



MACHAKOS UNIVERSITY

University Examinations 2019/2020

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF PHYSICAL SCIENCES

FIRST YEAR SECOND SEMESTER EXAMINATION FOR

ARTISAN IN FOOD AND BEVERAGE (TVET)

ARTISAN IN CLOTHING TECHNOLOGY

ARTISAN IN ELECTRICAL ENGINEERING

ARTISAN IN MOTOR VEHICLE ENGINEERING

SCIENCE

DATE: 23/3/2020

TIME: 2.30-5.30 PM

INSTRUCTIONS:

This paper consists of five questions, attempt ALL.

QUESTION ONE

- a) Define the following terms (3 marks)
 - i) Sound
 - ii) Echo
- b) State five sources of sound (5 marks)
- c) State and explain three factors affecting velocity of sound in air (6 marks)
- d) Explain why the walls of broadcasting studios and concert halls are made of cotton materials (2 marks)
- e) State three applications of pulse-echo technique (4 marks)

QUESTION TWO

- a) A disc siren with **100** holes is rotated at constant speed making **0.20** revolutions per second. If air is blown towards the holes, calculate;
- i) The frequency of the sound produced (3 marks)
 - ii) The wavelength of the sound produced, if velocity of sound in air is **340m/s** (3 marks)
- b) State the law of reflection of sound and explain how an echo is produce (4 marks)
- c) The speed of sound in air 340m/s. A loud speaker placed between two walls A and B, but nearer to wall A than B, is sending out constant sound pulses. How far is the speaker from wall B if it is 200m from wall A and the time between the two echoes received is 0.176 seconds? (10 marks)

QUESTION THREE

- a) State five sources of energy (5 marks)
- b) State three renewable resources (3 marks)
- d) State three non-renewable resources (3 marks)
- e) State three forms of energy (3 marks)
- f) Calculate work done by a stone mason in lifting a stone of mass **15kg** through a height of 2.0m (*Take $g = 10\text{Nkg}^{-1}$*) (3 marks)
- g) A force of **7.5N** stretches a certain spring by **5cm**. How much work is done in stretching this spring by **8.0cm**? (3 marks)

QUESTION FOUR

- a) Define the following terms (4 marks)
- i) Acid
 - ii) Alkali
 - iii) PH
- b) State three common acids (3 marks)
 - c) State three areas where acids are found (3 marks)
 - d) State five properties of acids and bases (5 marks)
 - e) State five uses of oxygen (5 marks)

QUESTION FIVE

- a) Define the following terms stating their SI units (12 marks)
- i) length
 - ii) area
 - iii) volume
 - iv) mass
 - v) density
 - vi) time
- b) A block of glass of mass 187.5g is 5.0cm long 2.0cm thick and 7.5cm high. Calculate the density of the glass in kgm^{-3} (5 marks)
- c) Show that the density of water $1g/cm^3$ is equal to $1000kg/m^3$ (3 marks)