TECHNICAL UNIVERSITY OF MOMBASA

Faculty of Applied & Health Sciences

DEPARTMENT OF MATHEMATICS & PHYSISCS

DIPLOMA IN INFORMATION COMMUNICATION TECHNOLOGY (DICT)

APS 2103: FUNDAMENTALS OF PHYSICS

END OF SEMESTER EXAMINATION
SERIES: AUGUST 2014
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) Derive the dimension of acceleration. **(3 marks)**

(ii) Use dimensional analysis to check the validity of the equation. $V = u + at$ **(3 marks)**

b) Name and give one use of the radiations in the electromagnetic spectrum in their order of decreasing wavelength. **(7 marks)**

c) Explain the term "Band Width" **(2 marks)**

d) (i) Give TWO examples of intrinsic semiconductor. **(2 marks)**
(ii) Describe two ways in which the conductivity of intrinsic semi-conductor can be changed. **(6 marks)**

e) (i) A state Newton's second law of motion. **(1 mark)**
(ii) A car of mass 1600kg accelerates from 8m/s to 20m/s in 4 seconds. Calculate the accelerating force of the car. **(6 marks)**

Question Two

a) (i) State the law of conservation of energy. **(2 marks)**
(ii) Describe the energy conversion process in the computer. **(3 marks)**
(iii) State THREE sources of energy. **(3 marks)**

b) An electric motor raises a package vertically to a height of 20m in 5 seconds. If the package has a mass of 500kg. Determine average power of the motor. **(5 marks)**

c) What does the prefixes represent:
(i) Micro
(ii) Giga **(2 marks)**

Question Three

a) What is meant by:
(i) e.m.f of a cell **(1 mark)**
(ii) Internal resistance **(1 mark)**

b) A circuit consists of a cell, two resistors of 2 Ω and 4 Ω in series and a switch.
(i) Draw a circuit to represent the information above **(3 marks)**
(ii) If the cell supplies a current of 0.2A through circuit and it has internal resistance 1.5 Ω, determine its e.m.f **(4 marks)**

c) Discuss THREE factors that determine the resistance of an electrical conductor. **(6 marks)**

Question Four

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

b) State FOUR ways in which loss of power is minimized in a transformer **(4 marks)**

c) A car starts from rest and accelerates uniformly for 10 seconds and attains a velocity of 30m/s. The car moves at constant velocity attained for half minute before coming to rest in 10 seconds:

(i) Sketch a velocity time graph for the motion describe above **(3 marks)**

(ii) Calculate the total distance travelled by the car **(3 marks)**

Question Five

a) (i) State the law of electrostatics forces. **(2 marks)**

(ii) Explain why small pieces of paper are first attracted towards a glass rod rubbed with silk **(3 marks)**

b) Draw an electric field pattern for two point charges of same positive charge. **(2 marks)**

c) An electric lamp connected across a 240 volt line has a current of 0.5A in it. How much work is done in 15 minutes? **(4 marks)**

d) State FOUR uses of Lasers **(4 marks)**