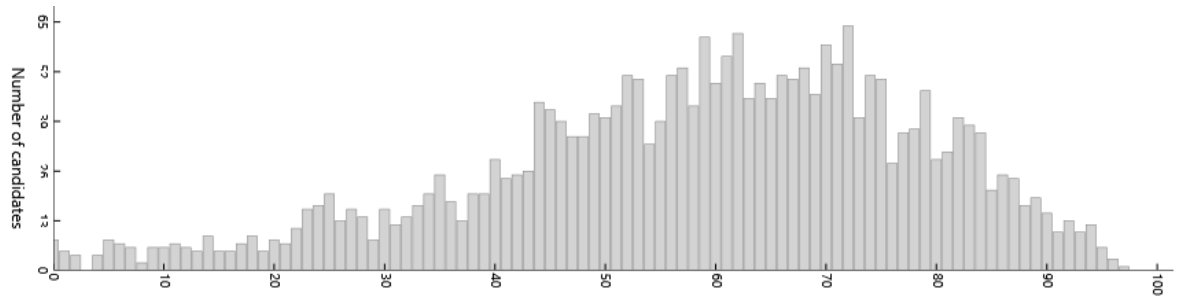
Summary report of the 2022 ATAR course examination report: Physics

Year	Number who sat	Number of absentees
2022	2545	51
2021	2680	43
2020	2861	40
2019	2770	58

The number of candidates sitting and the number attempting each section of the examination can differ as a result of non-attempts across sections of the examination.

Examination score distribution–Written



Summary

The examination was well-received by teachers and candidates alike and most candidates seemed to find it accessible. The examination covered the syllabus and there was appropriate differentiation and scaffolding of questions. The different styles of questions challenged candidates to display a variety of Physics skills. The examination appeared to be an appropriate length, as the majority of candidates were able to attempt most questions.

Attempted by 2539 candidates	Mean 58.22%	Max 97.05%	Min 0.00%
Section means were:			
Section One: Short response	Mean 62.71%		
Attempted by 2538 candidates	Mean 18.81(/30)	Max 29.48	Min 0.00
Section Two: Problem-solving	Mean 59.91%		
Attempted by 2525 candidates	Mean 29.95(/50)	Max 49.45	Min 0.00
Section Three: Comprehension	Mean 47.29%		
Attempted by 2506 candidates	Mean 9.46(/20)	Max 20.00	Min 0.00

General comments

Some candidates performed very well overall. These candidates displayed a sound grasp of the concepts covered and a high level of mathematical proficiency. There were concerns regarding the lack of mathematical and problem-solving skills demonstrated in some candidates' responses. Rearranging equations, such as $r = \frac{mv}{qB}$ to $m = \frac{v}{qBr}$, were done poorly. There were also many candidates who mistakenly produced errors when using

fractions, with $\frac{a}{b}-\frac{c}{d}=\frac{a-c}{b-d}$ being a common error. Trigonometric functions also appeared to be problematic for some candidates. Questions that required the addition of vectors, or taking components of vectors, exposed a lack of understanding for many candidates, as they added two dimensional vectors as if the vectors were co-linear. An example of this was in circular motion $F_c = T - mg$. When asked to calculate 15% of a number, many candidates divided that number by 0.15 instead of multiplying. Substitution, simultaneous equations, simplification and derivation were also areas in which a number of candidates lacked skills. Questions that required explanations were poorly done by a large number of candidates.

Advice for candidates

- Ensure you look at the number of marks awarded to a question and allocate your time appropriately.
- Pay attention to setting out your answer. Marks can be awarded for process despite an incorrect answer. If your process is unclear, no marks can be awarded.
- Cross out any incorrect working.
- Tell the marker what you are doing. For example, $F_c = F_g$ tells the marker that you have identified what is providing the centripetal force in this situation. This shows a level of understanding and could be worth a mark in itself.
- Close the argument. If a question asks you to show or prove something, your last statement should be exactly that. Do not simply perform a calculation and then leave that number dangling. If the task was to show a is less than b, do not simply calculate b and leave it. State or show that it is more than a.

Advice for teachers

- Give your students ample opportunity to practise manipulation of equations, taking components of vectors and manipulating trigonometric functions.
- Emphasise significant figures. If a question asks candidates to estimate a value, only two significant figures must be given.
- Provide students opportunities to practise more multi-step calculations where more than one formula is involved.
- Demonstrate how vectors work by drawing more free body and vector diagrams with emphasis on components and specific trigonometric functions relating two components.
- Emphasise standard explanations of common situations.
- Emphasise to students that they need to read the questions carefully in order to extract exactly what is being described and what is required in the answer. Many students see a diagram and explain something which, albeit correct, is not the answer required. An example of this is explaining the role of a split ring commutator in a question about an AC generator.

Comments on specific sections and questions

Section One: Short response (58 Marks)

Section One had many familiar contexts and was attempted by almost all candidates. Candidates struggled with questions that required an explanation of a situation. Questions 3 and 7 proved to be challenging for many candidates. Question 11 part (c) was a complex concept to explain and most candidates struggled to achieve full marks.

Section Two: Problem-solving (91 Marks)

Many candidates struggled with the concepts of efficiency, equilibrium and significant figures. Candidates appeared to find difficulty in decoding questions in unfamiliar contexts. Questions 16 and 17 achieved the lowest means in Section Two.

Section Three: Comprehension (38 Marks)

Overall, the mean for Section Three was considerably lower than the other two sections of the examination. Candidates overall performed better on Question 18 than Question 19. In both questions, many candidates did not appear to fully read the whole passage first before trying to answer the questions, as they missed key pieces of information that were needed to form part of their answers.