(13) Speed

1 What is speed? Rearrange these phrases to make a definition.

- in a certain time
- a moving object
- the distance covered by
- a measure of

_____

_____

2 What does accelerate mean? Tick (✔) one box.

To move faster   ☐

To move slower   ☐

To keep the same speed ☐

To change direction   ☐

3 Iniko runs in a 400-metre race. He starts quickly, then keeps a constant speed around most of the track, then runs as fast as he can to the finishing straight. Which sequence below describes his actions? Tick (✔) one box.

Run steadily, accelerate, run steadily   ☐

Run steadily, accelerate, accelerate   ☐

Accelerate, run steadily, accelerate   ☐

Accelerate, accelerate, run steadily   ☐

Speed records

4   The 10-second barrier was the time to beat for world-class sprinters in the
    100-metre race. The first athlete to do so was Jim Hines in 1968. It has been
    done many times since but no one has yet gone below 9 seconds. What is the
    speed in km/hr of someone who can run 100 metres in 10 seconds? Show your
    working.

    _____

    _____

    _____

5   A lion can run at a speed of 80 km/hr.
    a) How many metres could it run in 1 minute? Show your working.

    _____

    _____

    In a game park, a lion surprises a zebra and sprints after it for 15 seconds.
    b) How far does the lion travel? Show your working.

    _____

    _____

    _____

    The zebra can run at 1067 metres per minute. In the 15 seconds during which
    the lion is chasing it, the zebra needs to reach a gap in some rocks 300 metres
    away where it will be safe.

    c) (i) How far can the zebra travel in 15 seconds? Show your working.

    _____

    _____

    _____

→

    (ii) Can the zebra reach the rocks? ————————————————

    (iii) Explain your answer fully. ————————————————

    ————————————————————————

d) What will happen to the zebra and the lion? ————————————

————————————————————————

Measuring speed

6 The following statements describe the events that happen in a speedometer as a car starts to move. They are in the wrong order. Arrange them correctly by writing the letter of each statement in the order in which it occurs.

  A Magnet spins

  B Wheel shaft turns

  C Cup around magnet turns

  D Pointer moves across scale and shows speed

  E Cable wire turns

  F Cup makes pointer move

————————————————————————

7 a) What does a radar gun fire? ————————————

   b) How is reflection used in the process of finding the speed of a vehicle?

————————————————————————

————————————————————————

   c) What does the computer do to calculate the speed?

————————————————————————

————————————————————————

8 Peter challenges three other members of his class to a one-lap race. Usen, Jamil, Sari and Eleanor stand by the start/finish line and use stopwatches to record when the runners set off and when they complete the lap.

a) State **two** ways in which errors may occur in recording the runners' speeds.

_____

_____

b) How could the recording of the runner's speed be made much more accurate?

_____

_____

9 Alan, Dabir and Harum test three zip wires to find which one is the fastest. Dabir oils his trolley before he makes his trip but the others do not. Alan swings about on his journey and travels 60 metres in 1 minute, Dabir lies back so his body is vertical and travels 90 metres in 1 minute, Harum makes a star shape and travels 120 metres in 1 minute.

a) What force may be affected by oiling one trolley and not the other?

_____

b) What force may be affected by the positions of Dabir and Harum's bodies?

_____

c) Show your working to calculate the speeds in km/hr of:

(i) Alan _____

_____

(ii) Dabir _____

_____

(iii) Harum _____

_____

The height of the top and bottom supports of the zip wires are shown in the table.

Zip wire	Top support height/m	Bottom support height/m	Drop/m
A	5	1.5	
B	8	3	
C	3	2	

d) Calculate the drop of each zip wire and record it in the right-hand column.

e) Which zip wire do the results suggest each student used? Draw a line between them to answer the question.

Zip wire

A

B

C

Student

Alan

Dabir

Harum

f) How could the students repeat the investigation and make it more reliable?

_____

_____

_____

Distance/time graphs

10 Ade made the following observations on an insect. It moved 1 cm in 10 seconds, then 2 cm in the next 10 seconds, it stayed still for 10 seconds, then moved 5 cm in the next 10 seconds, it stayed still for 20 seconds, then moved 2 cm in the next 30 seconds.

a) Draw a distance/time graph of the insect's movement.
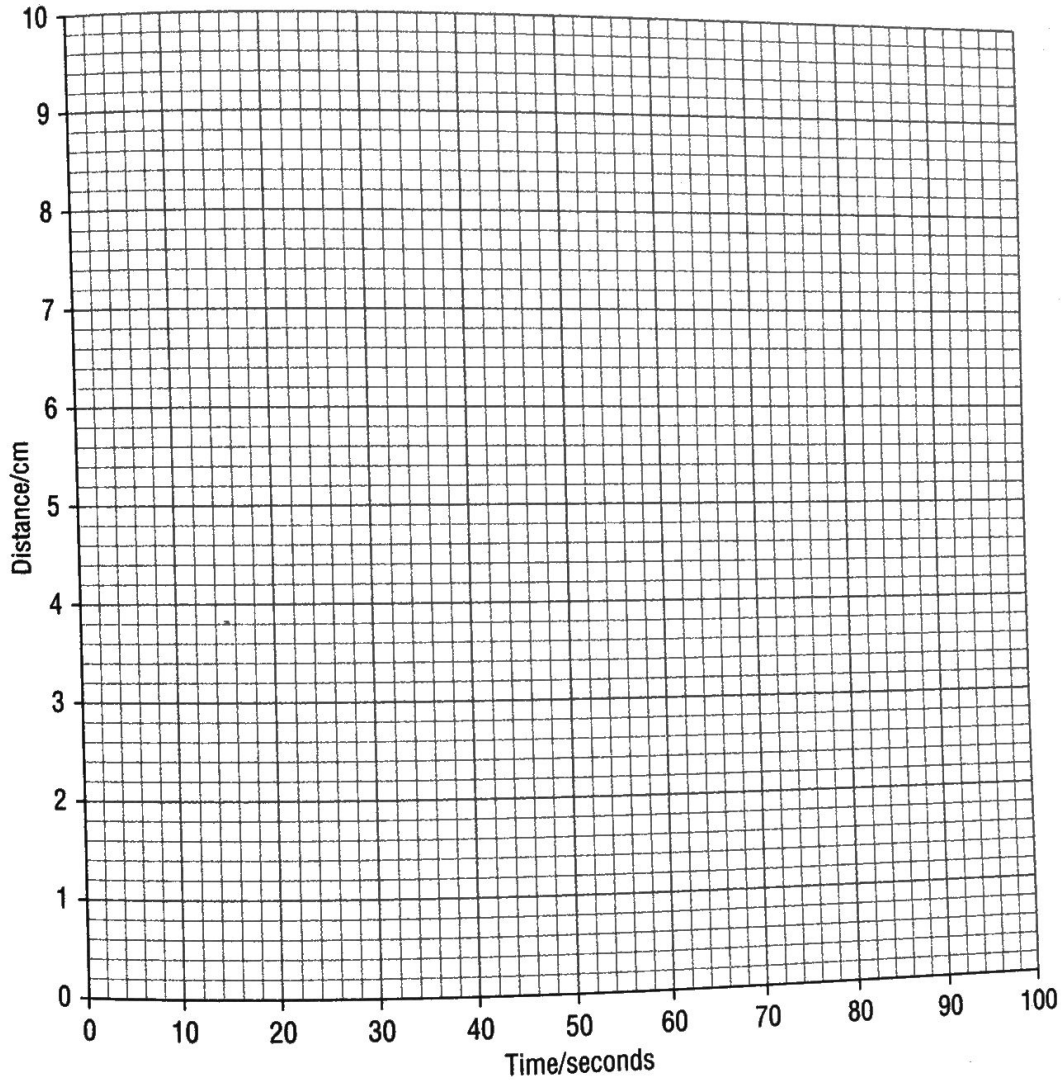
b) When did the insect travel fastest? _____

c) When did the insect travel slowest? _____

d) How far would the insect have got in 1 minute if it had kept moving at its

original speed? _____

e) Ade saw the insect then move 20 cm in 2 seconds. What do you think it did?

_____