



**MURANG'A UNIVERSITY COLLEGE**

*A constituent college of Jomo Kenyatta University of Agriculture and Technology*

**FIRST YEAR EXAMINATION FOR THE DIPLOMA IN FOOD SCIENCE AND TECHNOLOGY**

**SPH 1101: PHYSICS EXAM**

**DATE: 8<sup>TH</sup> DECEMBER 2015**

**TIME 2 HOURS**

**Answer question ONE and any other TWO questions in this paper**

**Question 1**

- A. State the SI units of the following; [5mks]
- a. Mass
  - b. Time
  - c. Electric current
  - d. Luminous intensity
  - e. Amount of substance
- B. State three derived quantities. [3mks]
- C. Determine the dimensions of force. [3mks]
- D. Define the following terms. [4mks]
- a. Displacement
  - b. Speed
  - c. Distance
  - d. Acceleration
- E. A car moving at 10m/s increases its velocity to 20m/s in 5 seconds. Find ;
- a. The acceleration of the car. [3mks]
  - b. The distance travelled by the car in this time [ 3mks]
- F. State Newton's laws of motion. [ 3mks]
- G. A car of mass 2000kg is brought to rest from a velocity of 30m/s by a constant force of 6000N. Determine
- a. the change in momentum produced by the force [ 3mks]
  - b. the time it takes the car to come to rest. [ 3mks]

**QUESTION 2 (20 marks)**

- A. Name two types of thermometers. [ 2mks]
- B. Why is water not a suitable thermometric liquid. [ 3mks]
- C. An electric kettle rated 2.5kW, 240 V is filled with water. If the water requires  $7.5 \times 10^5$  Joules of heat to boil from the initial temperature,
- a. For how long should the circuit be on ? [5mks]
- b. Find the resistance of the heating element. [5mks]
- c. How much current flows in the circuit? [5mks]

**QUESTION 3 (20 marks)**

- D. Define the following terms [4mks]
- a. Heat
- b. Heat capacity
- c. Specific heat capacity
- d. Latent heat
- E. A person wants water for use at  $50^{\circ}\text{C}$ . How much water at  $80^{\circ}\text{C}$  should be added to 60kg of water at  $10^{\circ}\text{C}$  to achieve the desired temperature? Take specific heat capacity of water to be  $4200\text{j/kgK}$  [5mks]
- F. State and explain three modes of heat transfer. [9mks]
- G. state two scales used in measuring temperature. [2mks]

**QUESTION 4 (20 marks)**

- A. A car moving at 40m/s applies brakes and its velocity reduces to 20m/s in 5 seconds. Find ;
- i. The deceleration of the car. [3mks]
- ii. The distance travelled by the car in this time [3mks]
- B. Jane wanted to make a cake of mass 2kg. She was to use 5 eggs each of mass 50g, 600g of sugar, 10 Newtons of flour. The rest of the weight was taken by other ingredients. Find the weight of the ingredients. 3mks
- C. A lorry of mass 20,000kg is brought to rest from a velocity of 10m/s by a constant force of 120,000N. Determine
- c. the change in momentum produced by the force [4mks]
- d. the time it takes the lorry to come to rest. [3mks]
- D. Convert the following temperatures as stated; [4mks]
- a.  $20^{\circ}\text{C}$  to Kelvin
- b. 348 K to Celcius

**QUESTION 5 (20 marks)**

- A. An electric oven rated 2000W, 240 V is used to warm some food . If the food requires  $8.0 \times 10^5$  Joules of heat to attain the desired temperature,
- I. For how long should the circuit be on ? [5mks]
  - II. Find the resistance of the heating element. [ 5mks]
  - III. How much current flows in the circuit? [5mks]
- B. Why is mercury a suitable thermometric liquid. [2mks]
- C. A boy of mass 30kg sits 4m from the pivot of a seesaw. How far should a girl of mass 20kg sit for the system to be in equilibrium? [3mks]