NZQA
New Zealand Qualifications Authority
Mana Tohu Matauranga O Aotearoa

Assessment Report

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Level 2 Physics 2018

Standards 91170 91171 91173

Part A: Commentary

Candidates are advised to clearly explain what they are doing at each step in calculation questions. It is hard for markers to give credit to a space filled with numbers. Writing the relevant formula, then substituting numbers then giving the correct numerical solution with correct units, is expected. “Show” questions particularly require some sort of explanation.

When making comparative statements such as “resistance is increasing”, candidates should be clear whether they are referring to the total resistance or the resistance of a component in the circuit.

Candidates need to answer all parts of a question, in particular, when instructed to give a direction or state an assumption.

Part B: Report on standards

91170: Demonstrate understanding of waves

Candidates who were awarded **Achievement** commonly:

- used Descartes formula correctly
- explained what refraction is
- drew refracted rays on a diagram
- used basic wave equations and concepts to answer questions
- used Snell's law correctly
- identified when diffraction occurs
- solved a simple wave superposition question.

Candidates whose work was assessed as **Not Achieved** commonly:

- could not draw simple ray diagrams or draw refraction rays
- could not perform basic calculations or manage standard form calculations
- were unable to identify amplitude or wavelength on a diagram
- could not identify positions of constructive and destructive interference or explain their cause.

Candidates who were awarded **Achievement with Merit** commonly:

- drew correct ray diagrams
- correctly described images
- identified the appropriate mirror to use in certain situations
- explained how wavelength affects diffraction
- identified positions of constructive and destructive interference and gave a basic explanation of what causes it
- correctly used standard form in calculations.

Candidates who were awarded **Achievement with Excellence** commonly:

- justified why they selected a particular mirror for a task

- explained how the wave equation and a constant frequency affects refraction
- used path difference to correctly describe interference
- explained how the wave equation and a constant frequency affects refraction.

Standard specific comments

Candidates should use a ruler for all ray diagrams, labelling points when asked. For Show questions, it is expected pupils provide full working, including the formula, substation and then the correct numerical answer.

91171: Demonstrate understanding of mechanics

Candidates who were awarded **Achievement** commonly:

- completed one-step calculations correctly
- explained simple physics concepts
- calculated spring constant correctly
- calculated elastic potential energy correctly
- explained conservation of energy
- calculated impulse correctly
- calculated speed from impulse correctly
- knew the travel direction of a projectile released from circular motion
- calculated velocity from distance and time.

Candidates work was assessed as **Not Achieved** commonly:

- completed some one-step calculations in limited contexts
- explained some simple physics concepts in limited contexts.

Candidates who were awarded **Achievement with Merit** commonly:

- completed most multiple-step calculations accurately
- explained most physics concepts clearly and in depth
- calculated total elastic potential energy correctly
- explained the physics of changes that would increase launch speed of a projectile in context
- recognised all of the forces acting on a balanced beam, without including any non-existent forces
- explained the physics of why the time of an impact reduces the force of that impact
- combined the use of an appropriate kinematic equation with trigonometry to calculate the vertical speed of a projectile
- explained clearly the effect of reduced gravity on the time of flight and hence the range of a projectile.

Candidates who were awarded **Achievement with Excellence** commonly:

- wrote elegant, accurate solutions to numerical problems
- wrote clear, comprehensive explanations of physics phenomena
- drew closed vector diagrams correctly to scale and used them to calculate an unknown force
- discussed fully the physics of changes that could increase the launch speed of a projectile in context
- recognised the significance of impulse or change of momentum being the constant factor when stopping a moving object
- carried out a succinct calculation to show whether a projected balloon was in the correct position to be caught.

Standard specific comments

91173: Demonstrate understanding of electricity and electromagnetism

Candidates who were awarded **Achievement** commonly:

- applied E=V/d given two values to find the third
- knew negatively charged particles were attracted to the positive plate and could draw field lines between charged plates
- applied resistor combination formula
- applied the right-hand rule for determining the direction of force on a current carrying wire
- Did not realise that although changing the distance between the plates changed the strength of the electric field it also reduced the distance the particle could move and these two effects cancelled each other out.

Candidates work was assessed as **Not Achieved** commonly:

- confused magnetic and electric fields
- thought that increasing the distance between the plates increased the particles velocity.
- could not determine the direction of force on a current carrying wire in a magnetic field and did not use the words given in the question to convey the direction
- used the length of the rod and not the length of the magnetic field to calculate the induced voltage
- did not clearly show how a resistance was found in a show question
- thought the separation of charge caused by a moving conductor in a magnetic field was the induced current and did not realise this was the induced voltage
- did not know what the letters in formula stood for and applied incorrect formula
- thought the d in E_p=Eqd was the distance between the plates and not the distance moved by the particle.

Candidates who were awarded **Achievement with Merit** commonly:

- knew the electric field curved from the ends of parallel plates
- knew that adding parallel components lowered the total resistance of the circuit
- could consistently apply the right hand rule (or similar) to identify the positive end of a moving conductor or the direction of force on a current carrying wire
- determined the power of components in a parallel branch of a circuit
- knew you need and induced voltage and a circuit to get an induced current.

Candidates who were awarded **Achievement with Excellence** commonly:

- calculated the speed of a particle accelerated by an electric field
- identified when a moving conductor in a magnetic field induced a voltage and current
- explained which bulb in a circuit was brighter and justify in terms of voltage and current
- explained the effects of adding an Ammeter to a circuit in parallel with a component.

Standard specific comments

Many candidates failed to realise that by increasing the distance between the plates you also lowered the electric field strength between the plates and therefore falsely claimed that increasing the distance between the plates would increase the speed of the particle.

Many candidates still do not understand how you can have an induced voltage and not an induced current with some thinking that the separation of charge that occurs is the induced current.

Most candidates were unable to explain what adding an ammeter in parallel would do to a circuit.

Physics subject page

Previous years' reports

2016 (PDF, 215KB)

2017 (PDF, 46KB)