Assessment Report

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Level 2 Physics 2020

Standards 91170 91171 91173

Part A: Commentary

Candidates who achieved higher grades used correct physics terminology.

All calculated answers should be given with an appropriate SI unit.

Candidates should ensure they completely answer the question. Many candidates after completing a calculation of force failed to give the direction of the force.

Part B: Report on standards

91170: Demonstrate understanding of waves

Candidates who were awarded **Achievement** commonly:

- could construct two rays on the ray diagram, but were not able to locate the image correctly or draw it with the correct orientation
- substituted the values incorrectly in the mirror formula, but performed the calculations correctly with incorrect values

- understood the phenomenon of refraction but drew the rays coming out of the observer's eyes instead of the object
- recognised the phenomenon of total internal reflection, but could not calculate the critical angle
- drew the correct diagram for the refraction of water waves, but did not realise that the amplitude increases with the decrease of speed to keep the energy conserved
- could describe the difference between light and sound waves only partially
- attempted to explain the wave interference without reference to amplitude or path difference.

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

- could draw one ray on the ray diagram correctly, but not two
- mixed up the images formed by different types of mirrors, e.g., stated that the plane mirror produces real image
- could not add or subtract fractions
- could not name refraction correctly; the rays on the refraction diagram bent the wrong way – away from the normal in water
- could not name the total internal reflection phenomenon or calculate the critical angle
- constructed the wave fronts on the refraction of water waves diagram at an angle or with wider spaces in shallow water
- could not identify the wave interference as a reason for fluctuation of the volume of sound.

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

- constructed the ray diagram correctly, and identified and described the image
- correctly described the types of images produced by different mirrors, and gave the comparison in the context of the question
- calculated the height of the image, but did not describe the image correctly
- drew the refraction diagram with the rays bending away from the normal when coming out of the water

- explained fully why the object looks closer to the surface to the observer
- explained the total internal reflection phenomenon, but forgot about the condition of the light travelling from more to less optically dense medium
- recognised that the amplitude of the water waves increases when the waves travel in shallow water
- provided full comparison of the light and sound waves
- described the wave interference phenomenon without reference to the path difference.

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

- calculated the height of the image correctly and described the image as inverted, real, diminished
- stated both conditions for total internal reflection, and calculated the critical angle
- explained the wave interference with clear reference to the path difference for the nodal lines to be (n – 1/2) wavelength.

Standard specific comments

Many candidates showed light rays passing through a mirror and not being reflected by it.

Some candidates thought that light was emitted from the eyes.

91171: Demonstrate understanding of mechanics

Candidates who were awarded **Achievement** commonly:

- knew the appropriate formulae to apply in different contexts
- performed single-step calculations accurately
- drew free-body force diagrams
- understood the concept of centripetal force
- stated the necessary conditions for equilibrium
- applied Hooke’s law.

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

- were unable to attempt to answer many questions
- solved very simple numerical problems
- drew diagrams inaccurately
- used physics terminology very imprecisely
- confused physics concepts, particularly energy with momentum, and force with momentum.

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

- read questions sufficiently carefully to understand what was required in response
- drew vector diagrams
- completed multi-step calculations correctly
- explained phenomena using correct physics terminology
- showed thoughtful consideration of more than one physics concept in an answer.

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

- read questions very carefully so that their response addressed exactly what was being asked
- drew vector diagrams carefully and accurately
- completed multi-step solutions of numerical problems based on different topics in a clear, elegant and economical manner

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91173: Demonstrate understanding of electricity and electromagnetism

Candidates who were awarded **Achievement** commonly:

- correctly applied the rule for combining resistors in parallel
- applied $V = BvL$ to calculate the induced voltage across a conductor cutting a magnetic field

- understood that positively charged particles were attracted to the negative plate
- applied the right hand slap rule or equivalent to work out the direction of force
- knew that increasing the speed increased the induced voltage.

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

- confused magnetic and electric fields
- used the word power when they meant current
- did not know what the letters in a formula represented and often thought (E)lectric field was energy or (V)oltage was velocity.
- wrote about the energy changes when the changes in force were asked for
- thought removing a parallel component decreased the total resistance
- made generic statements like: voltage is the same in parallel.

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

- knew that the field between parallel plates was uniform
- determined the current in a series / parallel circuit
- realised that in a uniform electric field, electric force is constant.
- calculated the size and direction of a force on a charge in an electric field
- explained what happens when a resistor in a parallel circuit is removed
- stated the direction of charge movement as a conductor is moved through a magnetic field
- determined the size and direction of the force on a conductor moved through a magnetic field.

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

- succinctly carried out complex circuit calculations accurately
- explained what they were doing at each ste,p and clearly indicated what each calculated value represented
- knew that, if the entire circuit was in the magnetic field, that no current could flow

- calculated the resistance when given the power output of a circuit.
- calculated the distance moved using conservation of energy in an electric field.
- explained what happens to voltage and current as a ‘loop’ moves through a magnetic field.
- used correct physics terminology
- drew clear, accurate diagrams
- linked ideas together to form a comprehensive answer – often going beyond the parameters of the question
- could correctly identify formula, substitute values, and rearrange equations.

Standard specific comments

Questions Two (c) and Three(d) highlighted that some candidates relied solely on past papers in their revision. Many responses appeared to be answers from previous examination; questions which have been memorised and repeated without the relevant adjustment needed to make the response fit the details of the current examination question. For example, candidates wrote about energy changes for (c) and wrote about power and brightness for (d).Candidates who achieved with Merit or Excellence provided answers relevant to the questions asked.

Physics subject page

Previous years' reports

2019 (PDF, 108KB)

2018 (PDF, 120KB)

2017 (PDF, 46KB)

2016 (PDF, 215KB)