FACULTY: BASIC AND APPLIED SCIENCES

DEPARTMENT: PHYSICAL AND CHEMICAL SCIENCES

FIRST SEMESTER EXAMINATIONS 2017/2018 ACADEMIC SESSION

COURSE TITLE: ELEMENTARY MODERN PHYSICS **COURSE CODE: PHY 201**

DURATION: 2Hrs: 30 mins **HOD's SIGNATURE -**

COURSE UNITS: 2units

INSTRUCTIONS: Answer three questions only.

QUESTION ONE

(a) State two postulates of Einstein special relativity?
(b) Differentiate between Lorentz transformation and Galilean transformation of Newtonian physics.
(c) Describe the two consequences of Lorentz transformation?

QUESTION TWO

(a) Explain the following: proper frame, proper length, proper time.
(b) A light pulse is emitted at the origin of a frame of reference, S' at time t'=0. Its distance x' from the origin after a time t' is given by $x'^2 = c^2t^2$. Use the Lorentz transformation to transform this equation to an equation in x and t and show that this is $x^2 = c^2 t^2$. Discuss the implication of this result.

QUESTION THREE

(a) What is relativistic velocity?
(b) Calculate the length and the orientation of a rod of length 8m in a frame of reference which is moving with a velocity equal to 0.8c, in a direction making an angle of 45^0 with the rod.

QUESTION FOUR

(a) Explain Planck's law of blackbody radiation and Wien's displacement law?
(b) List five factors on which the temperature of planet depends.
(c) Explain the uncertainty principle by Heisenberg?