Uganda Martyrs University

FACULTY OF EDUCATION

BACHELOR OF EDUCATION (PRIMARY) YEAR ONE

SEMESTER ONE EXAMINATIONS, 2022/23

PHYSICAL SCIENCE EDUCATION

PAPER II: PROPERTIES OF MATTER, VECTOR AND SCALAR QUANTITIES

DATE: 12/01/2023 DURATION: 3 hours. TIME: 2:00pm - 5:00pm

Instructions:

- **Do not write anything on this question paper.**
- **Attempt only 4(four) questions of your choice**
- **Begin each selected question on a new page in the answer booklet.**
- **Follow instructions on this question paper and answer booklet carefully.**
- **Each question carries a total of 25 marks**

Question one:

a. i. What are the basic properties of matter? **(3 marks)**
ii. State what happens when tea leaves are put in a cup of hot water. **(2 marks)**
iii. Suppose the liquid in a ii) is divided into four transparent glasses, tell what is most likely to be observed. **(2 marks)**
iv) what is the importance of a vacuum in a thermos flask. **(2 marks)**

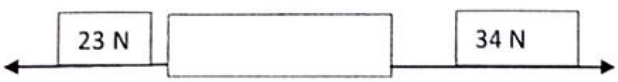
b. i. Mention any three substances that change directly from gaseous to solids and vice verse. **(3 marks)**
ii. State the particle model of matter. **(2 marks)**
iii. Discuss how convectional currents take place. **(3 marks)**
iv state any three applications of convectional currents. **(3 marks)**

Question two:

a. Define the following terms;
i. Brownian motion. **(1mark)**
ii. Diffusion. **(1mark)**
iii. Osmosis. **(1mark)**
iv. Describe a brief experiment an experiment to demonstrate diffusion in liquid **(4marks)**
iii. Define a vector giving three examples. **(4 marks)**

b. i. Define a scalar giving two examples. **(3 marks)**
ii. A force of 300 N acts on a mass of 600 Kg, what is the acceleration of this mass. **(3 marks)**

iv. What is the equivalent force acting on the rod presented? **(3 marks)**



Question three:

a. i. Suppose a motor bike rider rides due south at 120 kmh^{-1} but the wind blows due due west at 100 kmh^{-1}. Find the resultant velocity. **(3 marks)**

ii. At what direction is this resultant velocity? **(2 marks)**

iii. Draw a diagram to show how a negative and a positive vector is presented horizontally. **(2 marks)**

b. i. What do you understand by resolution of a vector and what do we call the parts after resolution. **(2 marks)**

ii. A ship moves with a velocity of 12 ms^{-1} N 45^0 E. Find the time it takes to sail 11 km North. **(2 marks)**

iii. Mention any three applications of vectors. **(3 marks)**

c. Find the size of the net force produced by a 6 N and 32 N force in each of the following arrangements

i. The forces act in the same direction. **(3 marks)**

ii. The forces act in the opposite directions. **(3marks)**

Question four:

a. Explain why cooking on a higher altitude take longer time. **(4 marks)**

b. Briefly explain how you would show to the learners that matter is made of small tiny particles that are in a state of random motion. **(5 marks)**

c. i. A force of 20N is acting at an angle of 60^0 to the horizontal. What is its magnitude in the vertical and horizontal components. **(5 marks)**

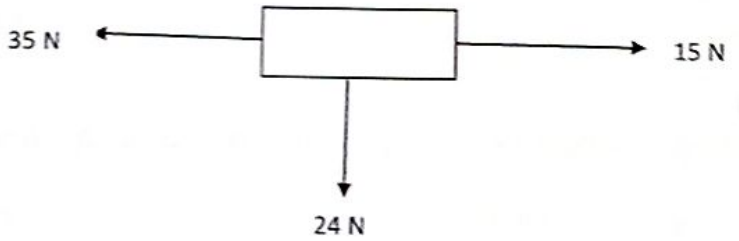
ii. A boat moves with a velocity of 150 m/s S 45^0 West. How long will take to move 120 km in the East. **(3 marks)**

iii. state any three differences between mass and weight. **(3marks)**

Question five:

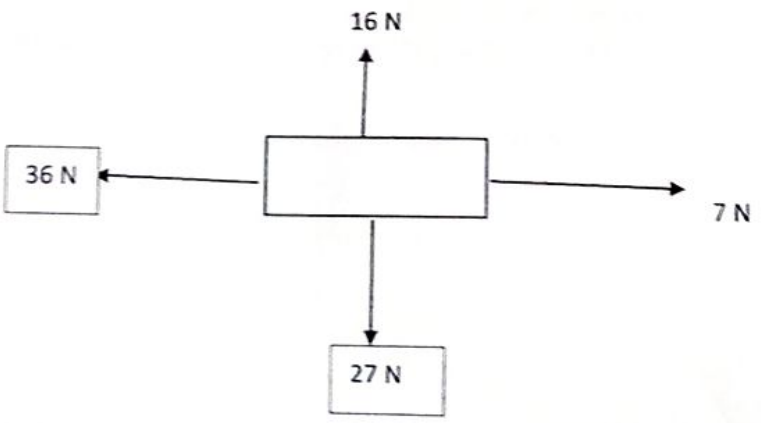
a. Find the resultant force in the following figures.

i.



(4 marks)

ii.



(5 marks)

b. A plane must reach 500 km due South. If the velocity of the wind is 120km/hr due East. In Which direction should the plane fly if its velocity is 300km/hr, calculate the time it will take to reach the place? **(4 marks)**

c. Given that the vectors, $A = 3i + 5j + 6k$, $B = 4i + 77j + 25k$, and $C = 12i + 15j + 42k$. Using the information above, find;

i. $A + B$ **(1 marks)**

ii. $A - C$ **(2 marks)**

iii. $C + B - A$ **(2 marks)**

iv. $2C + 3A$ **(2marks)**

Question six:

Use the following procedure to construct, to scale, a parallelogram.

i. On a graph paper select a suitable scale, for instance, 2 cm to represent 2 N, draw a line OC to represent 16 N force. **(3 marks)**

ii. Using your protractor, measurer an angle of 45^0 at O, draw a line OB, to represent the 12 N force. **(3 marks)**

iii. Complete the parallelogram with OC and OD forming two sides of the parallelogram. **(2 marks)**

iv. Measure the length of the diagonal OD. **(4marks)**

v. Use the scale to find the magnitude of the resultant. **(3 marks)**

vi. Measure the angle and state the direction of the resultant to the 16N force. **(2 marks)**

vii. What would be the resultant force if the 16 N and 12 N forces were acting at right angles to each other. **(3 marks)**

END