Sample Assessment Task Year 12 Physics

NSW HSC Physics Stage 6

NSW Education Standards Authority

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Sample Assessment Task Year 12 Physics

Sample for implementation for Year 12 from Term 4, 2018

Context:

Discoveries about the interactions that take place between charged particles and electric and magnetic fields led to the invention of numerous devices that convert electrical energy into other forms of energy. Students will use the principles and laws discussed in this module to design and construct a device that uses and illustrates the principles of electromagnetism.

Task number: 2 **Weighting: 25%** **Timing: Term 1, Week 10**

Outcomes assessed |

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A student: | | - PH12-13 explains and analyses the electric and magnetic interactions due to charged particles and currents and evaluates their effect both qualitatively and quantitatively. | - PH11/12-2 designs and evaluates investigations in order to obtain primary and secondary data and information | | - PH11/12-4 selects and processes appropriate qualitative and quantitative data and information using a range of appropriate media | | - PH11/12-6 solves scientific problems using primary and secondary data, critical thinking skills and scientific processes | | - PH11/12-7 communicates scientific understanding using suitable language and terminology for a specific audience or purpose |

Nature of the task | | Students: | | - | choose a household appliance that operates using the principles of electromagnetism that have been studied during the course | | | - | construct a model of the device to demonstrate how it works | | | - | exhibit the model | | | - | explain principles employed in the apparatus | | | - | make an evaluation of the model during a 5-minute interview | | | - | submit a comprehensive logbook | | | - | submit an appropriately referenced bibliography of your sources | | | Student information: | | - The model is to be constructed out of recycled or common inexpensive materials. | | - A risk assessment is to be completed and approved by your teacher

before construction. | | - The model must run on no more than 12V (power supply or batteries). | | - Examples of possible household appliances could include: an electric doorbell, magnetic locking device, induction heating device, loudspeaker, electric fan, or a device approved by your teacher. | | - Class time of **4 hours** will be provided for research and testing and to use available school resources if required. This task will also require out-of-class time to complete successfully. | | - The logbook should include relevant dates, notes and reflections on resources accessed, labelled diagrams, experimentation, problems encountered and how you solved them. | | - Submit data as part of your logbook, showing results of testing your model to measure appropriate variables and an evaluation of the results obtained. |

Marking criteria:

Knowledge and Understanding 10 marks (PH12-13
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Students: | | - explain the operation of the chosen device in terms of electromagnetism | | - demonstrate understanding of the conservation of energy in the operation of the device and its significance | | - relate the operation of model to an understanding of electric and magnetic interactions | | - evaluate the qualitative and quantitative effects of changing electric/magnetic fields with appropriate data and observations | | ##### Planning and Conducting Investigations 5 marks (PH11/12-2) | | Students: | | - use the model to illustrate electromagnetic principles of the device identified | | - construct the model safely | | - design the model to enable the collection of reliable and valid data | | ##### Problem Solving and Communicating 10 marks (PH11/12-4, PH11/12-6, PH11/12-7) | | Students: | | - discuss the underlying scientific concepts shown in the model | | - use correct scientific terminology relating to correct scientific principles | | - present a correctly formatted logbook with evidence of notes and reflections | | - present an appropriate bibliography which demonstrates collection of reliable and valid sources of information | | - present correctly labelled and appropriate diagrams of model in logbook | | - show evidence of problem-solving and adjustments as part of methodology |

Feedback provided | | To inform future learning your feedback will consist of: | | - | annotated marking guidelines | |

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Marking Guidelines:

Knowledge and Understanding 10 marks (PH12-13
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Students: | ##### Marks | :=========== + PH12-13 explain and analyse the electric and magnetic interactions due to charged particles and currents and evaluates their effect both qualitatively and quantitatively |

- demonstrate an extensive understanding of the use of electromagnetism in the chosen device 9–10

- provide a detailed understanding of the law of conservation of energy and how it applies to the device, including energy efficiency
- relate the operation of model to relevant principles and laws
- present information coherently in logbook to show variables measured and results evaluated
- show a thorough understanding of the use of electromagnetism in the chosen device 6–8
- provide a general understanding of the law of conservation of energy and addresses energy efficiency OR provide a detailed understanding of the law of conservation of energy and how it applies to the device
- outline most of the relevant principles and laws
- present information in logbook to show variables measured and results evaluated
- indicate a sound understanding of the use of electromagnetism in the chosen device 3–5
- indicate a sound understanding of the law of conservation of energy
- outline some of the relevant principles and laws
- present measured variables clearly in logbook
- indicate a basic knowledge of the use of electromagnetism in the chosen device 1–2

  OR

- state the conservation of energy law

  OR

- identify a relevant principle or law

Planning and Conducting Investigations 5 marks (PH11/12-2)

Students:	**Marks**

PH11/12-2 design and evaluate investigations in order to obtain primary and secondary data and information

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  | 4--5
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  design a model that illustrates electromagnetic principles of device identified | | | |

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  ```

  safely carry out model construction, identify hazards/risks and precautions | | | |

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design a model that enables the collection of reliable and valid data | | |

- ```
  | 2--3
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  ```

design a model that illustrates some electromagnetic principles of device identified | | | |

- ```
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  |
  ```

  safely carry out model construction, identify some hazards/risks and precautions | | | |

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  ```

  design a model that enables the collection of some reliable and valid data | | |

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  | 1
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  ```

design a model that illustrates at least one electromagnetic principle of device identified | | | | > OR | |

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  safely carry out model construction | | | | > OR | |

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  ```

  design a model that enables the collection of data | | |

Problem Solving and Communicating 10 marks (PH11/12-4, PH11/12-6, PH11/12-7)

Students:	**Marks**
PH11/12-4 select and process appropriate qualitative and quantitative data and information using a range of appropriate media	
• provide notes and analytical reflections in logbook	4–5

- collect reliable and valid data and sources of appropriately referenced information
- present clearly represented data and correctly labelled, appropriate diagrams of model in logbook
- provide notes and some reflections in logbook 2–3
- collect some reliable and valid data and sources of some referenced information
- present some data and labelled diagrams of model in logbook
- present a logbook containing some information 1
- collect data and some information recorded in some form of bibliography
- present some data and diagrams in logbook

PH11/12-6 solve scientific problems using primary and secondary data, critical thinking skills and scientific processes

- show clear evidence of problem-solving and adjustments as part of methodology, with problems/issues recorded and adjustments made to solve problems 4–5
- show some evidence of problem-solving and adjustments as part of methodology, with an issue/problem identified and an adjustment made 2–3
- show some attempt to problem-solve in development of model 1

OR

- show an adjustment as part of methodology

PH11/12-7 communicate scientific understanding using suitable language and terminology for a specific audience or purpose

- discuss model and underlying scientific concepts using a high level, well organized response 4–5
- use correct scientific terminology and effectively relate to appropriate principles
- discuss model and scientific concepts with a coherent response 2–3
- use some scientific terminology and relate to scientific principles
- outline a relevant scientific concept correctly 1

OR

- use some scientific terminology and identifies a correct principle