



Rewarding Learning

General Certificate of Secondary Education
2023

Centre Number

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Candidate Number

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Double Award Science: Physics

Unit 7 Practical Skills
Booklet B
Higher Tier



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FRIDAY 16 JUNE, MORNING

TIME

30 minutes.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

You must answer the questions in the spaces provided.

Do not write outside the boxed area on each page or on blank pages.

Complete in black ink only. **Do not write with a gel pen.**

Answer **all** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 35.

Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

Quality of written communication will be assessed in Question **1(a)**.



- 1 (a) A student carries out an experiment to demonstrate the refraction of light.

In this question you will be assessed on your written communication skills including the use of specialist scientific terms.

What name is given to the line drawn at right angles to the surface of a piece of glass?

Explain fully what is meant by refraction.

Name **two** essential pieces of laboratory apparatus used to demonstrate refraction.

The amount of refraction is related to the change of speed of light.

Complete the sentence below to show how they are related.

The greater the amount of refraction then the

[6]



- (b) When a ray of white light is directed towards a triangular glass prism, a range of colours may be displayed on a screen.

What is the name of this process?

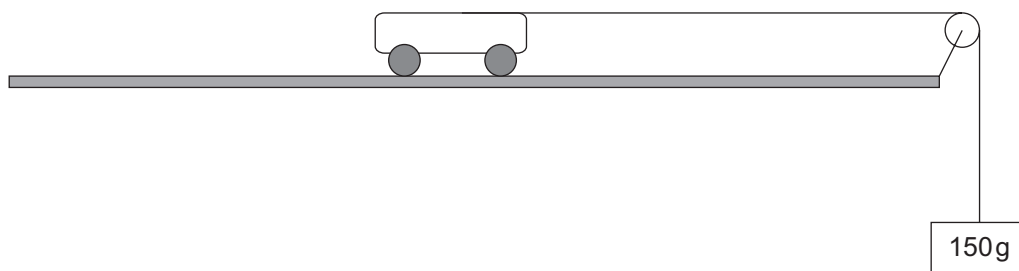
What name is given to the range of colours on the screen?

State the names of the colours produced, beginning with the colour which has been **refracted most**.

_____ [4]



2 A student wants to investigate the motion of a trolley along a runway.



Source: Chief Examiner

(a) (i) The weight of the 150 g mass provides a force.

Calculate the weight of the 150 g mass.

You are advised to show your working out.

Weight = _____ N [4]

(ii) Which of the three equations below could be used to calculate the rate of change of speed?

Circle your answer.

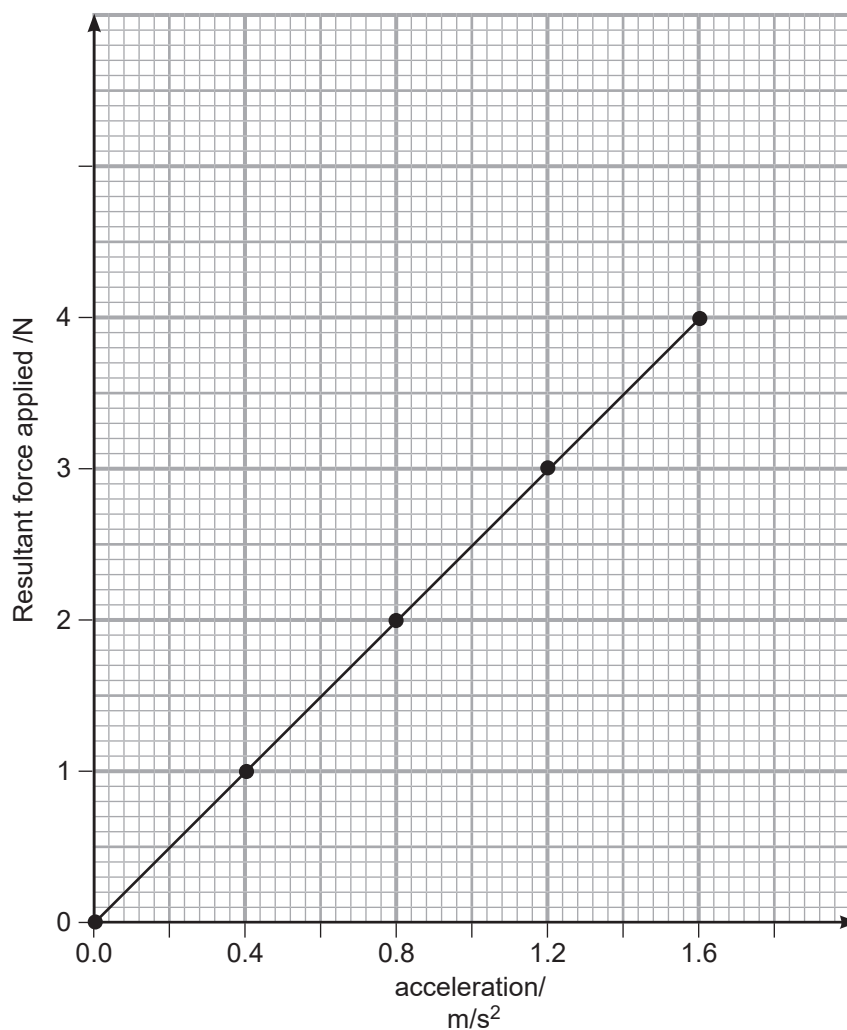
$$\text{rate of change of speed} = \frac{(\text{initial speed} + \text{final speed})}{2}$$

$$\text{rate of change of speed} = \frac{(\text{final speed} - \text{initial speed})}{\text{time}}$$

$$\text{rate of change of speed} = \frac{(\text{final speed} - \text{initial speed})}{2} \quad [1]$$



(b) A graph of resultant force on a trolley against its acceleration is shown.



Use the graph to find the mass of the trolley.

You are advised to show your working out.

Mass of trolley = _____ kg [3]

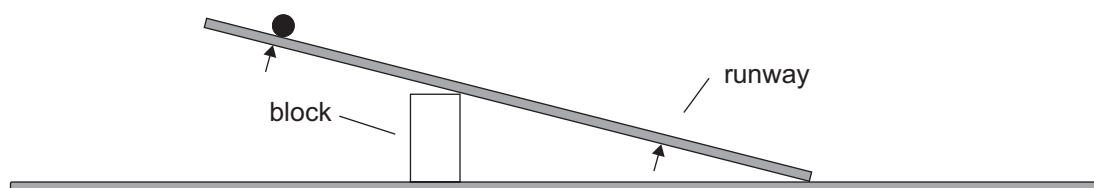
[Turn over

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- 3 An investigation was carried out to determine how the average speed of a ball moving down a runway varies with its slope.



Source: Chief Examiner

- (a) (i) Without using any other apparatus, how could a student change the slope of the runway?

_____ [1]

- (ii) Two markers, indicated by arrows on the diagram, are shown on the runway.

Making reference to the two markers, describe fully how the average speed of the ball down the runway could be measured.

_____ [3]

- (iii) Why should the student repeat the experiment to find the average speed for each slope?

_____ [1]



The results of the experiment are shown in the table for four different slopes, but two of the boxes have missing values.

	Average speed of ball down slope / cm/s		
	Experiment 1	Experiment 2	Average
Slope 1	6.5	6.8	
Slope 2		9.7	9.4
Slope 3	11.4	11.8	11.6
Slope 4	13.7	13.1	13.4

(b) Complete the two missing values in the table above.

Give your values correct to **one decimal place**.

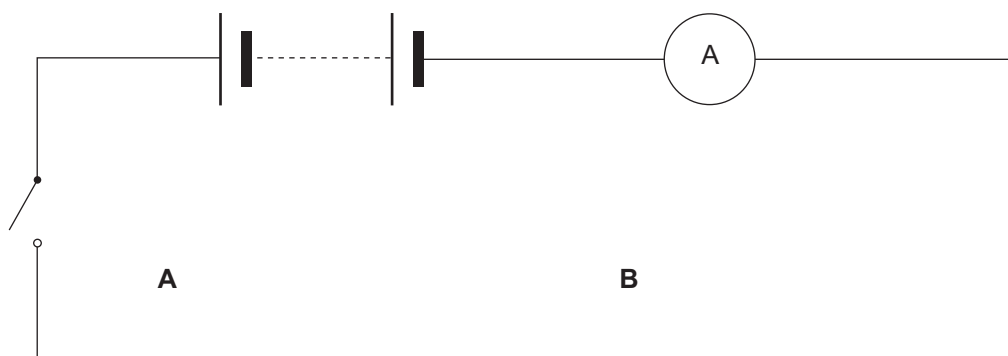
[3]

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- 4 An experiment is carried out to investigate how the current through a filament lamp depends on the voltage across it.

An incomplete circuit is shown.



- (a) In gap **A**, insert the symbol for a lamp.

In gap **B**, insert the symbol for the component which will allow a student to get a number of readings of voltage and current.

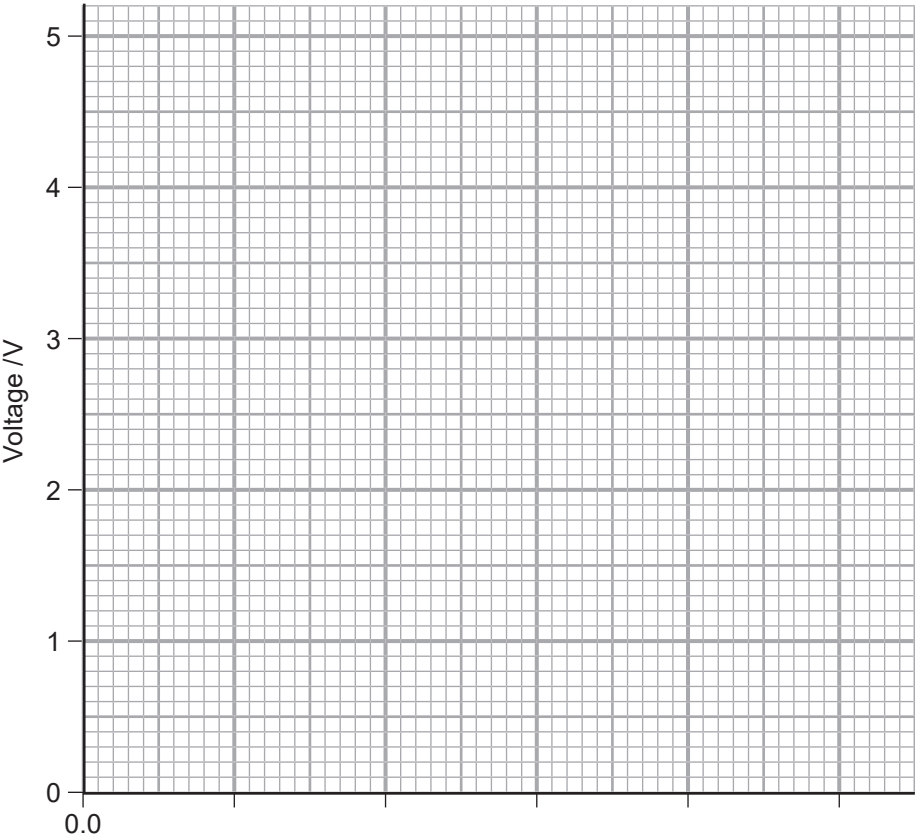
Add the symbol of the meter which will allow the voltage across the lamp to be measured.

[3]



The following readings were obtained in the experiment.

V/V	0	1	2	3	4	5
I/A	0.00	0.30	0.40	0.45	0.48	0.50



(b) (i) You are asked to plot a graph of voltage against current for the filament lamp.

Choose a scale for the horizontal axis and label it.

Plot the points on the graph.

Draw a curve of best fit beginning at the point (0,0). [5]

(ii) Use the graph to state how the resistance of the filament lamp changes as the current increases.

_____ [1]



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For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	

Total Marks	
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Examiner Number

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