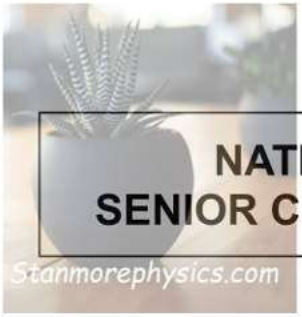
education

MPUMALANGA PROVINCE
REPUBLIC OF SOUTH AFRICA



NATIONAL SENIOR CERTIFICATE

GRADE 11

PHYSICAL SCIENCES

JANUARY 2025

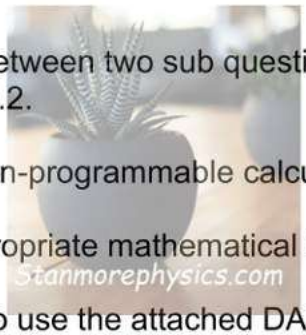
TOPIC TEST: VECTORS

MARKS: 30
TIME: 36 Minutes

This question paper consists of 5 pages

INSTRUCTIONS AND INFORMATION

1. Write your name in the appropriate space on the ANSWER BOOK/FOLIO PAPER.
2. This question paper consists of NINE questions. Answer ALL the questions in the ANSWER BOOK/FOLIO PAPER.
3. Start EACH question on a NEW page in the ANSWER BOOK/FOLIO PAPER.
4. Number the answers correctly according to the numbering system used in this question paper.
5. Leave ONE line between two sub questions, for example between QUESTION 2.1 and QUESTION 2.2.
6. You may use a non-programmable calculator.
7. You may use appropriate mathematical instruments.
8. You are advised to use the attached DATA SHEETS.
9. Show ALL formulae and substitutions in ALL calculations.
10. Round off your final numerical answers to a MINIMUM of TWO decimal places.
11. Give brief motivations, discussions, et cetera where required.
12. Write neatly and legibly.



QUESTION 1 : MULTIPLE-CHOICE QUESTIONS

Four options are provided as possible answers to the following questions. Each question has only ONE correct answer. Choose the answer and write only the letter (A – D) next to the question number (1.1 – 1.3) in the ANSWER BOOK, for example, 1.4 E.

1.1 Two forces of 3 N and 9 N act on the same point. If the angle between the forces can have any value, which ONE of the following cannot be a possible magnitude of the resultant force?

A 13 N

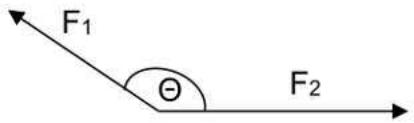
B 12 N

C 7,5 N

D 6 N

(2)

1.2 Two forces act at a point as indicated. If the angle Θ decreases from 120° to 0°, the magnitude of the resultant force will …



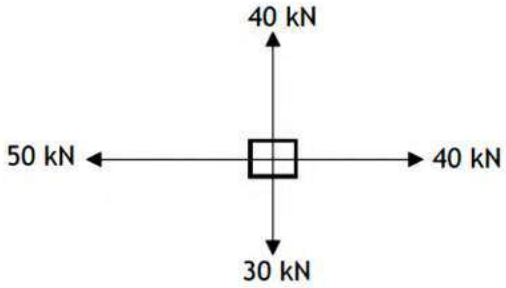
A Decrease

B Increase

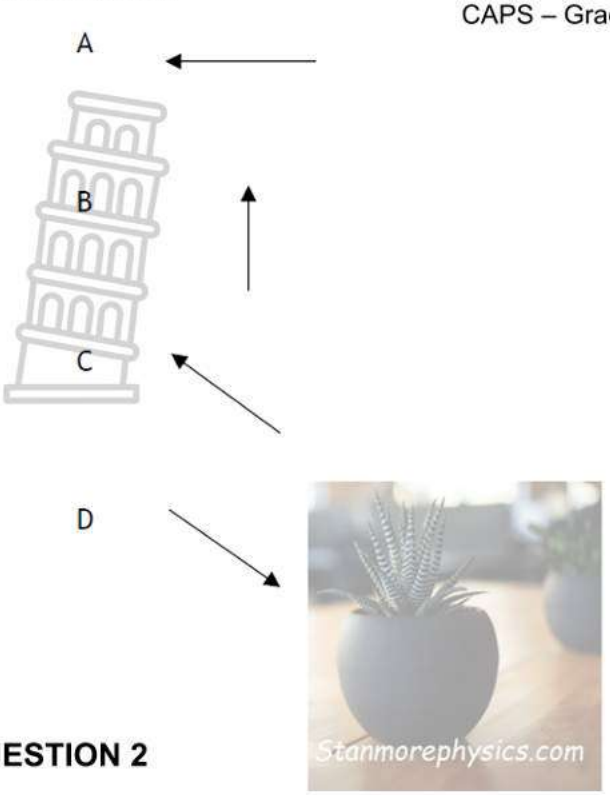
C Remain the same

D Decrease and increase (2)

1.3 Four tugboats apply forces to an oil-rig as shown.



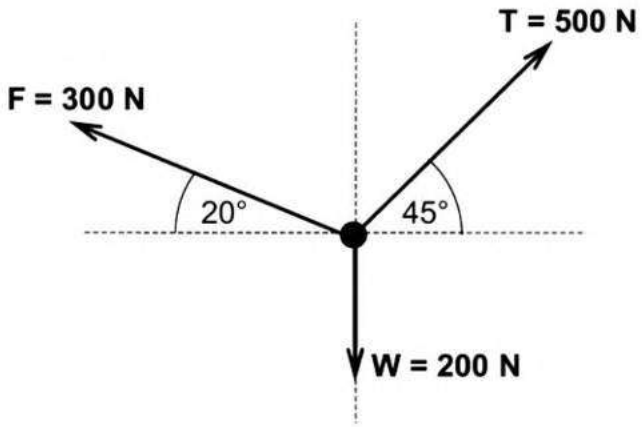
Which of the following vector diagrams represent the magnitude of the resultant force?



(2)
[6]

QUESTION 2

Consider the three forces acting on an object as shown in the diagram below:



2.1 Define the term *resultant*. (2)

2.2 Calculate the horizontal and vertical components of force T. (4)

2.3 Calculate the horizontal and vertical components of force F. (4)

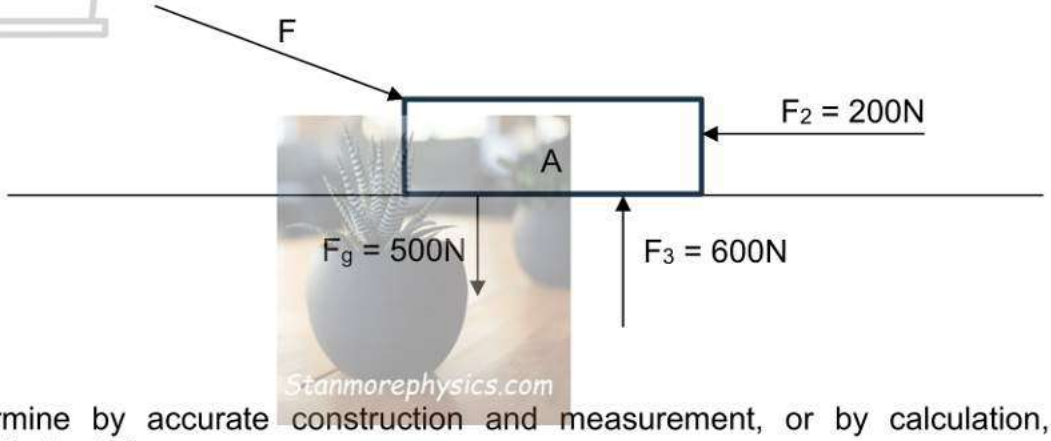
2.4 Determine the magnitude and direction of the resultant horizontal force. (2)

2.5 Determine the magnitude and direction of the resultant vertical force. (2)

2.6 Using the tail-to-tail method, draw a neat, labelled force diagram and determine the magnitude and direction of the resultant force acting on the object. (5)
[19]

QUESTION 3

The forces on object A in the diagram are in equilibrium. Force F is exerted diagonally downwards on object A. The weight (w) of the object is 500 N, F_2 to the left is 200 N and F_3 upwards is 600 N.



Determine by accurate construction and measurement, or by calculation, the magnitude of F. (5)

[5]

TOTAL: 30