DULWICH COLLEGE | SINGAPORE |

Year 9 May Assessment
Physics Paper 1
Double Award

Name:.....

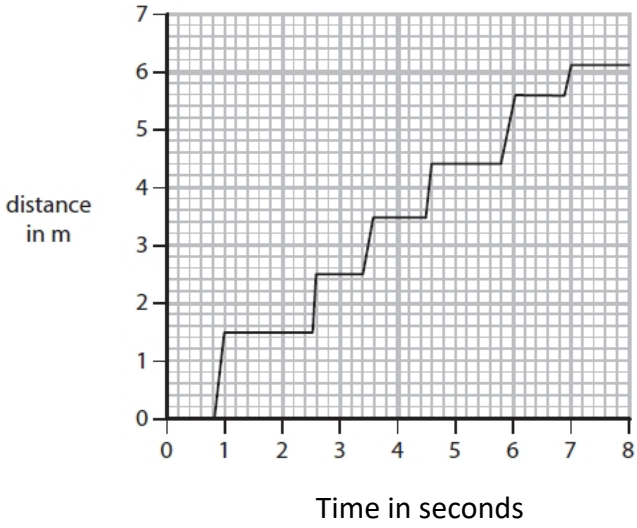
Time allowed: 45 minutes
Answer **all** questions in the spaces provided. You may use a calculator

Total Marks available	/40	Teacher comment:
	%	
Level/Grade		

	Student Reflection
1. Distance-time graph	
2. Properties of waves	
3. Wave speed	
4. Density and nature of science	
5. Velocity-time graph	
Overall reflection including revision techniques	

Q1. The diagram shows some people waiting in a queue at a supermarket.

The queue moves forward each time a person leaves the checkout. Person X spends seven minutes in the queue before reaching the checkout. The graph shows how distance changes with time for person X.



(a) (i) What is the initial length of the queue? **(1)**

initial length = ... m

(ii) Explain how you could use the graph to work out the number of times person X is stationary. **(2)**

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(b) (i) State the equation linking average speed, distance moved and time taken. **(1)**

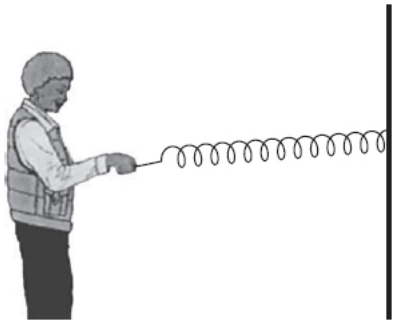
(ii) Calculate the average speed of person X in the queue. Give the unit. **(3)**

average speed = ... unit .....

(Total for question = 7 marks)

Q2.A teacher demonstrates different types of wave.

(a) He uses a spring to demonstrate longitudinal waves.



(i) Draw arrows on the diagram to show the directions in which the teacher moves his hand.

(1)

(ii) Give an example of a longitudinal wave.

(1)

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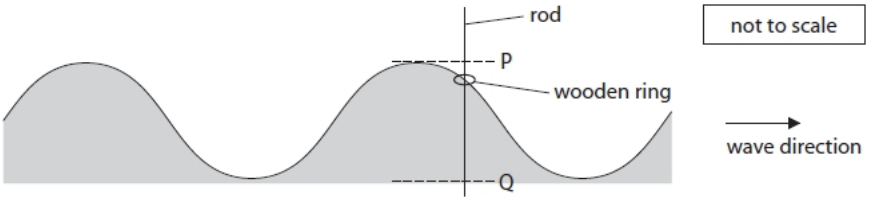
(b) The teacher then demonstrates transverse waves. He fixes a vertical rod in a pond. He places a small wooden ring on the rod. The ring floats on the water and moves up and down the rod as waves go past.



(i) On the diagram, draw a line to show one wavelength. Label your line with the letter W.

(1)

(ii) The distance from P to Q is 5.0 cm. Determine the amplitude of the wave.

(1)

amplitude = ... cm

(iii) The wooden ring reaches point P every 15 s. Calculate the frequency of the wave. Give the unit.

(3)

frequency = ... unit .....

(iv) Explain how the movement of the wooden ring demonstrates that this wave is transverse.

(2)

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(v) The wave shown is a water wave. Give a different example of a transverse wave.

(1)

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(Total for question = 10 marks)

Q3. Some waves travel across the sea. They all have the same wavelength.

(a) What is meant by the term **wavelength**?

(1)

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(b) The waves travel across the sea at 3.0 m/s and have a frequency of 1.5 Hz.

(i) State the equation linking wave speed, frequency and wavelength.

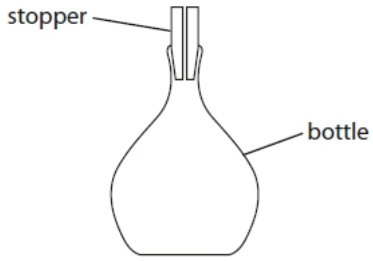
(1)

(ii) Calculate the wavelength of the waves. **(1)**

wavelength ..... m

(Total for question = 3 marks)

Q4. A student uses a bottle and a stopper to find the density of an unknown liquid. The stopper fits tightly into the bottle and has a small diameter hole through it.



(a) This is the student's method.

- use a balance to find the mass of the bottle and stopper
- completely fill the bottle with water
- insert the stopper and dry the outside of the bottle
- use the balance to find the mass of the full bottle and stopper

These are the student's results.

mass of empty bottle and stopper = 63.4 g

mass of full bottle and stopper = 112.9 g

Use the student's results to determine the volume of the water in the bottle.

Give your answer to three significant figures.

[density of water = 0.998 g/cm^3]

(4)

volume = ... cm^3

(b) The student empties the bottle and then dries it.

He refills the bottle with the unknown liquid.

He measures the mass of the full bottle and stopper as 143.8 g.

Calculate the density of the unknown liquid.

(3)

density of unknown liquid = ... g/cm^3

(c) Another student uses a measuring cylinder to find the volume of the unknown liquid. Discuss the advantages and disadvantages of using each method to find the volume of the unknown liquid.

(3)

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(Total for question = 10 marks)

Q5. A speed camera is positioned at the side of a road.

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The camera measures the speed of a vehicle on the road to determine whether the vehicle is travelling too fast.

(a) The camera takes two photographs of the vehicle 0.25 s apart. The photographs are used to measure the distance travelled by the vehicle during this time.

(i) State the formula linking average speed, distance moved and time taken.

(ii) In the time between the two photographs, the car travels a distance of 6.5 m. Calculate the average speed of the car.

(2)

average speed = ... m/s

(iii) The speed limit of the road is 80 kilometres per hour. Determine whether the car is exceeding the speed limit. **(2)**

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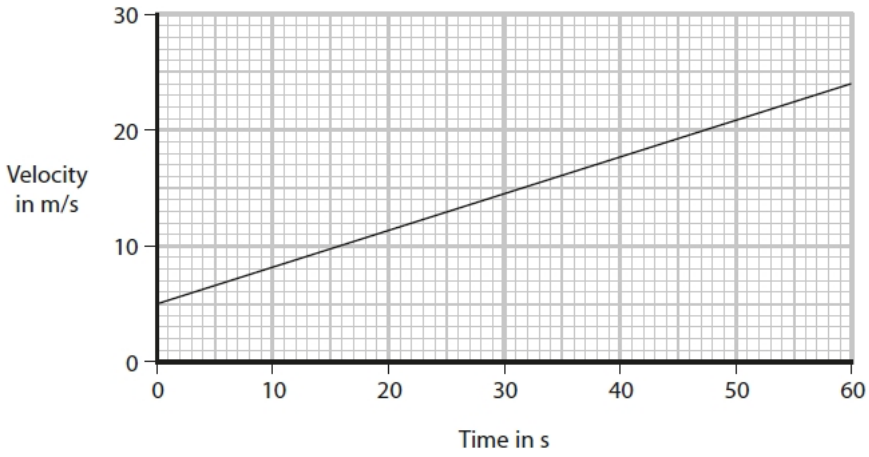
(b) The velocity-time graph shows how the velocity of a lorry changes with time.



(i) Explain how the graph shows that the lorry has a constant acceleration.

(2)

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(ii) State the formula linking acceleration, change in velocity and time taken.

(1)

(iii) Calculate the acceleration of the lorry.

(3)

acceleration = ... m/s^2

(Total for question = 10 marks)