IMechE response to the consultation on the proposed changes to the assessment of mathematics, physics and combined science GCSEs in 2025, 2026 and 2027 (16 October 2024)

The Institution of Mechanical Engineers (IMechE) represents 115,000 engineering professionals and students in the UK and worldwide. The Institution plays a significant role in promoting education and skills in mechanical engineering, thus inspiring pupils and young people into engineering careers.

Within the Institution, the Engineering Policy Unit informs and responds to UK policy developments by drawing on the expertise of our members and partners, and the Education and Skills Strategy Board works to influence government and other stakeholders across the field to recognise the contributions and potential of engineering to society. By engaging widely with key actors in the field, the Institution campaigns to shape education policy and raise the profile of engineering, technology, STEM education and engineering careers.

1. To what extent do you agree or disagree with the proposal that formulae sheets should be provided in the exams for GCSE mathematics in 2025, 2026 and 2027?
Strongly Agree

2. Do you have any comments on the proposal to provide formulae sheets in the exams for GCSE mathematics in 2025, 2026 and 2027?
The IMechE supports these proposed changes as a meaningful advancement in education. Rather than viewing this initiative solely as a response to the COVID-19 pandemic, we believe it reflects a deeper understanding of effective teaching and pedagogical practices. Similarly, students will be encouraged to focus on grasping and applying mathematical concepts, moving away from the limitations of rote memorisation.
Within this context, we emphasise the importance of students becoming familiar with these formulae sheets well before the exams take place to maximise their effectiveness. While memorisation skills have their place and should be encouraged to some degree, they should not be the primary focus of assessment.
From an engineering perspective, this approach aligns well with real-world practices where professionals routinely access various tools and resources to support their work. The IMechE supports this directive as it prepares students for a professional environment where problem-solving skills and the application of knowledge are far more critical than rote memorisation.

3. To what extent do you agree or disagree with the proposal that equations sheets should be provided in the exams for GCSE physics and combined science in 2025, 2026 and 2027?
Strongly Agree

4. Do you have any comments on the proposal to provide equations sheets in the exams for GCSE physics and combined science in 2025, 2026 and 2027?

We believe this proposal aligns with modern educational practices that prioritise comprehension over memorisation. A solid grasp of essential equations in physics and combined science enables students to engage effectively in problem-solving and critical thinking.

From an engineering perspective, this reflects real-world practices where professionals have access to reference materials and tools. While memorisation skills are valuable, they should complement an educational philosophy that emphasises understanding and adaptability. We recommend that students familiarise themselves with the equation sheets before exams to ensure they can navigate and utilise them effectively, thus improving their performance and mirroring the resource-rich environments engineers typically encounter

Equality impact assessment

Ofqual's equality impact assessment on proposed exam changes considers the effects on students with protected characteristics, particularly those with Special Educational Needs and Disabilities (SEND). While some students find formulae and equations sheets helpful, others may struggle with them, especially when requiring adjustments like enlarged papers. Nevertheless, Ofqual believes these sheets are essential for ensuring all students have access to necessary materials without memorisation. To maintain consistency and familiarity across exam boards, Ofqual proposes to continue using the existing format for support materials in exams for 2025, 2026, and 2027.

5. Are there other potential equality impacts that Ofqual has not identified? (Required)

Yes

6. If yes, what are they?

We believe that additional potential equality impacts affecting students' performance and knowledge acquisition may include the stress associated with navigating multiple sheets during exams. This stress could particularly impact students with anxiety or other mental health conditions. Additionally, students with Special Educational Needs Disabilities (SEND) have diverse requirements; some may experience confusion or difficulties when trying to navigate the sheets during exams. Addressing these concerns is essential to ensure all students have equitable opportunities to demonstrate their knowledge and skills.

7. Do you have any suggestions for how any potential negative impacts on particular groups of students could be mitigated?

We recognise that exams can be stressful, particularly for those facing anxiety, mental health challenges, or other difficulties. It is also essential to ensure that equation sheets are user-friendly. Providing clear and ongoing guidance and training for both students and teachers can significantly enhance the effectiveness of these resources, with a strong emphasis on promoting inclusion and equality.

Regulatory impact assessment

Ofqual's proposed changes to GCSE exam arrangements for mathematics, physics, and combined science in 2025, 2026, and 2027, respond to a request from the Department for Education (DfE). Students will no longer need to recall all usual formulae and

equations, while the qualifications remain valid. Developed with input from exam boards, the proposals aim to reduce the burden on schools and allow more teaching time. Centres may print formulae sheets for teaching but are not required to, as clean copies will be provided during exams. Exam boards will incur some costs for implementation but are familiar with these arrangements, minimising risks and expenses.

8. Are there additional activities associated with providing students with formulae and equations sheets in their GCSE mathematics, physics and combined science exams that Ofqual has not identified above?
(Required)
Yes

9. If yes, what are they?
In the context of these changes, we believe that training sessions and workshops for teachers may be necessary to ensure they are well-equipped to guide students in effectively using these sheets during exams and familiarising themselves with them. This training can help teachers understand how to integrate these resources into their teaching practices, creating a more supportive environment that enables students to use the resources effectively. Equally, allowing student workshops could be beneficial for both teachers and students. These sessions would provide students with the opportunity to practice using the equation sheets in a supportive setting. Additionally, we believe that establishing monitoring and evaluation mechanisms to assess the effectiveness of these resources is crucial for long-term success.

10. What, if any, additional costs do you expect you would incur if students are provided formulae and equations sheets in their GCSE mathematics, physics and combined science exams for 2025, 2026 and 2027?
We anticipate that there may be some additional costs incurred related to teacher training, workshop organisation, administrative costs associated with coordinating the distribution of these materials to schools, and printing costs. Additionally, there may be costs associated with monitoring and evaluating the effectiveness of these resources, which will involve gathering feedback from both students and teachers.

11. Do you have any suggestions for alternative approaches that could reduce burden and costs?
We recommend forming partnerships with educational technology companies to access software or platforms that can streamline the distribution and use of formulae and equations sheets, thereby reducing administrative burdens and costs. Additionally, providing students with access to digital versions of these sheets can significantly lower printing costs and facilitate easier updates and modifications to the materials.