & PHYSISCS

CERTIFICATE IN INFORMATION TECHNOLOGY & MAINTENANCE (CICM 14S)

APS 1103: FUNDAMENTALS OF PHYSICS

END OF SEMESTER EXAMINATION
SERIES: APRIL 2015
TIME ALLOWED: 2 HOURS

<u>**Instructions to Candidates:**</u>
You should have the following for this examination
- *Answer Booklet*
- *Mathematical Table*

This paper consist of **FIVE** questions

Answer question **ONE (COMPULSORY)** and any other **TWO** questions
Maximum marks for each part of a question are as shown
This paper consists of **THREE** printed pages
Question One (Compulsory)

a) State THREE ways in which the strength of an electromagnet can be increased.   **(3 marks)**

b) A car starts from rest and accelerates uniformly for 10 seconds to attain a velocity of 20m/s. Determine:
     (i) It acceleration
     (ii) Its displacement   **(6 marks)**

c) Describe the construction of a waxed paper capacitor   **(5 marks)**

d) Define: (i) Potential difference   **(1 mark)**
        (ii) Resistance   **(1 mark)**

e) Study the circuit below:

Figure 1

If the total current passing through the circuit is 0.2A, determine:
     (i) The effective resistance   **(4 marks)**
     (ii) The p.d. V of the battery   **(3 marks)**

f) Explain TWO characteristics of waves   **(4 marks)**

g) State THREE factors affecting resistance of a conductor   **(3 marks)**

Question Two

a) Distinguish giving examples between a semiconductor and a conductor   **(4 marks)**

b) Describe a process that can be used to produce an N-type semiconductor   **(3 marks)**

c) If a current of 4.0A is passed through a cable for 30 minutes and its resistance is 50Ω, how much electrical energy is converted to heat energy?   **(4 marks)**

d) Sketch the output voltage signal for a system which is:
     (i) Analogue
     (ii) Digital   **(4 marks)**

Question Three

a) Give THREE properties and THREE application of laser lights.   **(6 marks)**

b) Distinguish between transverse and longitudinal waves **(4 marks)**

c) What is the speed of a wave motion of frequency 2.5MHz and wavelength 0.6m? **(3 marks)**

d) State TWO uses of micro-waves **(2 marks)**

Question Four

a) State FIVE basic physical quantities and their SI units **(5 marks)**

b) (i) Distinguish between distance and displacement **(2 marks)**
   (ii) A bus takes 45 minutes to cover a distance of 60km. Determine its peed in m/s **(3 marks)**

c) State FIVE properties common to all electromagnetic waves **(5 marks)**

Question Five

a) (i) What is meant by "Electric Field" **(2 marks)**
   (ii) Draw an electric field of two point charges of different types of charges close to each other
   (2 marks)
   (iii) Explain how the electric field patterns shows the field strength or intensity **(4 marks)**

b) A capacitor is marked 1000μF. What is the charge on it at 20V? **(4 marks)**

c) Give THREE uses of capacitors **(3 marks)**