NGO & SONS
ACADEMIC COACHING

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PHYSICS

Module 1

KINEMATICS

Homework 1

- Definition of terms
  - Types of Motion
  - Vector and Scalar Quantities
  - Distance and Displacement
  - Speed and Velocity
  - Acceleration
  - Speeding up and slowing down
  - Uniform Motion and Non=uniform motion

YEAR 11

Name:

Class:

Section 1:

Multiple Choice

1) Which of the following lists contains only scalar quantities?

   a. Distance, velocity, time, force
   b. Acceleration, displacement, kinetic energy, momentum
   c. Time, kinetic energy, distance, speed
   d. Velocity, force, mass, momentum

2) Which of the following lists contains only vector quantities?

   a. Time, velocity, momentum, force
   b. Momentum, force, velocity, displacement
   c. Acceleration, force, velocity, kinetic energy
   d. Time, distance, kinetic energy, speed

3) Which of the following describes the method used to convert from gigametres to kilometres?

   a. Multiply by 1,000.
   b. Multiply by 1,000,000.
   c. Divide by 1,000.
   d. Divide by 1,000,000.

4) Which of the following is the most correct statement?

   a. Displacement describes how far an object travels to reach a given point.
   b. The standard unit for speed and velocity is kmh^{-1}.
   c. Velocity is a measure of the rate an object travels a distance.
   d. Distance is the sum of all of the lengths of the journey regardless of direction.

5) 1 kilogram is approximately how many μg (micrograms)

a. One thousand micrograms.
b. One hundred thousand micrograms.
c. One million micrograms.
d. One billion micrograms.

6) In which of the following scenarios is the distance travelled equal to the displacement from the original position?

a. Sam runs around a track 400m in circumference, starting and finishing at the same spot.
b. Julie sprints the entire length of a 100m track.
c. Kim jogs 300m north, 200m east and 400m south.
d. Dale drives from his house to the gym following by the shops and then home.

7) A cyclist travels at 60kmh^{-1} for 0.5 hours, and then at 40kmh^{-1} for the next 1.5 hours until the destination is reached. How fast would a second cyclist, travelling at constant speed, need to ride to arrive at the destination at the same time?

a. 40 km h^{-1}
b. 45 km h^{-1}
c. 50 km h^{-1}
d. 55 km h^{-1}

Section 2:

Short Answers

1) Fill in the following table.

(7 marks)

Quantity	**Symbol**	**Type of Quantity (Scalar/Vector)**
Distance		
Mass		
Momentum		
Energy		
Time		
Displacement		
Force		

2) What is the difference between speed and velocity?

(2 marks)

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3) A car travels at 72kmh^{-1} in 6 minutes.

   a) Find the car's speed in ms^{-1}.

(1 marks)

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b) How far does the car travel in 20s?

(1 marks)

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4) Tom walked 4m west in 3 minutes and then turned south and travelled a further 4m in 2 minutes. He then turned and walked east for 7m in 5 minutes.

a) Draw a diagram to represent Tom's journey.

(1 marks)

b) Calculate the distance Tom travelled in his journey

(1 marks)

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c) Find the magnitude of Tom's average velocity from his starting position.

(2 marks)

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5) Explain the difference between instantaneous speed and average speed.

(2 marks)

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6) An Olympic sized 50-meter swimming pool was used for practice. Terry completed 4 laps in 1 minute and 24 seconds.

a) Calculate his average speed.

(2 marks)

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b) Calculate his average velocity.

(1 marks)

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7) Jenny averages 80kmh^{-1} for a 120km journey. For the first 40km, she averages 60kmh^{-1}. What must her average speed have been for the remainder of the journey

(3 marks)

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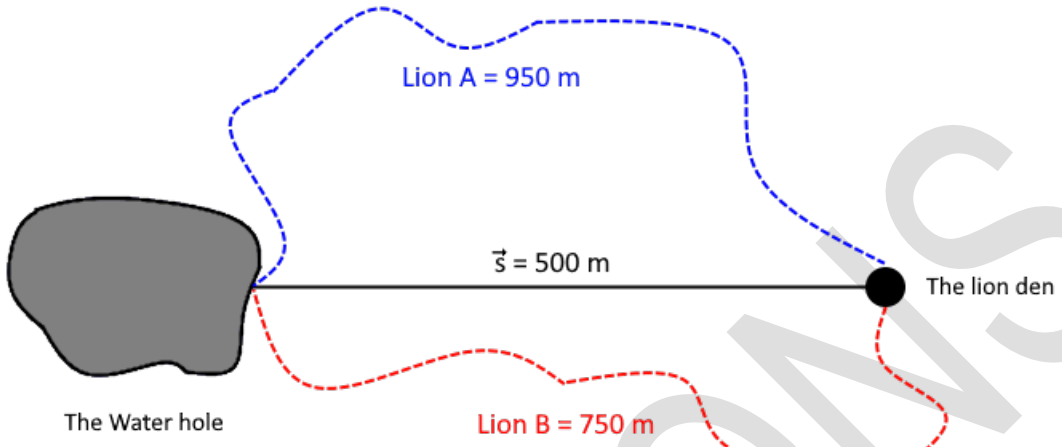
8) Two lions leave their den and head to a watering hole that has a displacement of 500 m West from the den. The two lines take different paths to reach this waterhole, however, the journey for both lions was 30 minutes. The diagram below shows this journey.



a) What is the average speed of lion A and lion B?

(2 marks)

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b) What is the average velocity of lion A?

(1 marks)

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9)

a) Explain whether it is possible to move with constant speed but not constant velocity.

(2 marks)

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b) Explain whether it is possible to move with constant velocity but not constant speed.

(2 marks)

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10) The Blue Orchid and the Yellow Devil taxis services pick up passengers at an airport at midday to drive to the same destination. The driver of the Yellow Devil taxi averages $100kmh^{-1}$ for 4 hours , while the driver of the Blue Orchid taxi travels for 3 hours at an average speed of $80kmh^{-1}$. At what speed must the Blue Orchid taxi driver travel during the next hour so that the two taxis arrive at the same place at 4 p.m.?

(3 marks)

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Answers:

Short Answer

3) a) 20m/s b) 400m

4) b) 15m c) 0.0083m/s

6) a) 2.38m/s

7) 96km/hr

8) a) A: 0.3m/s B: 0.42m/s b) 0.28m/s W

10) 160km/h