KIRIRI WOMENS' UNIVERSITY OF SCIENCE AND TECHNOLOGY
UNIVERSITY EXAMINATION, 2016/2017 ACADEMIC YEAR
FIRST YEAR, FIRST SEMESTER EXAMINATION
FOR THE DEGREE OF BACHELOR OF SCIENCE
(COMPUTER SCIENCE)

Date: 10th August, 2016.
Time: 8.30am – 10.30am

KPH 101 - PHYSICS 1

INSTRUCTIONS TO CANDIDATES

ANSWER QUESTION ONE (COMPULSORY) AND ANY OTHER TWO QUESTIONS

QUESTION ONE (30 MARKS)

a) Using the theory of dimensions, determine, the dimensions of constants '*a*' and '*b*'in Vander Wall's equation, $\left[P + \frac{a}{V^2}\right](V - b) = RT$, where P is pressure and V, is Volume.

(10 Marks)

b) Calculate the quantity of heat conducted through 4 m^2 of a brick wall 15 cm thick, in 2 hours, if the temperature on one side is 10° C and on the other side is 30° C. (Assume thermal conductivity of brick = 0·13 W m^{-1}K^{-1}).

(6 Marks)

c) A train travelling at 72 km h^{-1}undergoes a uniform retardation of 2 m s^{-2} when brakes are applied. Find the time taken to come to rest and the distance travelled from the place where the brakes were applied.

(6 Marks)

d) A man 2 m tall, whose eye level is 1.84 m above the ground, looks at his image in a vertical mirror. Using a clear labelled ray diagram, find the minimum vertical length of the mirror if the man is to be able to see the whole of him.

(8 Marks)

QUESTION TWO (20 MARKS)

a) Two trains are 10 km apart on a line running south(S) to north (N). The one farther North is moving to west (W) at 20km h^{-1}. The other is moving north (N) at 20 km h^{-1}.

    i) What is their distance of closest approach?

    ii) How long do they take to reach the point of closest approach?

(15 Marks)

b) i) Define simple harmonic motion

(3 Marks)

    ii) State the relationship between displacement of a body from its mean position and the restoring force when a body executes simple harmonic motion.

(2 Marks)

QUESTION THREE (20 MARKS)

The velocity, *V*, of a wave set up in a stretched string by plucking it, is given *by :*
$V = k F^x l^y m^z$, where *F* is the force or tension in the string, *l* the length of string and *m*, is the mass of it and *k* is a constant. Determine using dimensions, the simplified formula of the string velocity.

QUESTION FOUR (20 MARKS)

a)   A body is supported by a spiral spring and causes a stretch of 1.5 cm in the spring .If the mass is now set in vertical oscillation of small amplitude. What is the periodic time of the oscillation?

(11 Marks)

b)   State   the laws of gases usually associated with the names of Boyle, Charles and Dalton.

(9 Marks)

QUESTION FIVE (20 MARKS)

a)   Distinguish between progressive and stationary wave motion.

(8 Marks)

b)   Plane sound waves of frequency 100 Hz fall normally on a smooth wall. At what distance from the wall will the air particles have maximum amplitude of (Assume velocity of sound in air may be taken as 340 m s^{-1}).

(12 Marks)