

Accessible examination papers

8 December 2023 version – Nicolas Labrosse (with thanks to Stephany Biello, Angela Busse, Norman Gray, Stuart Grey, Scott Roy, Katharine Terrell, Daffyd Waters, Graham Woan)

Printed examination papers

- 1. Plain language:** When drafting examinations use clear and concise language in instructions and questions. Keep sentences short and to the point. Use plain language and avoid unnecessary jargon wherever possible. This helps all students by reducing barriers to understanding instructions and questions.
- 2. Use a consistent layout:** Use a consistent layout throughout the paper. This includes consistent use of e.g. headings, subheadings, question parts, and question numbering. Questions that are continued over the page should have continuation flags. This helps students navigate the paper and understand its structure.
- 3. Font and size:** Use a font at a size of 12 points or larger with consistency between symbols and text. Sans-serif fonts are often quoted as being more readable on screen and on paper. However there are issues with sans-serif in exams, including almost total confusion between 1, l and I, and the lack of consistent mathematical symbols.
A good alternative is available with STIX2 fonts. They are designed for scientific, medical, and technical fields. They provide a uniform set of fonts with the most comprehensive list of all symbols that one might want to use, and can be installed for Word and LaTeX.
- 4. Left justified text:** Use left justified text consistently. Marks against each sub-question can be indicated in brackets after the question. Left-aligned text is easier to read because the eye can easily find the start of the next line. Fully justified text can lead to irregular spacing between words which negatively impacts accessibility.
- 5. Spacing:** Use 1.5 line spacing and leave a line space between paragraphs. This improves readability by preventing lines of text from blending together.
- 6. Images and diagrams:** Provide a description for all images and diagrams. This can be in the form of a caption or within the main text. This helps students who use screen readers understand the content of the image.
Ensure students are familiar with the type of visualisation used (e.g. students do not require unfamiliar concepts to interpret the data).
If the figure is described carefully in the question, a caption can be moved to an appendix section to keep the layout of the exam paper simple.
- 7. Colour:** If colours must be used, they should be high contrast. However, do not rely on colour alone to convey information. E.g. use direct labelling of lines, bars etc. High contrast colours are easier to distinguish, and should be separated by white space if possible, although not everyone perceives colours in the same way.

8. **Mathematical notation:** Use standard mathematical notations and ensure they are clear and legible. This helps students understand the content and prevents confusion.

Online examination papers

1. **Headings and tags:** Use built-in heading styles for a logical document structure. This helps screen readers navigate the document.
2. **Alternative text for images:** Add alternative text to visuals. This helps screen readers understand the image.
3. **Symbols and formulas:** Use the formula environment in Word for symbols and formulas. This ensures that they are correctly interpreted by screen readers.
4. **Tables and datasheets:** Use simple structures for tables and datasheets. Complex tables can be difficult for screen readers to interpret.
5. **Accessibility checker:** Use an accessibility checker to review your document. Besides Blackboard Ally and MS Office built-in tools, check out [Coblis — Color Blindness Simulator – Colblindor \(color-blindness.com\)](https://color-blindness.com)

Archiving examination papers

1. **PDF format:** Save the document as a PDF. It is important to note that while PDFs are widely used and can be made accessible, they may not provide the same level of accessibility as HTML or EPUB formats. For online archiving of examination papers, consider providing the document in alternative formats, such as HTML or ePub.
2. **Tagged PDF:** Create a tagged PDF. This includes information about the structure of the document and helps screen readers.
3. **Alternative formats:** Consider providing the document in alternative formats, such as HTML or ePub.

Things to avoid

1. **Complex tables:** Avoid using complex tables with merged cells. These can be difficult for screen readers to interpret.
2. **Text boxes:** Avoid using text boxes as they can be difficult for screen readers to navigate.
3. **Footnotes:** Avoid using footnotes. Instead, incorporate the information into the main text.
4. **Italics:** Avoid using italics as they can be difficult to read for people with dyslexia.

Conversion to HTML or ePub

To convert a Word document to HTML, use the Export function. Choose 'Save as' and then "Web Page, Filtered (*.htm, *.html)." This removes some of the proprietary HTML markup specific to Word.

You can then use a free software like Calibre to convert your HTML file to ePub.

To convert a LaTeX document to HTML, one possibility is to use LaTeX ML, or alternatively, PANDOC.

Mathpix produces very good conversions between different formats, particularly from PDF to HTML.

Whatever the tool you use, the conversion process might not be perfect, and it is a good idea to always check the output to make sure it looks as expected.

Helpful resources

[University of Glasgow - MyGlasgow - Digital Accessibility](#). The “Detailed digital accessibility guidance for teaching staff” document available under “Guidelines for content authors” covers topics like accessible tables.

[University of Glasgow - MyGlasgow - Digital Accessibility - STEM subjects](#). This page specifically covers equations, formulae and diagrams, Word documents, LaTeX, R and R Markdown etc, and it also covers how to provide alternative text for complex diagrams.

Guidance from scientific publishers e.g. [Routledge & CRC Press Authors - Accessible Content](#) with helpful tips on ALT Text and accessible image description.

[Color Universal Design \(CUD\) / Colorblind Barrier Free \(uni-koeln.de\)](#). This includes a set of colours that is unambiguous both to colourblind and non-colourblind readers.

[Color blind friendly palettes for data visualizations with categories \(biologists.com\)](#). Another website that offers a collection of colourblind-friendly palettes for various purposes.

[Designing equitable and inclusive visualizations: An underexplored facet of best practices for research and publishing - Schimpf - 2021 - Journal of Engineering Education - Wiley Online Library](#) A guest editorial to reduce “unintentional exclusionary practice” in designing and reviewing visualisations. Examples of inclusive visualisations are given.

[good fonts for dyslexia study.pdf \(umich.edu\)](#) recommends fonts to use based on reading performance and subject preference.

Accessibility checklist for examination papers

This checklist can be used by question setters and during internal checks to verify that key steps have been taken to guarantee accessibility. Ultimately it is the responsibility of Exams Officers, or academic staff nominated by Schools’ Learning and Teaching Convenors, to ensure that sufficient accessibility checks are made during the preparation of examination papers.

1. **Plain language:** Is clear and concise language used in instructions and questions? Are most sentences short and to the point? Is unnecessary jargon avoided?
2. **Consistent layout:** Is the layout consistent throughout the paper, including the use of headings, subheadings, and question numbering? Are there continuation flags for questions that are continued over the page?

3. **Font and size:** Is an appropriate font used consistently between text and symbols, at a size of 12 points for the main text? Are italics avoided?
4. **Left justified text:** Is the text left justified consistently? Are marks against each sub-question indicated in brackets after the question?
5. **Spacing:** Is 1.5 line spacing used and is there a line space between paragraphs?
6. **Images and diagrams:** Is there a description provided for all images and diagrams, either in the form of a caption or within the main text? Can images and diagrams be interpreted without unfamiliar concepts?
7. **Colour:** If colours are used, are they high contrast? Is colour not the only means used to convey information? Can information be presented using labels or different line styles instead?
8. **Mathematical notation:** Are standard mathematical notations used and are they clear and legible?
9. **Headings and tags:** Are built-in heading styles used consistently for a logical document structure?
10. **Alternative text for images:** Is alternative text added to visuals?
11. **Symbols and formulas:** Is the formula environment consistently used for symbols and formulas?
12. **Tables and datasheets:** Are simple structures used for tables and datasheets?
13. **Complex tables:** Are complex tables with merged cells avoided?
14. **Text boxes:** Are text boxes avoided?
15. **Footnotes:** Are footnotes avoided, with the information instead incorporated into the main text?
16. **Accessibility checker:** Has an accessibility checker been used to review the document?
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