Assessment Report

Level 1 Science 2017

Standards 90940 90944 90948

Part B: Report on standards

90940: Demonstrate understanding of aspects of mechanics

Candidates who were awarded **Achievement** commonly:

- interpreted information from a graph e.g. described the motion of objects in speed /time or distance/ time graphs
- gathered points from a graph and correctly processed these e.g. calculated velocity or speed from a distance time graph
- had a simple understanding of terms involved in mechanics including force, pressure, surface area, mass, weight and energy
- performed simple calculations from given data e.g. calculated acceleration from change of speed and time
- understood that energy is conserved, i.e. Ep is converted into Ek as an object falls
- knew adding a person increased the weight of a horse on the ground.

Candidates who were assessed as **Not Achieved** commonly:

- chose the wrong formula to use in calculations
- could not gather and/or use information from graphs
- could not perform simple calculations
- did not think critically about the answers given on their calculator screens
- could not describe physics terms in their own words
- relied on memory to recall formulae rather than using those provided
- resorted to explaining physics from their own experiences, e.g. “it feels heavier”
- tried to define physics words in relation to their unit e.g. “mass is something measured in kilograms”.

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

- manipulated formulae to complete multiple step calculations, but often brought forward errors from previous steps
- compared mass and weight accurately
- understood and applied the ideas around balance and unbalanced forces, and how net forces give rise to a change in speed

- understood conservation of energy when work is done lifting or dragging objects
- explained the effect that the use of a ramp has on force size/ work done / power on objects
- confused downwards weight force with ‘thrust’
- explained the relationship between force and pressure but did not include area
- interpreted graphs accurately and used information to explain concepts.

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

- made multi -step calculations and included the appropriate units
- made clear links between ideas and consequences, e.g. an object sinks more because mass increases and hence weight increases, which means an increased force and so an increase in pressure
- understood and applied ideas around energy gained and work done on objects under the influence of gravitational force
- recognised that the same work would be done using two methods, yet less force and power was needed when dragging
- described clearly how an object behaves under the influence of gravity and friction forces as it returns to earth during free fall, and on release of a parachute.

Standard-specific comments

Candidates generally had a good understanding of most concepts examined.

Clearly labelled diagrams were not used enough by candidates to help them explain their answers and, when used, these diagrams were often incomplete or inaccurately drawn, e.g. the length of arrows, the drawing of straight lines, and the naming of all force pairs were not done carefully enough.

The failure of candidates to recognise that work done (or Ep) is conserved when using a ramp or lifting vertically often prevented candidates from achieving a higher grade.

Use of subject specific language is important. Being able to use graphs to then explain motion using language is a skill that needs practice. Many candidates used ‘constant speed of acceleration’ or ‘accelerate at a constant speed’ where ‘speed’ was used instead of ‘rate’, indicating they had confused these two terms.

90944: Demonstrate understanding of aspects of acids and bases

Candidates who were awarded **Achievement** commonly:

- knew litmus paper was red in acid and blue in a base, but were often unsure about neutral
- described basic particle collision theory
- could give electron configurations and basic ion formation
- recognised some colours of UI and associated pH values.

Candidates who were assessed as **Not Achieved** commonly:

- could not access/understand the questions and/or did not use bullet points given
- did not use the given information correctly
- did not know the two expected reactions, adding hydrogen or carbonate as products
- were unfamiliar with litmus or confused it with universal indicator
- left at least one question blank or several parts of questions
- confused key terms like atom, ion and electron, group with column, row or period.

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

- explained reactions in terms of change in collision rate rather than simply more collisions
- wrote correct symbol equations
- showed good understanding of the relationship between group number and ion formation
- recognised the need for electron transfer in ion formation during a reaction, not just ending with a balanced compound
- recognised that silver had one valence electron from its charge on the ion table
- demonstrated knowledge of links between UI colours, pH and relative H^+/OH^-ion concentrations.

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

- explained that ionic compound formation during a reaction required BOTH the transfer of electrons to give full valance shells AND that the ions remained in an ionic bond due to electrostatic attraction/ force
- showed comprehensive understanding of particle collision theory, i.e. that collision rate will slow as reactant particle concentration decreases and that temperature affects BOTH the speed of particles to collide more often AND their energy/force (i.e. activation energy).
- recognised that the same number of collisions/reactions/reactant particles were present giving the same product amount, but collision rate was altered by temperature
- explained neutralisation correctly, identifying the products water and salt thus lowering the H^+concentration rather than simply outnumbering it
- could write correctly balanced equations.

Standard specific comments

Even some top candidates misunderstood ionic bonding, with the idea that a neutral molecule requires the return of the electrons for ion formation (rather than each ion maintaining a charge) being common. Confusion with covalent bonding was also common with the term “sharing” used often to describe an ionic bond.

Candidates also struggled to explain the actions of particles in reactions, with many responses clearly rote-learned from previous years’ exams.

The very simple and straightforward question on identification of substances was exceptionally poorly answered. This may have been due to a lack of recognition of NaCl as a neutral salt or the carbonates as having a basic pH, or perhaps due to a lack of familiarity with practical work.

90948: Demonstrate understanding of biological ideas relating to genetic variation

Candidates who were awarded **Achievement** commonly:

- demonstrated understanding of the basic genetics terminology
- mistook environmental damage as having a genetic basis
- had little understanding of the concept of a test cross
- listed genotypes and phenotypes correctly
- failed to link answers to the context, or used irrelevant examples
- showed an understanding of genetic variation
- described how unique sex cells are formed
- stated that sexual reproduction leads to variation and asexual does not.

Candidates who were assessed as **Not Achieved** commonly:

- showed little or no understanding of the question

- defined only a small number of genetics terms
- could not produce a Punnett square
- did not link mutations to gametes or understand that mutations are genetic
- were unable to interpret pedigree charts
- did not understand the difference between inherited and non-inherited
- had limited understanding of the processes producing unique gametes.

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

- used genetic language confidently
- applied knowledge to familiar contexts
- could not always apply understanding to a new context
- clearly understood the influence of mutations on DNA and how it linked to phenotype
- identified a non-genetic change and explained it therefore could not be passed on
- understood what a test cross is and how it is used to identify a genotype
- understood that it can be difficult to prove the genotype of an individual with a dominant phenotype
- explained that gametes have one set of chromosomes and how they can be combined during fertilisation to make unique gametes
- understood that clones have no genetic differences and the implications for this, in context.

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

- explained clearly the link between mutation, DNA, gene, allele, and phenotype using an unfamiliar context
- explained comprehensively how a mutation results in different alleles and produces a new phenotype
- explained fully the inheritance of parental alleles and how they lead to certain genotypes and phenotypes of the offspring, including the use of a test cross
- related the ideas of large sample size and genotype uncertainty to the use of a test cross
- explained clearly that the difference between individuals of the same species results from meiosis, including the formation of (haploid) gametes and the shuffling of alleles, along with random fertilisation, leading to unique offspring
- explained that asexually reproduced (cloned) individuals are influenced in the same way by their environment, in context
- related the success of an individual to it being able to pass on its alleles to future generations.

Standard specific comments

Common issues for candidates included: not knowing that test crosses require multiple offspring; believing mutations are due to the base pair rule changing; not defining concepts; not being aware of genotypes for dominant phenotypes; stating that chromosome shuffling occurs after fertilisation.

Science subject page

Previous years' reports
2016 (PDF, 0KB)