

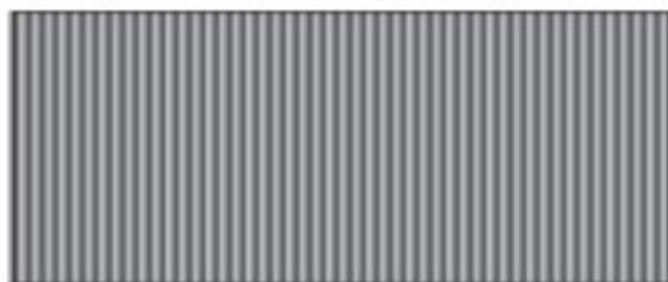
Name of the Student: \_\_\_\_\_

Max. Marks : 19 Marks

Time : 19 Minutes

**Q1.**

- (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.

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(3)

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

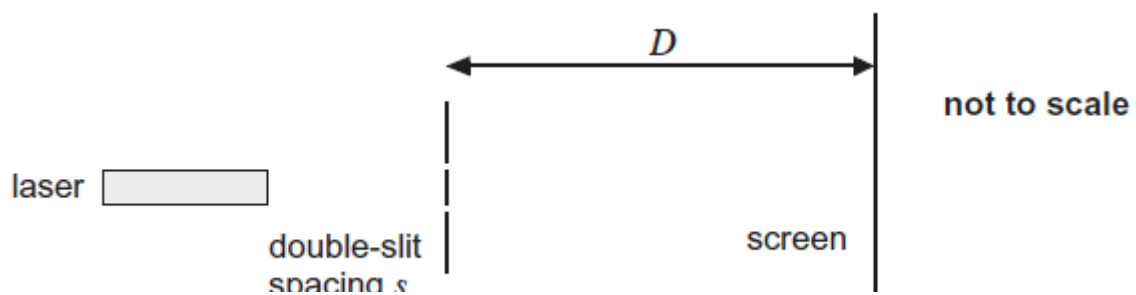
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(2)

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



$$s = 0.60 \pm 0.02 \text{ mm}$$

$$D = 1.500 \pm 0.002 \text{ m}$$

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

- (i) the wavelength of the laser light used

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(1)

- (ii) the percentage uncertainty in this value of wavelength

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(1)

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

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(1)

(Total 8 marks)

## Q2.

- (a) The arrangement shown in the diagram is used by a student in a photoelectric effect experiment.



work function = \_\_\_\_\_ J

(3)

- (ii) The polarity of the battery in the diagram is now reversed and light of 490 nm is incident on the photocathode. The energy of the light falling on the surface of the photocathode each second is 6.1  $\mu\text{J}$ .

Calculate the maximum current that the microammeter could record.

maximum current = \_\_\_\_\_  $\mu\text{A}$

(2)

(Total 11 marks)