MACHAKOS UNIVERSITY

University Examinations 2021/2022

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF PHYSICAL SCIENCES

FOURTH YEAR SUPPLEMNTARY/SPECIAL EXAMINATION FOR

BACHELOR OF EDUCATION (SCIENCE)

SPH 403: PRACTICAL PHYSICS II

DATE: 17/03/2022 **TIME: 11:00 – 1:00 PM**

INSTRUCTIONS:

- Answer any **One** question (each 20 marks).

QUESTION ONE (20 MARKS)

Using the following equation, $R = \epsilon\sigma T^4$ whereas R= energy radiated per area per time, ϵ=emissivity of the material of the body, σ = Stefan's constant =$5.67\text{x}10^{-8}$ $Wm^{-2}K^{-4}$, and T is the temperature in Kelvin,

a) Design an experiment to be used to determine the temperature of the sun from its energy density (8 marks)

b) Sketch the relevant curve to show the respective relationships (5 marks)

c) What assumptions were made? (3 marks)

d) Make underlying conclusions in relevance to our home/hut fireplaces (4 marks)

QUESTION TWO (20 MARKS)

a) While supporting, explain why the temperature of a liquid initially at boiling point quickly reduces over time than a settled cooling liquid (6 marks)

b) Describe any three modern applications of cooling effects and especially the Newton's cooling (8 marks)

c) After performing an experiment on cooling phenomenon, students found out that the relation between measured variables was $f(x) = 76 + 104(0.975777)^x$. Using mathematical relations and laws of physics, justify that indeed the students were right. (6 marks)