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**GARISSA UNIVERSITY**

**UNIVERSITY EXAMINATION 2019/2020 ACADEMIC YEAR ONE**

**SECOND SEMESTER EXAMINATION**

**SCHOOL OF PURE AND APPLIED SCIENCES**

**FOR THE DEGREE OF BACHELOR OF EDUCATION**

**COURSE CODE: PHY 110**

**COURSE TITLE: BASIC MECHANICS 1**

**EXAMINATION DURATION: 2 HOURS**

**DATE: 13/02/2020 TIME: 09.00-11.00 AM**

**INSTRUCTION TO CANDIDATES**

* **The examination has FIVE (5) questions**
* **Question ONE (1) is COMPULSORY**
* **Choose any other TWO (2) questions from the remaining FOUR (4) questions**
* **Use sketch diagrams to illustrate your answer whenever necessary**
* **Do not carry mobile phones or any other written materials in examination room**
* **Do not write on this paper**

**This paper consists of THREE (3) printed pages *please turn over***

**QUESTION ONE (COMPULSORY)**

1. Distinguish between the following quantities
2. Scalar and Vector quantities **[1 mark]**
3. Weight and mass **[1 mark]**

 (b) A student weighs 588N. What is her mass? **[2 marks]**

 (c) State the following laws as applied to scalar quantities

(i) Law of commutation  **[2 marks]**

 (ii) Law of association **[2 marks]**

 (iii) Law of distribution **[2 marks]**

 (d) Deduce the necessary condition for the vectors

**A**= $a\_{1}i+b\_{1}j+c\_{1}k$ and  **B** = $a\_{2}i+b\_{2}j+c\_{2}k$ to collinear **[6 marks]**

(e) Define the following terms as applied to thermodynamics

 (i) Isothermal process **[2 marks]**

 (ii)Isometric Process **[2 marks]**

 (iii) Adiabatic Process **[2 marks]**

(f) (i) Distinguish between Adhesive and cohesive forces in fluids **[3 marks]**

 (ii) In fluids what is a laminar flow **[2 marks]**

 (iii)What is a progressive wave? **[3 marks]**

**QUESTION TWO**

1. State the three fundamental kinematic laws **[6 marks]**
2. (i) Derive the law of conservation of momentum **[8 marks]**

(ii) A 100kg football player runs straight down the field with a velocity of 4.0 m/s. A

1.0 kg artillery shell leaves the barrel of a gun with a muzzle velocity of 500 m/s. which has a greater momentum? (Magnitude) **[6 marks]**

**QUESTION THREE**

1. (i) What is specific heat capacity of a substance? **[3 marks]**

(ii)How much heat is required to raise the temperature of 0.20 kg of water from 150 to 450 **[5 marks]**

1. What are (i) 200 C on a Fahrenheit scale **[3 marks]**

 (ii) Normal body temperature 98.60F on the Celsius scale **[3 marks]**

1. (i) State the first law of thermodynamics **[3 marks]**

(ii) From 2c(i) explain an Isobaric process **[3 marks]**

**QUESTION FOUR**

1. (i) Define surface tension **[3 marks]**

(ii) What is capillarity? **[3 marks]**

1. Show that the height to which a liquid rises in a capillary tube depends on the diameter.$ h=\frac{2γ\cos(φ)}{ρgr}$ where symbols have their usual meaning . **[6 marks]**
2. (i) How high will plane water at 200 rise in a 1.0mm diameter glass

 capillary tube **[4 marks]**

(ii) Will soapy water raise more or less ($φ$ for pure water is 00 and $γ$ for water and soapy water is 0.073 N/M and 0.025 N/M respectively). **[4 marks]**

**QUESTION FIVE**

1. (i) De rive the Bernoulli’s equation **[10 marks]**
2. On account of the above equation explain why roofs of are blown off leaving walls intact **[5 marks]**
3. Show that elastic modulus of a material is given by $γ=\frac{\frac{F}{A}}{\frac{∆L}{L\_{0}}}$ . **[5 marks]**