TECHNICAL UNIVERSITY OF MOMBASA

Faculty of Applied & Health Sciences

DEPARTMENT OF MATHEMATICS & PHYSICS

DIPLOMA IN INFORMATION COMMUNICATION TECHNOLOGY (DICT 13S)

APS 2130: FUNDAMENTALS OF PHYSICS

END OF SEMESTER EXAMINATION
SERIES: DECEMBER 2013
TIME ALLOWED: 2 HOURS

Instructions to Candidates:
You should have the following for this examination
- *Answer Booklet*

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) (i) In what ways does laser light differ from the light from a filament lamp? **(3 marks)**
(ii) Give THREE uses of the laser light **(3 marks)**

b) Distinguish between digital and analogue signals giving examples of the devices producing them **(6 marks)**

c) (i) What is meant by the term "power" **(1 mark)**
(ii) What is the power output in a machine less than the power input in a machine less than the power input? **(2 marks)**

(iii) An electric lamp connected across a 240V supply has a current of 0.52A in it. How much work is done in 12 minutes? **(4 marks)**

d) A motor car is uniformly retarded and brought to rest from a speed of 90km/h in 20 seconds. Find its acceleration. **(5 marks)**

e) Explain the factors that affect the capacitance of a parallel plate capacitor **(6 marks)**

Question Two

a) (i) State the important requirements for any physical measurements **(3 marks)**
(ii) Derive the dimension of force. Given that F = ma **(4 marks)**

b) Convert the following quantities into the ones indicated in the bracket. Give your answer in standard form.

	μm
(i) 20m	((
(ii) 72.5 pF (F)	**(4 marks)**

c) State the factors affecting the strength of an electromagnet **(8 marks)**

Question Three

a) Define the terms:
(i) Inertia **(1 mark)**
(ii) Momentum **(1 mark)**

b) State FOUR sources of energy **(4 marks)**

c) (i) A car of mass 1000kg accelerates from 8 ms^{-1} to 20ms^{-1} in 4 seconds. Calculate the accelerating force of the car **(6 marks)**
(ii) Calculate its kinetic energy after 4 seconds **(3marks)**

Question Four

a) Explain why bits of papers and attracted to a charged rod (plastic) even though they have no charge. **(3 marks)**

b) Calculate the electrostatic force between two electrons separated by a distance of 10^{-1}m **(3 marks)**

c) (i) Describe the construction of a transformer **(5 marks)**

(iii) State FOUR ways of minimizing energy loss in the transformer **(4 marks)**

Question Five

a) State the basic functions of a transistor **(2 marks)**

b) (i) In alternating current what is meant by the term "root mean square" value? **(2 marks)**

(ii) The domestic mains supply voltage in 240V. Calculate the peak voltage **(3 marks)**

c) List any FOUR electromagnetic radiations (waves) and for each state one of its uses **(8 marks)**