MURANG'A UNIVERSITY OF TECHNOLOGY

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF APPLIED SCIENCES

UNIVERSITY ORDINARY EXAMINATION

2017/2018 ACADEMIC YEAR

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

SPH 1101 – PHYSICS

DURATION: 2 HOURS

DATE: 11TH DECEMBER, 2017

TIME: 9.00 – 11.00 A.M.

Instructions to Candidates:

1. Answer **Question 1** and **Any Other Two** questions.
2. Mobile phones are not allowed in the examination room.
3. You are not allowed to write on this examination question paper.

SECTION ONE - COMPULSORY

QUESTION ONE

(a) Name any two fundamental physical quantities and state their SI units (4 marks)

(b) Determine the dimensions of acceleration (3 marks)

(c) In a program aired in a local TV station, a lady of mass 178kg climbs stairs of height 30m in an effort to burn some calories. How many food calories did she burn by going up the stairs 10 times? (4 marks)

(d) Convert 500 calories into joules (2 marks)

(e) State the SI units of

i) Time

ii) Length

iii) Luminous intensity (3 marks)

(f) A cyclist moves at a speed of 20m/s westwards for 20 minutes. He then moved 500m eastwards in 30 seconds after which he cycled northwards for 2 minutes at a speed of 10m/s. find:

i) His average speed

ii) His average velocity (6 marks)

(g) State Newton's first law of motion (1 mark)

(h) Explain the meaning of contact force and state two examples of contact forces (3 marks)

(i) Fill the table below

Power of ten	Prefix	Abbreviation
10^{-18}		a
	nano	n
10^{15}		p
10^{-6}	micro	

(4 marks)

SECTION TWO – ANSWER ANY TWO QUESTIONS

QUESTION TWO

(a) A blast of sound is produced by a gun and after 2 seconds a man who is a distance x from the source hears the gun sound. If the speed of sound in air is 340m/s, find the value of x (3 marks)

(b) State and explain three types of inertia (6 marks)

(c) The velocity v of a particle is given by $v = u + at$ where u is the initial velocity, a is acceleration and t is time. Determine if the equation is dimensionally correct (4 marks)

(d) Define the following and state their SI units

i) Work

ii) Energy

iii) Stress (6 marks)

(e) State Hooke's law (1 mark)

QUESTION THREE

(a) A car initially moving at 20m/s increases it velocity to 40m/s in 5 seconds. Find:

i) The acceleration of the car

ii) The distance moved by the car (6 marks)

(b) A force of 50N acting on a wire of length 20mm and cross-sectional area $2cm^2$ makes the wire stretch by 0.4mm. Find the modulus of elasticity of the wire (4 marks)

(c) Explain how you can demonstrate surface tension using a painting brush and water (4 marks)

(d) Convert the following temperatures as stated:

i) 50°C to Fahrenheit scale

ii) 400K to Celsius scale

iii) 280°F to Kelvin scale (6 marks)

QUESTION FOUR

(a) In measuring the mass of a food supplement to be used in manufacturing a certain food product, a food technologist used a spring balance that had its pointer initially pointing at the 1cm mark. On attaching a 0.5kg mass of the food supplement, the pointer moved to the 5cm, mark on the spring balance.

i) Determine the strain of the spring balance (5 marks)

ii) If the diameter of the spring described above is 0.14cm, determine the stress it experienced (5 marks)

(b) Define momentum of a body and state its SI units (2 marks)

(c) Find the momentum of a body of mass 5000 gram moving at 72km/h (6 marks)

(d) Give two examples of scalar quantities (2 marks)

QUESTION FIVE

(a) State the three equations of motion (3 marks)

(b) Calculate the Kinetic energy of a body of mass 2kg moving at 30m/s (3 marks)

(c) The potential energy of a 5kg mass hanging at a height 'h' above the floor is 7000joules. Find the value of the height h (3 marks)

(d) Name two commonly used liquids as a thermometric liquid (2 marks)

(e) State two factors to consider when choosing a thermometric liquid (2 marks)

(f) State two reasons why water is not a good thermometric liquid (2 marks)

(g) For how long should an electric heater rated 2000watts be on to raise the temperature of 5kg of water from 15°C to 80°C. Take specific heat capacity of water to be 4200J/kg°C (5 marks)