

Be sure to show evidence of your thinking for all questions where appropriate. Round angular answers to ONE decimal place, all others to TWO decimal places. Use a RULER on all vector diagrams. Final answers should be in a box or be easily recognizable; be sure to include units with all answers.

1. A very well-educated pirate left a treasure map with the following directions to the hidden treasure.
 - (a) Walk 3.5 km @ NW to avoid the swamp
 - (b) Walk 5 km @ N10°E along a deep ravine to avoid the scary animals in that area
 - (c) Walk 6.2 km @ E20°S along the cliff edge
 - (d) Walk 3 km @SE through the desert to reach the riches you seek.
 - (i) On a separate page, draw a scale diagram illustrating the vectors used in this problem. (3 marks)
 - (ii) If you could jump in a helicopter and fly right to the treasure, determine the displacement (mag. Direction) of your flight? Do this by calculation **and** by measuring your scale diagram (they should be the same). (7 marks)

Neatness and accuracy are part of this question, use a sharp pencil, a ruler and protractor.

2. A go cart is travelling at 4.5 m/s [E], 2 seconds later it is travelling at 8m/s [N60°E]. What is the acceleration of the go cart as it rounds the corner of the track (mag. and direction)? Draw a scale diagram to help illustrate your solution. (6 marks)

3. A 3.6kg flower pot at rest, falls off a window sill 12m above the street level due to wind. The outside temperature is 20°C and there is a relative humidity of 30%. The flower pot narrowly misses a man of height 1.8m tall and mass 78kg. The flower pot continues to fall into an open sewer grate (diameter 80cm) and comes to rest at the bottom of the sewer 3m below ground level. (5 marks)
 - (a) What is the total flight time of the flower pot?
 - (b) What is the speed of the flower pot the instant before it hits the bottom of the sewer?

4. Use the following Velocity–Time Graph to generate the corresponding position-time graph and acceleration-time graph. Accuracy and neatness are part of this question, use a PENCIL to draw your graphs. PAY ATTENTION TO THE SCALE USED ON EACH GRAPH. Using the appropriate curve or line for a given segment is important. (6 marks)

