

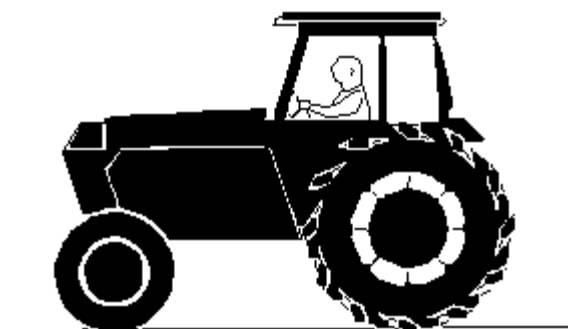
Name of the Student: _____

Max. Marks : 26 Marks

Time : 26 Minutes

Q1.

- (a) The diagram below shows a moving tractor. The forward force from the engine exactly balances the resisting forces on the tractor.



- (i) Describe the motion of the tractor.

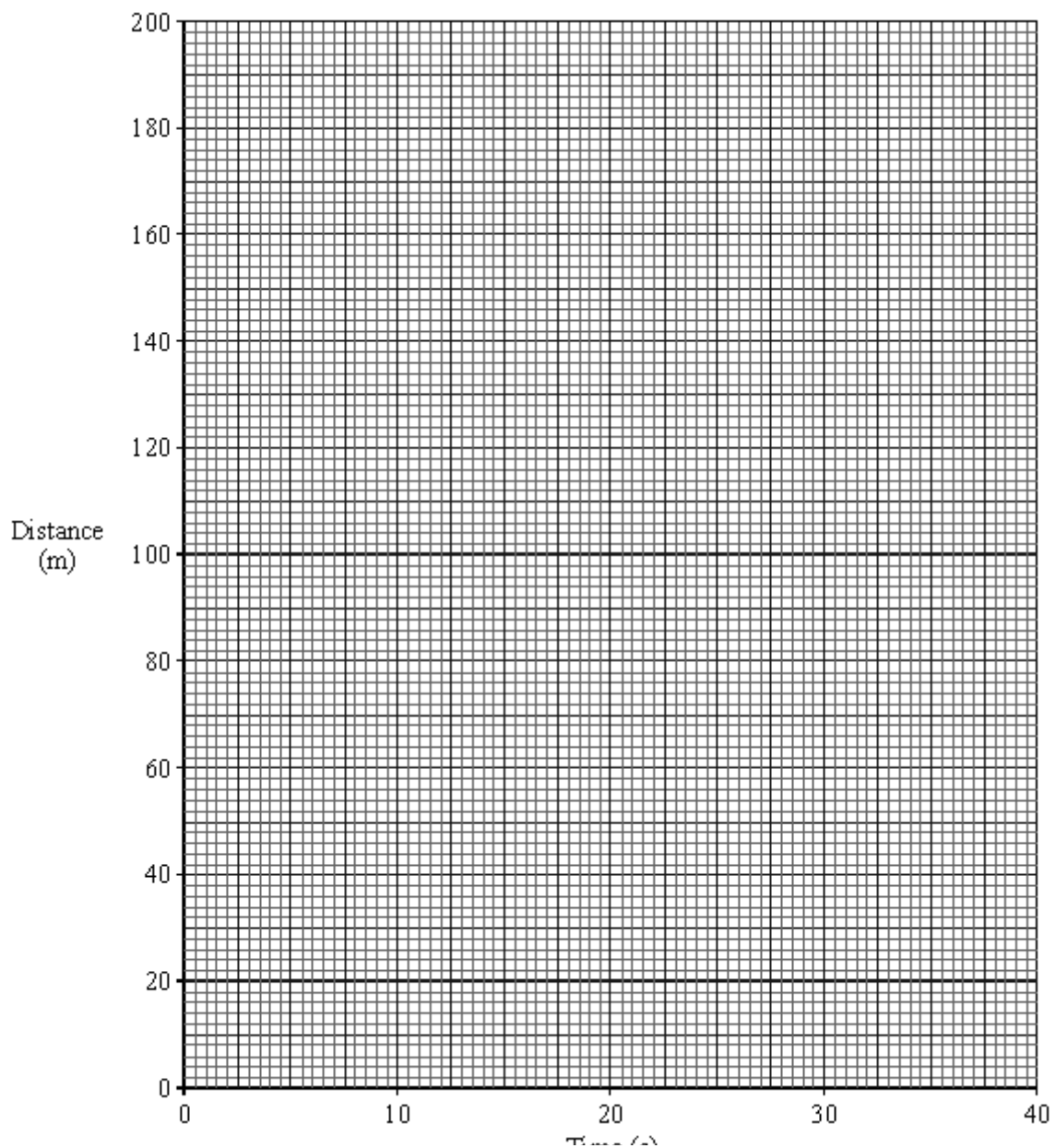
- (ii) The tractor comes to a drier part of the field where the resisting forces are less. If the forward force from the engine is unchanged how, if at all, will the motion of the tractor be affected?

(3)

- (b) Two pupils are given the task of finding out how fast a tractor moves across a field. As the tractor starts a straight run across the field the pupils time how long it takes to pass a series of posts which are forty metres apart. The results obtained are shown in the table below.

Distance travelled (m)	0	40	80	120	160	200
Time taken (s)	0	8	16	24	32	40

- (i) Draw a graph of distance travelled against time taken using the axes on the graph below. Label your graph line A.



(2)

- (ii) Calculate the speed of the tractor.

(3)

- (c) In another, wetter field there is more resistance to the movement of the tractor. It now travels at 4 m/s.

- (i) Calculate the time needed to travel 200m.

- (ii) On the graph in part (b) draw a line to represent the motion of the tractor across the second field. Label this line B.

(d) On a road the tractor accelerates from rest up to a speed of 6 m/s in 15 seconds.

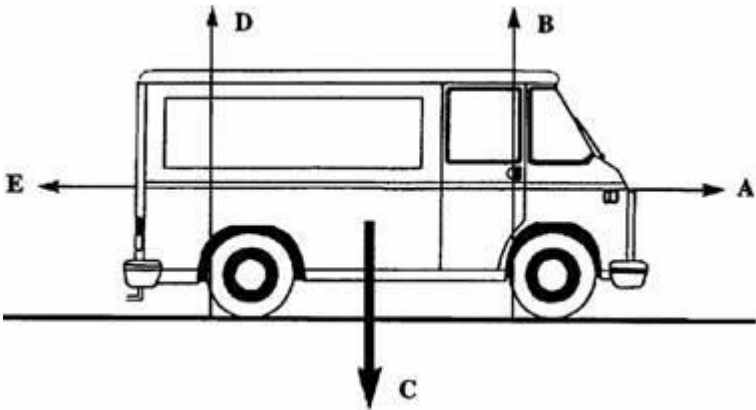
Calculate the acceleration of the tractor.

_____ Acceleration = _____ m/s²

(3)

(Total 15 marks)

Q2.



Five forces, **A**, **B**, **C**, **D** and **E** act on the van.

(a) Complete the following sentences by choosing the correct forces from **A** to **E**.

Force _____ is the forward force from the engine.

Force _____ is the force resisting the van’s motion.

(1)

(b) The size of forces **A** and **E** can change.
Complete the table to show how big force **A** is compared to force **E** for each motion of the van.
Do this by placing a tick in the correct box.
The first one has been done for you.

MOTION OF VAN	FORCE A SMALLER THAN FORCE E	FORCE A EQUAL TO FORCE E	FORCE A BIGGER THAN FORCE E
Not moving		✓	
Speeding up			
Constant speed			
Slowing down			

(3)

(c) When is force **E** zero?

(1)

(d) The van has a fault and leaks one drop of oil every second.
The diagram below shows the oil drops left on the road as the van moves from **W** to **Z**.



Describe the motion of the van as it moves from:

W to X _____

X to Y _____

Y to Z _____

(3)

(e) The driver and passengers wear seatbelts.
Seatbelts reduce the risk of injury if the van stops suddenly.

backwards downwards force forwards mass weight

Complete the following sentences, using words from the list above, to explain why the risk of injury is reduced if the van stops suddenly.

A large _____ is needed to stop the van suddenly.

The driver and passengers would continue to move _____.

The seatbelts supply a _____ force to keep the driver and passengers in their seats.

(3)

(Total 11 marks)