



JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY
SCHOOL OF HEALTH
UNIVERSITY EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN:
PUBLIC HEALTH
2018/2019 EXAMINATION
KISUMU CAMPUS

COURSE CODE: HCD 3121

COURSE TITLE: PHYSICS FOR ENVIROMENTAL HEALTH

DATE:16/08/19

EXAM SESSION: 2.00 – 4.00pm

TIME: 2:00HRS

Instructions:

- 1. Answer question 1 (Compulsory) in Section A and ANY other 2 questions in Section B.**
- 2. Candidates are advised not to write on the question paper.**
- 3. Candidates must hand in their answer booklets to the invigilator while in the examination room.**

(Planks constant $h = 6.63 \times 10^{-34} \text{ js}$, charge of an electron, $e = 1.6 \times 10^{-19} \text{ C}$ and velocity of light $c = 3.0 \times 10^8 \text{ ms}^{-1}$) Take $h = 6.63 \times 10^{-34} \text{ js}$, $m_e = 9.1$

SECTION A

QUESTION ONE

- a) Define the following terms
- A vector
 - Circular motion
 - Viscosity
 - Thermal equilibrium
- (4 marks)
- b) Demonstrate two methods of getting the cross product of vectors a and b with the vectors components;

$$\underline{a} = (2, 3, 4)$$

$$\underline{b} = (5, 6, 7)$$

Find $\underline{a} \times \underline{b}$

(6 marks)

- C (i) A car starts from rest and accelerates uniformly over a time of 5.21 sec for a distance of 110m. Determine the acceleration of the car

(3 marks)

(ii) Determine the centripetal force acting upon a 40-kg child who makes 10 revolutions around the Cliffhanger in 29.3 seconds. The radius of the barrel is 2.90 meters

(3marks)

- d) A bullet leaves a rifle with a muzzle velocity of 521m/s. While accelerating through the barrel of the rifle, the bullet moves a distance of 0.840m. Determine the acceleration of the bullet (assume a uniform acceleration)

(3 marks)

- e) With an aid of a diagram, explain two types of eye defects and how they can be corrected

(3marks)

- f) An X-ray tube has an accelerating potential difference of 100kv, what is the shortest wavelength in its X-ray beam?

(3 marks)

- g) Distinguish between Ferromagnetic and paramagnetic materials.

(2 marks)

QUESTION TWO

- a) Using a well labeled diagram discuss the three optical instruments

- Eye
- Microscope
- Telescope

(9marks)

- b) (i) A car starts from rest and accelerates uniformly over a time of 5.21 sec for a distance of 110m. Determine the acceleration of the car

(3marks)

(ii) Determine the centripetal force acting upon a 40-kg child who makes 10 revolutions around the Cliffhanger in 29.3 seconds. The radius of the barrel is 2.90 metres

(3 marks)

c) Discuss 3 applications of radioactivity.

(6 marks)

QUESTION THREE

a) Discuss three modes of heat transfer

(6 marks)

b) Find the final temperature if a heater source rated 42W heats 50g of water from 20°C in five minutes.

(8 marks)

c) (i) An engineer is designing the runway of an airport, the lowest acceleration rate is likely to be 3m/s^2 the take off speed for this plane will be 65m/s. assuming this minimum acceleration, what is the minimum allowed length for the runway?

(3 marks)

(ii) The observation deck of tall skyscraper 370m above the street. Determine the time required for the penny to free fall from the deck to the street below?

(3 marks)

QUESTION FOUR

a) Discuss how a Cathode ray oscilloscope works using a well labeled diagram

(9 marks)

b) State three applications of transistors

(3 marks)

c) Arrange the electromagnetic waves according to their wavelengths

(6 marks)

d) If a sound becomes louder, which wave characteristic is likely increasing – frequency, wavelength, amplitude, or speed?

(2 marks)

QUESTION FIVE

a) With the aid of a well labeled diagram;

i. Explain the production of X-rays

(8 marks)

ii. State one use of X-rays and one danger it can cause to our lives.

(2 marks)

b) Discuss three applications of ultrasonic sound

(6 marks)

c) State four factors affecting sound velocity

(4marks)