Practice Question Set For A-Level
Subject : Physics
Paper-3 Topic: Section A(Practical Skills Set-2)

Name of the Student:_____
Max. Marks : 19 Marks **Time : 19 Minutes**

Q1.

In 1999 a planet was discovered orbiting a star in the constellation of Pegasus.

(a) State **one** reason why it is difficult to make a direct observation of this planet.

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(1)

(b) The initial discovery of the planet was made using the radial velocity method which involved measuring a Doppler shift in the spectrum of the star.

Explain how an orbiting planet causes a Doppler shift in the spectrum of a star.

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(2)

(c) The discovery was confirmed by measuring the variation in the apparent magnitude of the star over a period of time.

Explain how an orbiting planet causes a change in the apparent magnitude of a star.
Sketch a graph of apparent magnitude against time (a light curve) as part of your answer.

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(3)

(Total 6 marks)

Q2.

The first section of a full-size stroboscopic photograph of a marble released from rest and in free fall is shown below. Every time the strobe light flashes an image of the marble is recorded. The time interval between successive flashes of the strobe light was 0.0435 s.

(a) This photograph can be used to find a value for the acceleration due to gravity g.

(i) Take measurements from the diagram below that can be used to find an accurate value for g.

(2)

(ii) Calculate a value for g using your measurements from **(a)(i)**.

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(2)

(b) Suggest why the duration of the flash of the strobe should be as short as possible.

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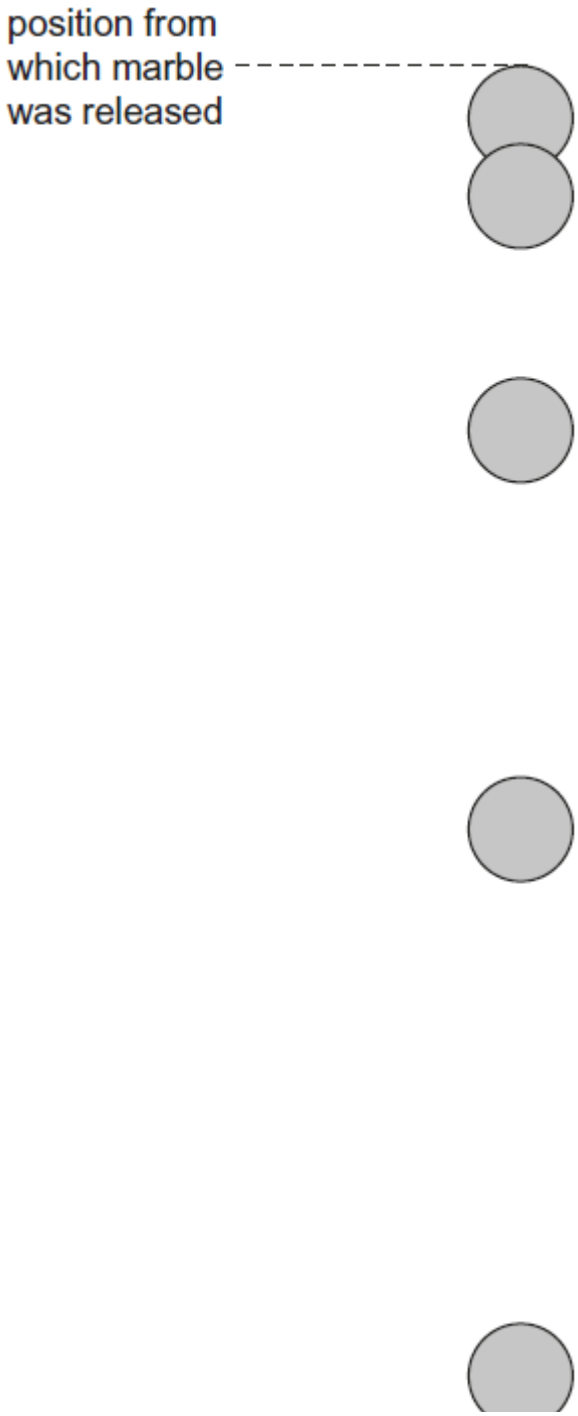
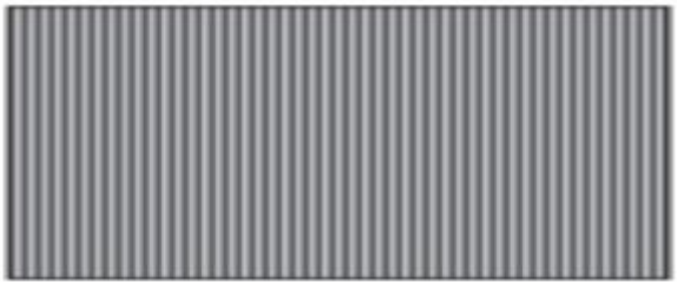
(1)



(Total 5 marks)

Q3.

(a) The image below shows a full-size photograph of a double-slit interference pattern, using a laser.



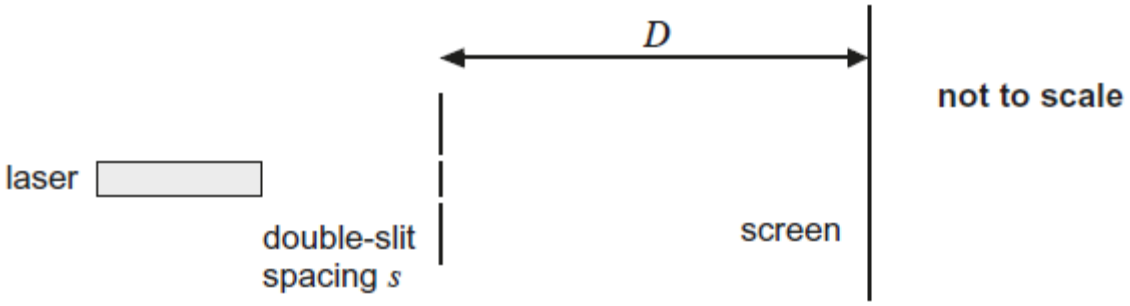
Determine the fringe width w using a ruler to take measurements from the image above. You may use a hand-lens to help you make this measurement.

(3)

(b) Calculate the uncertainty in the value of w measured in part **(a)**.

(2)

(c) In the experiment shown in the diagram below, the fringe pattern in the image in part **(a)** is produced.



s = 0.60 ± 0.02 mm
D = 1.500 ± 0.002 m

Using these data and your answers to part **(a)** and part **(b)**, determine

(i) the wavelength of the laser light used

(1)

(ii) the percentage uncertainty in this value of wavelength

(1)

(iii) the absolute uncertainty in this value of wavelength.

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(1)

(Total 8 marks)