NZQA
New Zealand Qualifications Authority
Mana Tohu Matauranga O Aotearoa

LIVE

Assessment Report

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Level 2 Physics 2019

Standards 91170 91171 91173

Part A: Commentary

Scientific notation and the use of prefixes were not well managed by candidates, nor the use of brackets when entering data into their calculators. It is expected that candidates at this level can change into standard SI units when given data with a prefix.

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 the correct rays for mirror or lens diagrams.
- confused phenomenon terminology.
- could not draw simple ray diagrams or draw refraction rays
- were unable to perform basic calculations or manage standard form calculations
- could not 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

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

- understood the differences between the types of ray diagrams
- solved two step numerical problems
- described complex issues succinctly.

Standard specific comments

Candidates are expected to use correct terminology and conventions, e.g. correct units in calculations.

91171: Demonstrate understanding of mechanics

Candidates who were awarded **Achievement** commonly:

- solved numerical problems that only involved one step and could do so consistently in different Mechanics contexts
- showed their understanding of mechanics concepts by describing straightforward ideas correctly.

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

- made little attempt to solve one-step numerical problems in mechanics
- attempted to solve problems using incorrect relationships
- could not manipulate given data appropriately
- were unable to explain straightforward physics ideas in the context of mechanics.

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

- wrote clear explanations of physics phenomena, linking more than one idea and could do this in different contexts.
- 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.

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

- solved multi-step numerical physics problems accurately in all Mechanics contexts
- wrote succinct explanations of physics phenomena, linking related ideas clearly and demonstrating their ability to do so in different contexts.
- 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.

91173: Demonstrate understanding of electricity and electromagnetism

Candidates who were awarded **Achievement** commonly:

- applied the correct physics formula
- applied $E=V/d$ given two values to find the third
- understood that negatively charged particles were attracted to the positive plate and could draw field lines between charged plates
- applied resistor combination formula
- knew the faster you went the longer it took to stop when acted on by a constant force
- knew the power of a lamp determined its brightness.

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

- confused magnetic and electric fields
- used the word power when they meant current
- did not know the prefixes kilo and milli
- did not know what the letters in a formula represented and often thought (E)lectric field was energy or (V)oltage was velocity.
- gave circular arguments in show questions by assuming the given value to prove the given value
- used the length of the rod and not the length of the rod in the magnetic field to calculate the induced voltage
- 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
- made generic statements e.g. current splits in parallel or voltage is the same in parallel

- did not realise that adding a component to a circuit changes everything except the supply voltage.

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

- knew how to convert minutes to seconds
- drew field lines between parallel plates
- calculated the total resistance of a circuit that contained both parallel and series components
- explained how a voltage was induced across a conductor
- knew kinetic energy changed to electric potential energy and could calculate the distance moved
- knew the power of a circuit determined its brightness.

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

- used precise physics language
- applied $V=IR$ and $P=IV$ to the whole circuit
- explained that doubling the speed quadrupled the stopping distance
- explained clearly what they were calculating at each step and which formula they were using
- explained what happened to the induced voltage if the conductor was no longer moving perpendicular to the magnetic field.
- gave complete arguments, clearly indicating whether they were referring to a single component of a circuit or the whole circuit
- performed multistep mathematical calculations accurately.

Standard specific comments

When asked about a change of component in a circuit, candidates need to make it clear whether they are referring to a particular component or the whole circuit when making statements like “voltage decreases”.

Candidates are disadvantaged when they make generic comments such as “voltage is the same across parallel components”.

Physics subject page

Previous years' reports

2018 (PDF, 120KB)

2017 (PDF, 46KB)

2016 (PDF, 215KB)

2017 (PDF, 46KB)