MYP 4&5 Physics - 3 - copy

Subject	Grade	Points
Physics	MYP 5	A 27 B 29 C 21 D 23

Question 1

Knowing and understanding

This task (questions 1 to 3) addresses the key concept of **relationships** and focuses on **criterion A** (Knowing and understanding).

The voltage across a conductor is determined by the product of current and resistance.

Ohm's Law is a formula used to calculate the relationship between voltage, current and resistance in an electrical circuit. If two of these values are known, technicians can reconfigure Ohm's Law to calculate the third. Resistance cannot be measured in an operating circuit, so Ohm's Law is especially useful when it needs to be calculated. Rather than shutting off the circuit to measure resistance, a technician can determine R using the variation of Ohm's Law.

Q 1.1 If a charge of 1600 millicoulomb is passing through a conductor in 1 second. **Calculate** the current passing through the conductor. Use proper units to present your answer. A 1 D 1

Words: 0

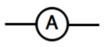
Q 1.2 Ohm's law is not valid for every conductor. **Justify** this statement. A 1

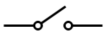
Words: 0

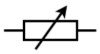
Q 1.3 **Identify** the circuit components from the given list and match them with their appropriate names. A 3

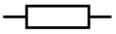
Open switch	Ammeter	Variable resistor	Cell

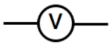
Voltmeter	LED	Resistor	Battery



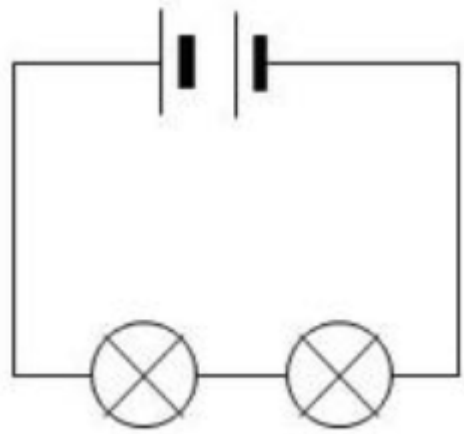


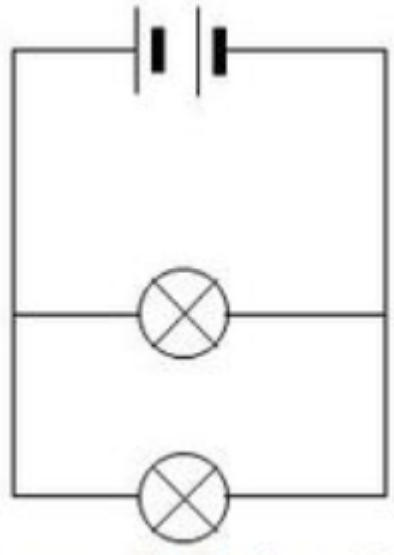






Q 1.4 With reference to how the bulbs are connected in the circuit, **identify** the given circuits. Also **list** **one** advantage and disadvantage of both the circuits. A 3





Circuit 1:

Circuit 2:

Words: 0

Q 1.5 **Find** the current flowing in both the circuits if the battery supplies a potential difference of 6 V and each bulb offers a resistance of 2 ohm. A 4

Words: 0

Q 1.6 The resistance offered by a conductor is 4 ohms. If the length of the conductor is doubled and its area of cross section is made ¼ of the initial value, **calculate** the new resistance offered by the conductor. You should include the units in your answer. A 2

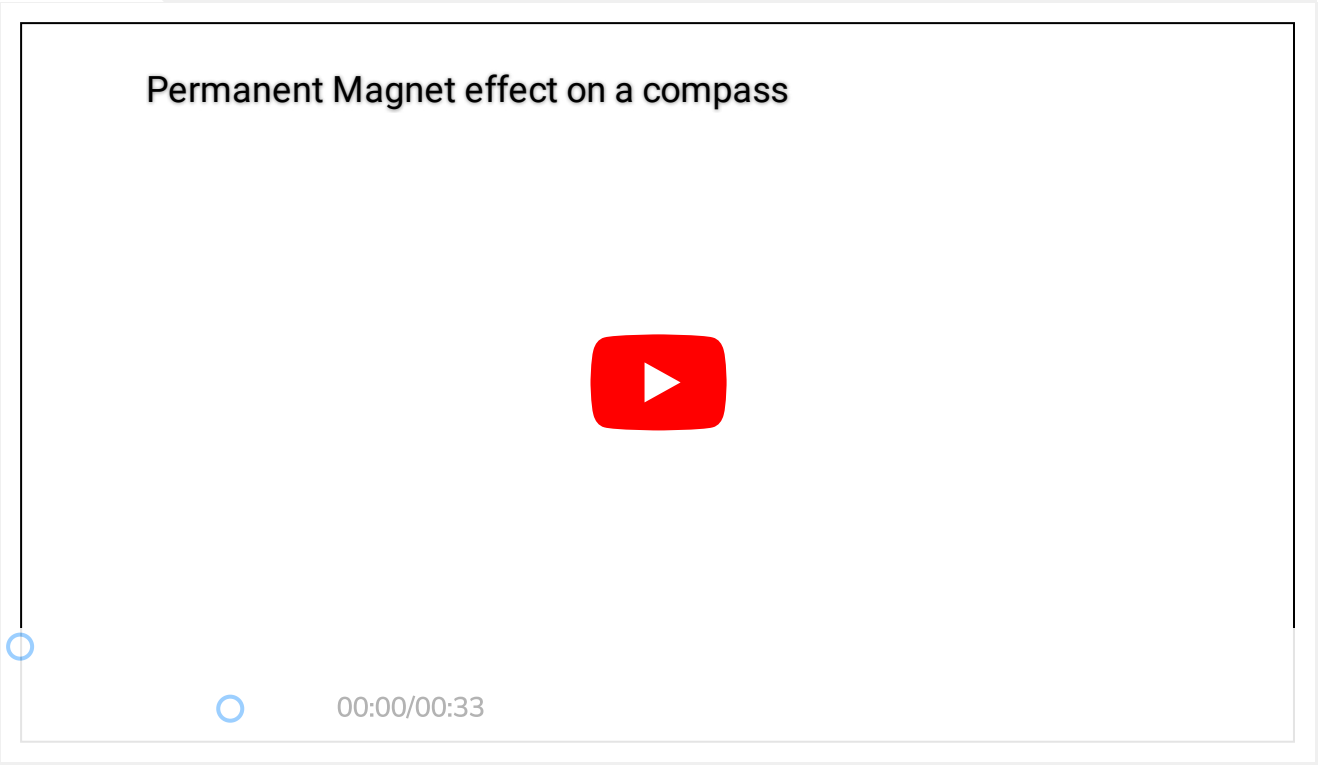
Words: 0

Question 2

A magnet is a material or object that produces a magnetic field. This magnetic field is invisible but is responsible for the most notable property of a magnet.

Magnetism is the force exerted by magnets where they attract or sometimes repel other magnetic materials.

Video 1



Q 2.1 **State** why the magnetic needle inside the compass showed deflection? A 1

Words: 0

Q 2.2 A 2

Select the correct option to complete the statements.

Magnetic field lines start from ____ pole and ends at ____ pole outside the magnet.

Magnetic field lines ____ cross each other.

The field strength is ____ proportional to the line density in a particular area.

Video 2.2

Video 1

Q 2.3 **Describe** the reason behind the soft iron piece achieving magnetism. A 2

Words: 0

Q 2.4 **Suggest** what would have happened if every time someone tried rubbing it with alternate poles? A 1

Words: 0

Question 3

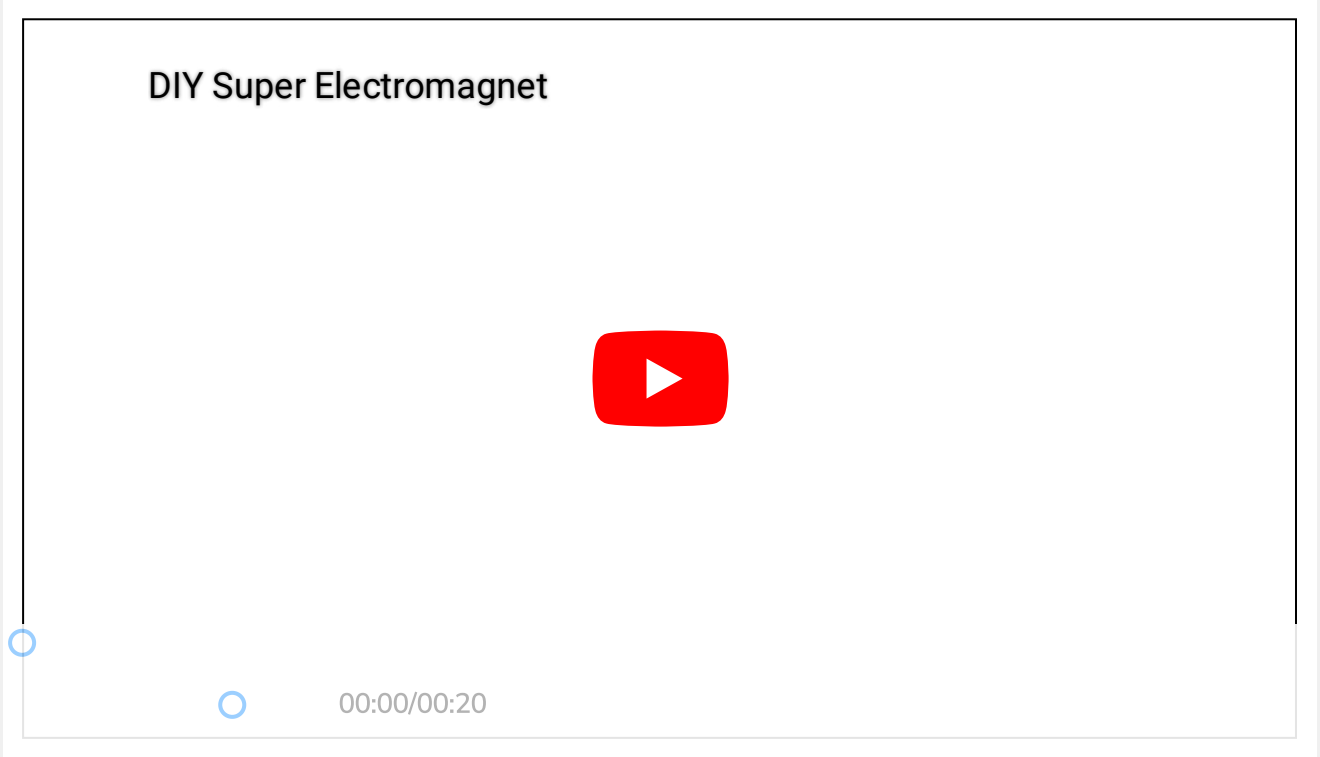
An electromagnet is a magnet created by the flow of electric current through a coil of wire, exhibiting magnetic properties.

An electromagnet is a type of magnet in which the magnetic field is produced by an electric current. Electromagnets are a different from permanent magnets as the former's magnetic properties can be switched on and off according to the need.

Video 3.1

A simple electromagnet is shown here

Video 1



Q 3.1 **Suggest** how the hammer was attracted by the coil. A 1

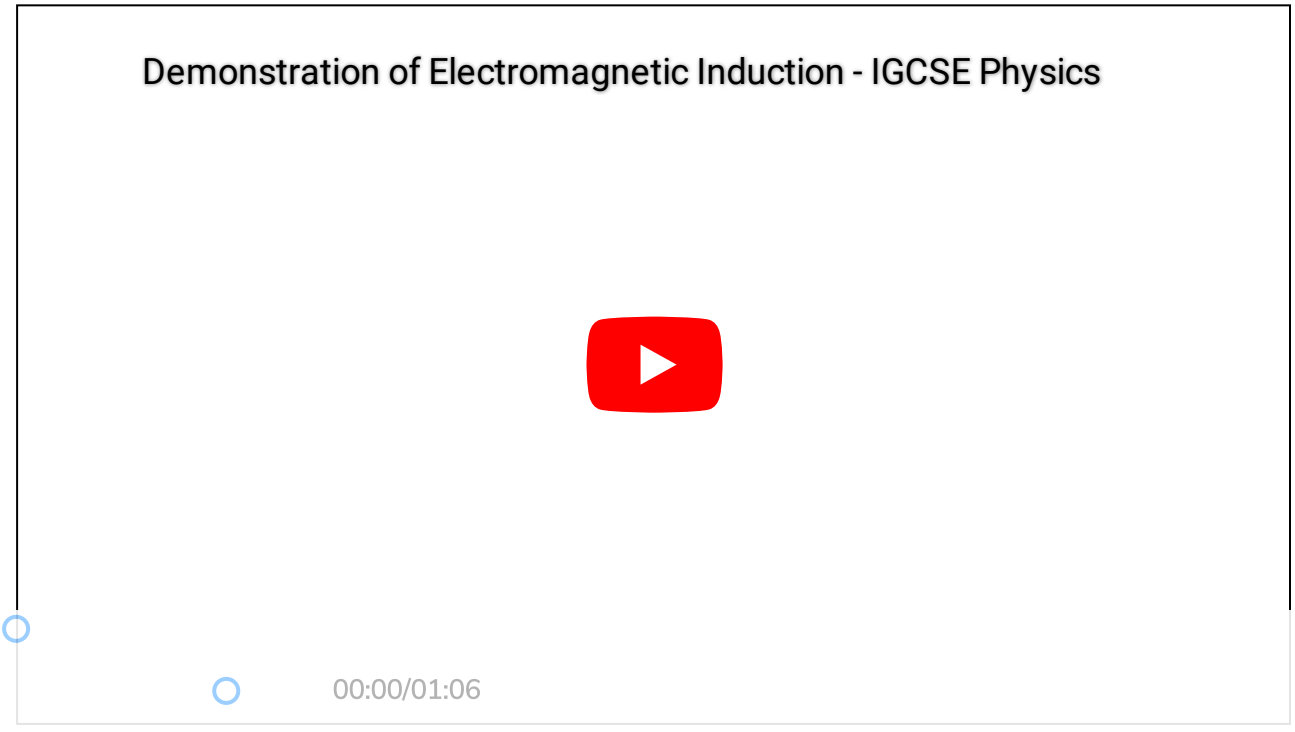
Words: 0

Q 3.2 **List two** applications of electromagnets. A 2

Words: 0

Video 3.2

Video 1

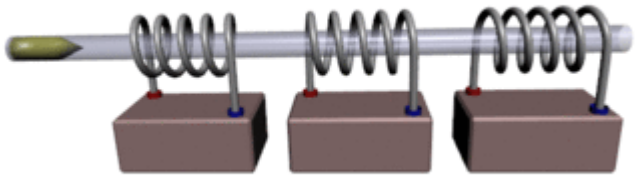


Q 3.3 **State** the change in the galvanometer reading when: A 3

- Magnet is inverted
- Magnet is brought away from the coil
- The magnet is replaced by another conducting coil.

Words: 0

Q 3.4 **State** the direction of magnetic field if the current in each coil is moving clockwise. A 1



Words: 0

Question 4

Investigation skills

This task (questions 4 to 7) addresses the key concept of **change** and focuses on **criterion B** (Inquiring and designing) and **criterion C** (Processing and evaluating). In this task, you will investigate relationships in physics.

Exploring how light bends and changes direction when it moves from one medium to another.

A student decides to investigate the phenomenon of refraction. For that she collects the angle of refraction corresponding to different angle of incidence. She prepares an interface of glass and air and starts her investigation

Q 4.1 **State** a question to be tested in this investigation. B 1

Words: 0

Q 4.2 **Formulate** and **explain** appropriate hypothesis which can be tested in this investigation. B 3

Words: 0

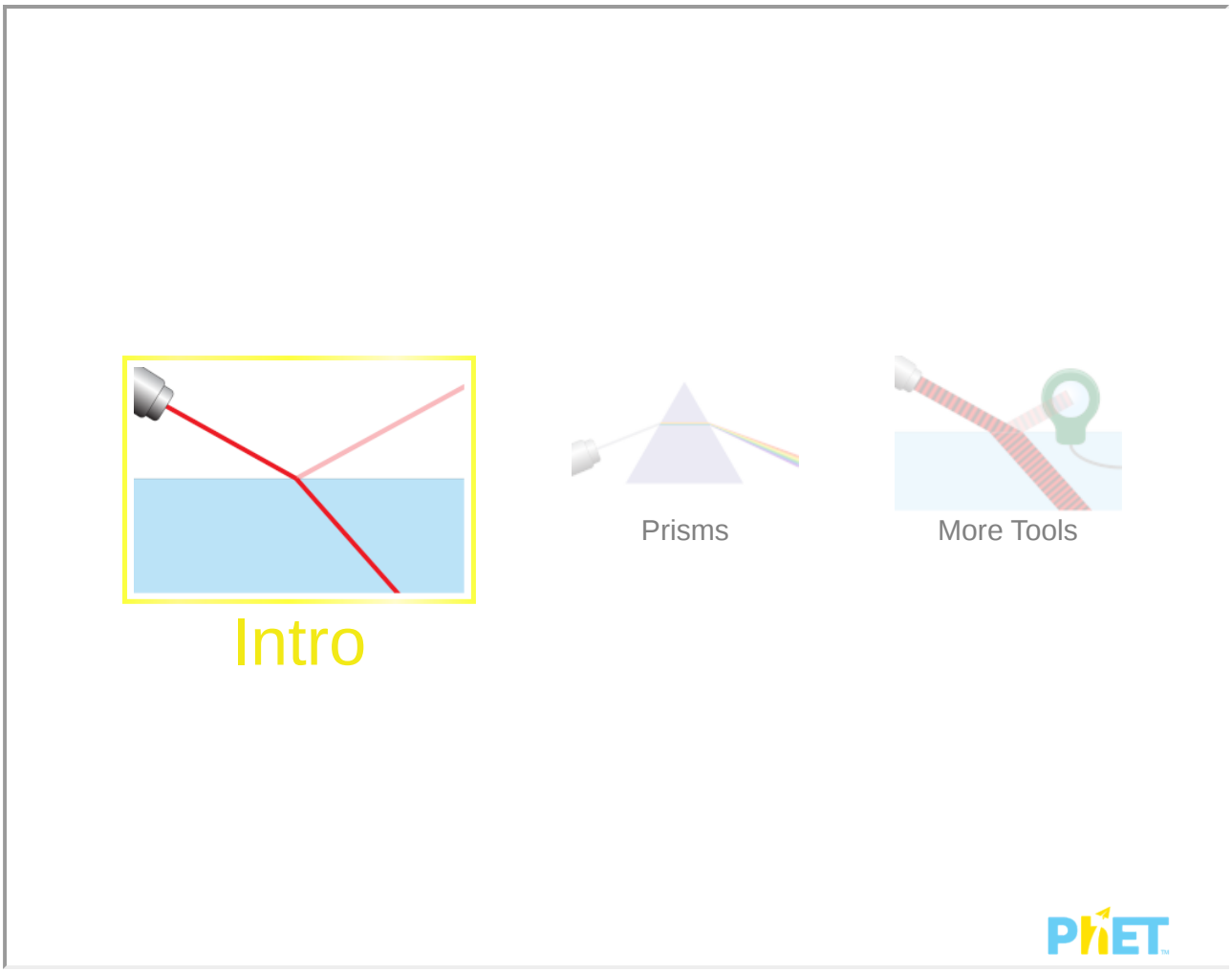
Q 4.3 **State** the dependent, independent and **one** control variables of the investigation. B 3

Words: 0

Simulation 4.1

The simulation presents the experiment the student performed.
Proceed further using the Intro tab of the simulation

Simulation 1



Q 4.4 **Measure** the values for the experiment and **present** in a tabular form. C 4

Words: 0

Q 4.5 **Discuss** whether or not the data you have collected is supporting your hypothesis. C 3

Words: 0

Q 4.6 **Suggest** any extension to this investigation. C 1

Words: 0

Question 5

Exploring how light bends and changes its path when crossing the boundaries between different materials.

The student after the initial investigation decided to check the phenomenon of refraction in different media interfaces.

Q 5.1 **State** a question that could be answered in this investigation. B 1

Words: 0

Q 5.2 **Formulate** and **explain** a hypothesis that can be tested using this investigation. B 3

Words: 0

Q 5.3 **Outline** the variables involved in this investigation. B 4

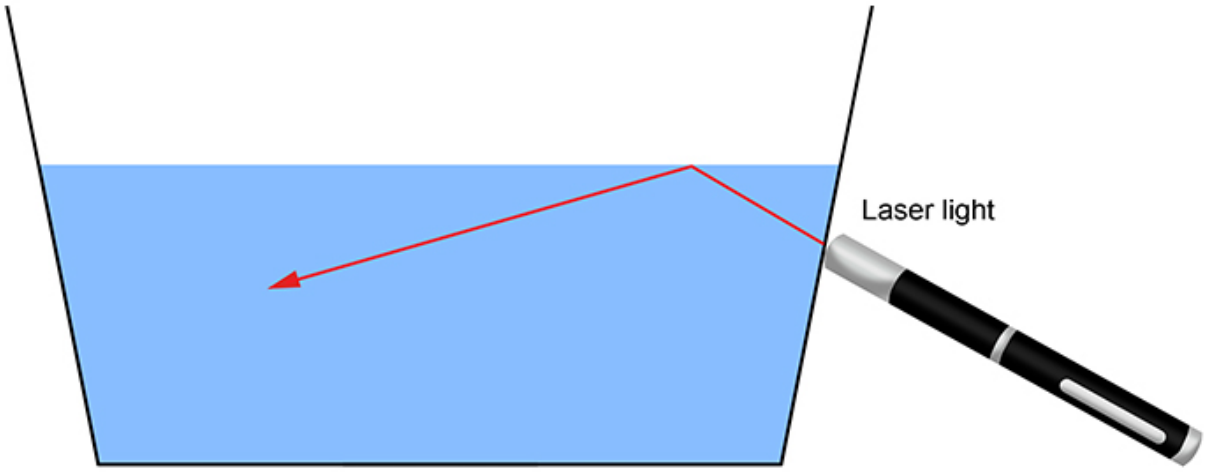
Words: 0

Question 6

Total internal reflection is where light trapped within a medium due to angle constraints, leads to complete reflection at the interface.

An MYP student while travelling through the deserts of Saudi Arabia observed that he could see patches of water some miles from him but disappeared when he reached near it. When asked about it his teacher informed him that this was due to an optical phenomenon known as total internal reflection. He decided to investigate the phenomenon and to determine the angle above which the phenomenon is taking place in different interfaces.
For that he arranged a stand, a laser light, a transparent tank and different liquids.

Image 1



Q 6.1 **Suggest** and **justify** one additional piece of equipment he will need to perform this experiment. B 2

Words: 0

Q 6.2 **State** **one** variable that he needs to control. **Describe** how and why this variable should be controlled. B 2

Words: 0

The table contain the data the student has collected in his investigation.

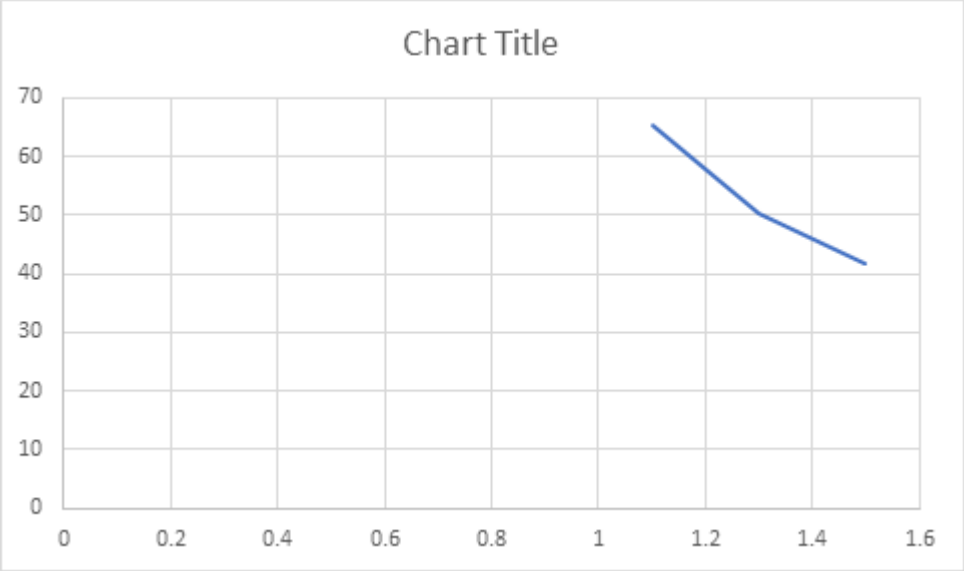
N1	N2	Theta(in degrees)
1.5	1.0	41.81
1.3	1.0	50.28
1.1	1.0	65.38
1.7	1.0	36.03

Q 6.3 **Interpret** the given data and **summarize** your conclusions. C 3

Words: 0

Q 6.4 The student plots a graph using the recorded values

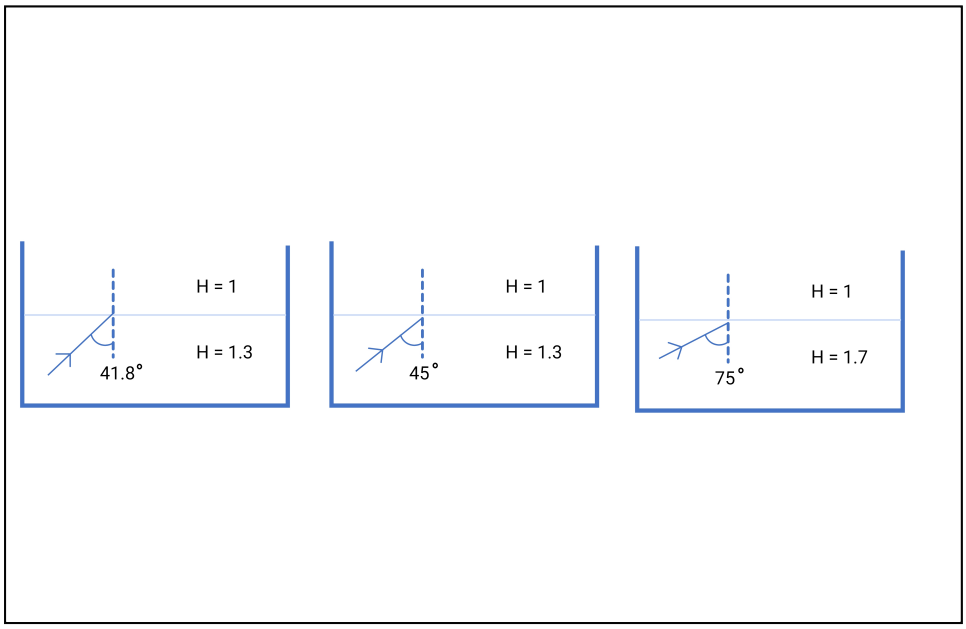
C 3



He forgets to mention the X and Y axis in the plot. **Determine** the X and Y axis. You should also provide an appropriate chart title.

Words: 0

Q 6.5 Using the recorded values, **draw** the path of the light rays in the following ray diagrams. **Justify** your answer. Let H represent the refractive index of the medium. C 4



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Q 6.6 **Discuss** the validity of the method of investigation. C 2

Words: 0

Q 6.7 **Suggest** an extension to this investigation. C 1

Words: 0

Question 7

Lateral Displacement is the sideways shifting of light as it traverses through a transparent medium at an angle.

The perpendicular shift in the path of light when it emerges out from the refracting medium is known as lateral displacement.
While studying about lateral displacement, a student gave a statement on it. He said, "The lateral displacement of a light ray when travelling through a glass slab depends on the angle at which the light ray enters the glass slab."

Some of the equipment he used for the investigation is given below.

Q 7.1 **In order to test this hypothesis, design a scientific investigation stating the different variables involved in it. In your answer you should include:** B 10

- **The variables involved in it**
- **The list of equipment you will use**
- **The method you will follow**
- **How you will collect sufficient data**

Words: 0

Question 8

Applying science

The global context is **orientation in space and time**. This task (questions 8 and 9) addresses the key concept of **systems** and assesses **criterion D** (Reflecting on the impacts of science).

GPS is transforming the way we interact and communicate with our surroundings.

Video 8.1

Video 1

Q 8.1 **State** the type of electromagnetic wave used for satellite communication. D 1

Words: 0

Q 8.2 **Discuss** and **evaluate** the implications of this type of technological advance in relation to the fairness and inclusiveness in the global community. In your answer you should consider: D 11

- The ethical implications
- The social implications
- A concluding appraisal

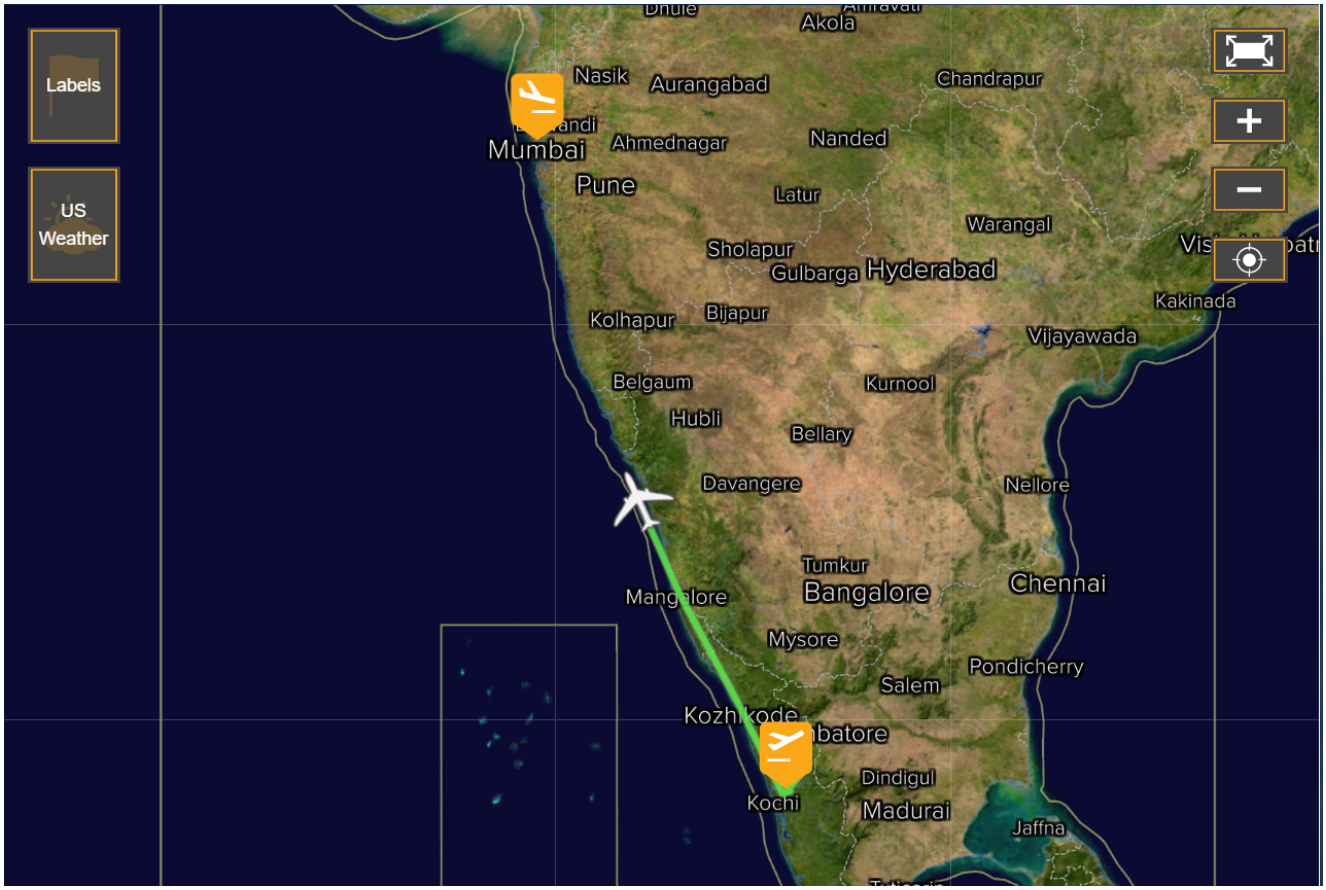
Words: 0

Question 9

GPS: Satellites paving your way.

The flight status of an aeroplane travelling from one city to another in India is given.

Image 1



Q 9.1 Apart from tracking, **suggest** **two** different applications where GPS is used. D 2

Words: 0

Q 9.2 Using information from the image and your wider MYP knowledge, **discuss** and **evaluate** the use of GPS in the application identified in Q 9.1. In your answer you should include: D 8

- Why GPS is important in your application
- The advantages of having this application in real world
- The disadvantages of having this application in real world
- Social and political factors
- Economic factors

Words: 0