St Mary's School
CAMBRIDGE

Year 10 Physics

Sample Entrance Examination

Time allowed: 30 minutes

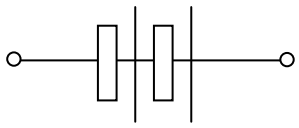
Name: _____

Total : 40 marks

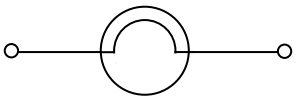
INSTRUCTIONS :

- **Spend 30 minutes on this section.**
- **You may use a calculator.**
- **You will need a pencil and ruler.**
- **Work through as many questions as you can, showing all relevant workings.**
- **If you do not understand a question, miss it out and go on to the next one.**
- **When you have done all you can, return to any questions that you may have missed.**
- **When you have finished check your answers**

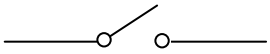
1.(a) Name each of the components shown.



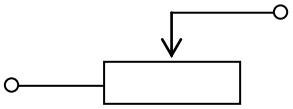
A



B



C



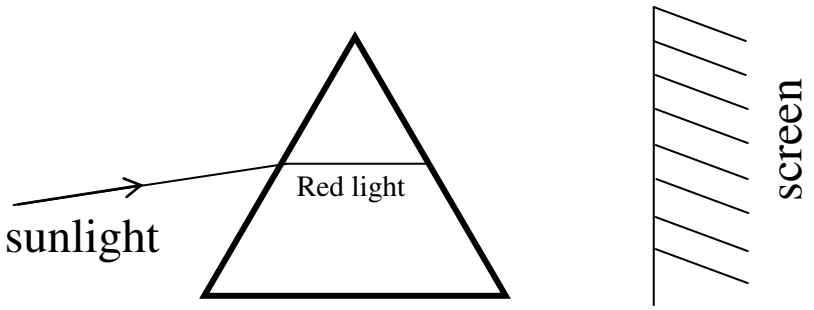
D [4]

(b) What is the purpose of component D ?

.....[1]

TOTAL / 5

2. The diagram below shows a prism used to split light from the sun into parts of the electromagnetic spectrum including the colours of the spectrum. The red end of the spectrum can be seen in the prism. The other colours have not been drawn on the diagram.



(a) What is the name for this bending of light at a boundary?

.....[1]

(b) Complete the diagram to show what happens to the violet part of the spectrum within the prism.

.....[1]

(c) Continue both rays out of the prism so that they hit the screen [2]

(g) Explain how a prism can split white light into the colours of the spectrum.

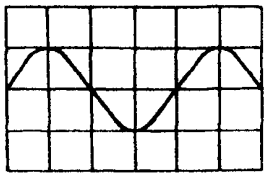
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.....[3]

TOTAL / 7

3.The diagram below shows an oscilloscope with a sound wave produced by a musical instrument.



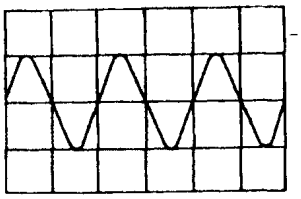
Each square represents a distance of 1cm.

(a) Use the above fact to state the wavelength and amplitude of the wave.

.....

.....[2]

(b) The diagram below shows a new sound produced by the same musical instrument.

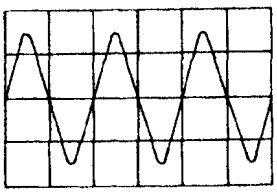


State how this new sound compares to the one produced in question 1.

.....

.....[2]

(c) The diagram below shows another new sound produced by the same musical instrument.



State how this new sound compares to the one produced in the first diagram.

.....

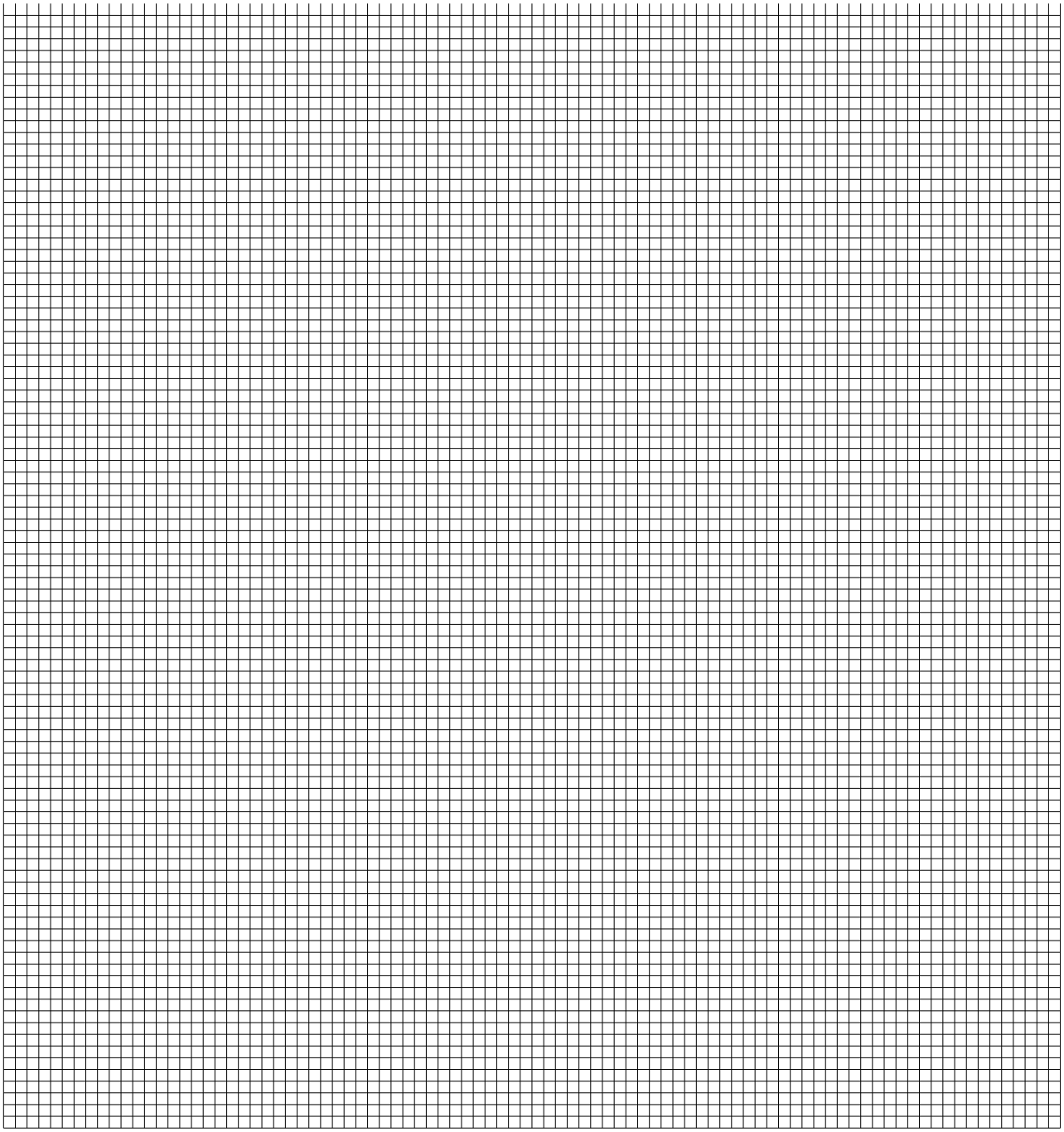
.....

[2]
TOTAL / 6

4. Here is some information about the speed of a car during its journey.

Speed m/s	Time s
0	0
5	10
10	20
15	30
20	40
20	50
20	60

(a) Plot a graph of speed m/s (vertical axis) against time s (horizontal axis). [3]



(Continued...)

(b) How far does the car travel in the first 30s of its journey?

.....

.....[3]

(c) Describe the motion of the car for the rest of its journey (the next 30s).

.....[1]

(d) At 60s, the driver starts to brake and the car stops after a further 15s (a total of 75s).

(i) Draw this deceleration on your graph. [1]

(ii) Calculate the deceleration of the car between 60 and 75s.

.....

.....

.....[3]

TOTAL / 11

5. A group of students carried out three experiments on energy changers.

(a) In the first experiment, Gareth connected an electric motor to a battery and used it lift a load of 3 N.

It took 10 s to lift it 1 metre.

(i) Write down the energy changes which take place

.....

.....

.....[3]

(ii) Calculate the work done in lifting the load (Work done = Force x distance)

.....

.....[2]

(iii) Calculate the power of the motor (Power = work done/time taken)

.....

.....[2]

.....

(b) Laura then used a falling mass of 10N to turn a dynamo and light a lamp.
The load fell at a constant speed of 2 m/s.

(i) Write down the energy changes which take place.

.....

.....

.....[4]

TOTAL / 11