



MACHAKOS UNIVERSITY

University Examinations for 2019/2020 Academic Year

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF MECHANICAL ENGINEERING

FIRST YEAR THIRD SEMESTER EXAMINATION FOR

CERTIFICATE IN ELECTRICAL ENGINEERING

APPLIED SCIENCE

DATE: 18/12/2020

TIME: 8.30-10.30 AM

INSTRUCTIONS

Answer all questions

1.
 - a) How is sound produced (3 marks)
 - b) The speed of sound in air is 340m/s. A loudspeaker placed between two walls A and B, but nearer to wall A than wall 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 (7 marks)
 - c) How is sound propagated (6 marks)
 - d) What evidence is there to show that sound is a wave motion (4 marks)
2.
 - a) Define the following and states the units
 - i. Health capacity (2 marks)
 - ii. Specific health capacity (2 marks)
 - iii. Specific latent heat of fusion (2 marks)
 - iv. Latent heat of vaporization (2 marks)
 - b) A block of iron of mass 1.25kg at 120⁰C was transferred to aluminum calorimeter of mass 0.3kg containing a liquid of mass 0.6kg at 25⁰C. The block and the calorimeter with its contents eventually reached a common temperature of 50⁰C. Given the specific capacity of iron as 450J/kg and that of aluminum 900J/kg, calculate the specific heat capacity of liquid (12 marks)

3. a) List five natural sources of energy (6 marks)
- b) Name the device that facilitates energy transformation (2 marks)
- c) Describe the energy transformation that takes place in each of the following
- i. A car battery is used to light a bulb
 - ii. Coal is used to generate electricity
 - iii. A pen drum bob swing to and for
 - iv. Water at the top of a waterfall and its temperature rises on reaching the bottom (12 marks)
4. a) Describe two methods of magnetizing a steel rod (6 marks)
- b) Explain why a magnet material is attracted to a magnet (2 marks)
- c) Explain why soft iron cannot be used to make permanent magnet (4 marks)
- d) Used domain theory and explain the difference between magnetic and non-magnetic materials (8 marks)
5. a) Differentiate between solid and liquid
- b) With aid of simple sketches explain that pressure act in
- i. Equally and in all direction
 - ii. Pressure increases with depth
 - iii. Pressure in liquid takes its own level