
Year 10 Physics

Test 2

Time Allowed: 40 minutes

Total Marks: 40

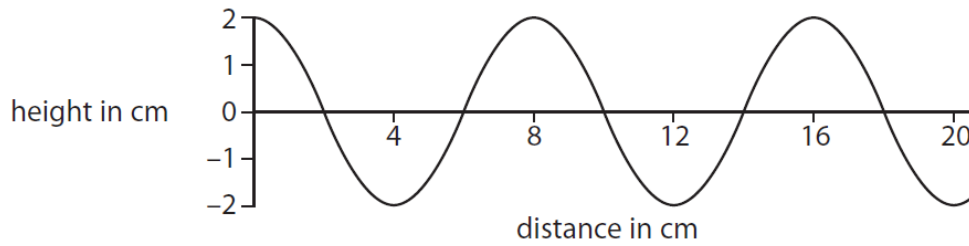
01 March 2024

Calculator Allowed

Full Name of Student:

1.

The diagram shows a water wave.



(a) (i) The amplitude of the wave is

(1)

- A 1 cm
- B 2 cm
- C 4 cm
- D 8 cm

(ii) The wavelength of the wave is

(1)

- A 2 cm
- B 4 cm
- C 8 cm
- D 20 cm

(b) Describe one difference between transverse and longitudinal waves.

Draw a labelled diagram to help your answer.

(3)

[Total for Question 1 = 5 marks]

2.

(a) Are sound waves in air transverse or longitudinal?

.....
(1)

(b) A sound wave has a frequency of 384 Hz and a wavelength of 0.86 m.
Calculate its speed in m/s.

.....
.....

Speed = m/s
(2)

(c) Another sound wave has a frequency of 38 400 Hz.

(i) Would you be able to hear this sound wave?

.....
(1)

(ii) Explain your answer.

.....
(1)

(d)

A student sings into a microphone.



Complete the sentence.

The useful energy transfer made by the microphone is from sound energy to
..... energy.

(1)

(e)

The amplitude, the frequency and the wavelength of a sound wave can be changed.

(i) What change could be made to make the sound lower in pitch?

.....
(1)

(ii) What change could be made to make the sound louder?

.....
(1)

(f)

Describe how you could measure the speed of sound in air by a simple direct method. You may draw a diagram to illustrate your answer.

.....
.....
.....
.....
.....
(4)

[Total for Question 2 = 12 marks]

3.

Parts of the electromagnetic spectrum have various uses.

(a) Which part is used for

(i) heaters and night vision equipment,

.....
(1)

(ii) sterilising food and medical equipment?

.....
(1)

(b) All the parts of the electromagnetic spectrum are transverse waves.

(i) State **one** property which all the parts have in common but which is **not** shared with other waves.

.....
(1)

(ii) Give **one** example of a transverse wave which is **not** part of the electromagnetic spectrum.

.....
(1)

(c)

The box contains the names of seven parts of the electromagnetic spectrum.

radio waves microwaves infra-red visible light ultraviolet X-rays gamma rays
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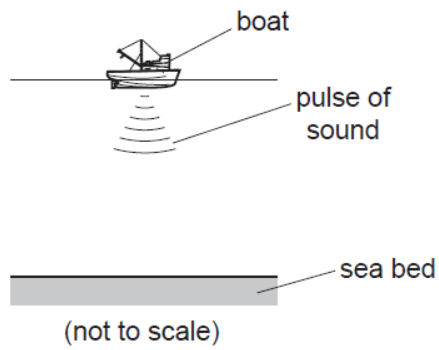
Describe the order in which they have been written.

.....
.....
(1)

[Total for Question 3 = 5 marks]

4.

A loudspeaker on a boat produces a pulse of sound in the sea. The echo of the pulse is received back at the boat after 3.0 s. The depth of the sea under the boat is 2250 m.



Workout the speed of sound in sea water using the information given above.

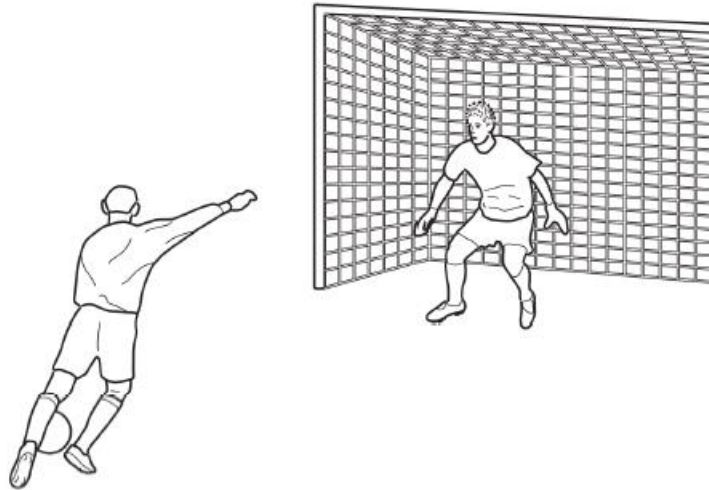
Speed = m/s

(2)

[Total for Question 4 = 2 marks]

5.

Ian is playing football.



Ian kicks a stationary football. The football travels in a straight line towards the goal.

The ball travels with a velocity of 20m/s, and has a mass of 450 g.

Calculate the kinetic energy of the ball.

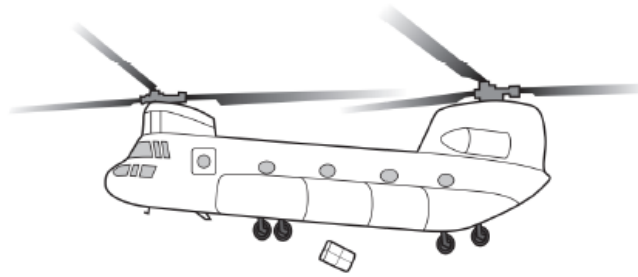
You must show your working.

answer = J [2]

[Total for Question 5 = 2 marks]

6.

A helicopter is used to deliver food parcels.



The helicopter hovers at a height of 20 m.

It drops a food parcel of mass 40 kg and weight 400 N.

Calculate the maximum speed at which the parcel hits the ground.

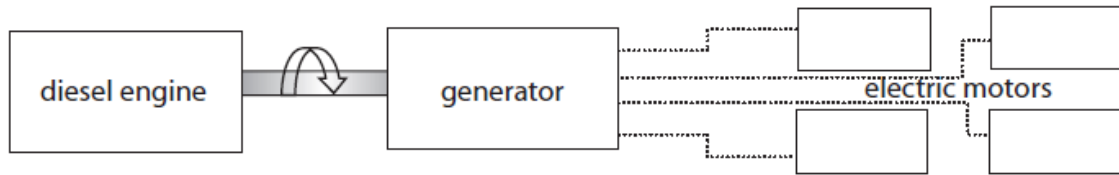
Use the idea of transfer between gravitational potential energy and kinetic energy to help you.

speed = m/s [3]

[Total for Question 6 = 3 marks]

7.

- (a) A train is powered by a diesel engine.
 The diesel engine is used to turn a generator.
 The generator provides electricity for electric motors which drive the wheels.



- (i) Draw one straight line from each train part to its useful energy transfer.

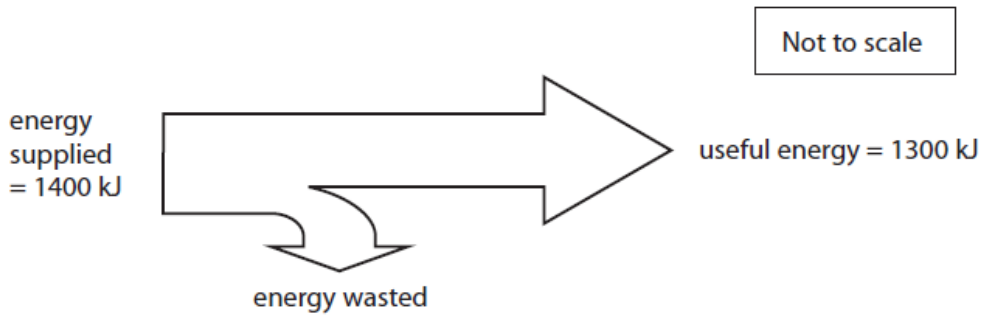
(3)

train part	useful energy transfer
<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">diesel engine</div>	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">chemical to electrical</div>
<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">generator</div>	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">chemical to kinetic</div>
<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">motor</div>	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">electrical to kinetic</div>
	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">kinetic to chemical</div>
	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">kinetic to electrical</div>

- (ii) State **one** example of a non-useful energy transfer in the motor.

(1)

(b) The diagram represents the energy transfer in one second in the generator.



(i) Calculate the amount of energy wasted in one second in the generator.

(1)

energy wasted = kJ

(ii) Calculate the efficiency of the generator.

(2)

efficiency of generator =

[Total for Question 7 = 7 marks]

8.

An object of mass 4 kg is thrown vertically downwards with an initial speed of 12m/s from the top of a tower of height 200m.

Ignore air resistance.

Gravitational field strength is 10N/kg.

(a) Calculate the kinetic energy of the object just after it is thrown.

Kinetic Energy = J

(1)

(b) Calculate the gravitational potential energy lost by the object during its journey until it hits the ground.

Gravitational potential energy lost = J

(1)

(c) Calculate the speed with which the object hits the ground.

Speed = m/s

(2)

[Total for Question 8 = 4 marks]

- End of Test -
