

Notes for exam question authors

Norman Gray

1.1, 2014 May 03

The full documentation for the `exam-n` document class is in the file `exam-n.pdf`, but some of this is quite detailed, and addressed to the exams convener, who has to assemble the overall exam. This document is a compact account of how to use the exams class as a question author.

You can find updated versions of the `exam-n` document class, and the complete documentation, at <http://purl.org/nxg/dist/exam-n>.

Template

```
1 \documentclass[compose]{exam-n}
2 \begin{document}
3 \begin{question}{20} \author{Frieda Bloggs}
4 \shout{Dummy question}
5 \part Show that, under the action of gravity alone, the scale size
6 of the Universe varies according to
7 \[
8 \ddot{R}=-\frac{4\pi G \rho_0}{3R^2}.
9 \]
10 Is  $\ddot{R}=\text{Diff1}*[2]{R}{t} > 10\text{units}\{\text{au.s}^{-2}\}$ ?
11 \partmarks*{4}
12 \begin{solution}
13 This can be solved by remembering the answer.
14 \end{solution}
15
16 \part Explain the nature of being.
17 \partmarks{16}
18 \begin{solution}
19 Om.
20 \end{solution}
21 \end{question}
22 \end{document}
```

Notice first that this is a standalone document – you can \LaTeX it to produce a formatted exam paper, as long as you include the `[compose]` option in the document class line. This complete document can later be given to the exams convener, who can input it unchanged into the master file which pulls the various questions together. It follows from that that you should be hesitant about putting anything into the preamble other than `\usepackage` commands, and you should consult with the exams convener to ensure that such packages go into the master file, too. It’s probably a safe bet that the ‘graphicx’ package will be included in the master file. If you want to include a `\newcommand`, or anything like that, it can be placed inside the `question` environment. For other customisations, negotiate with the exams convener.

The `question` environment contains (surprise) a question, broken into parts (a, b, c, ...) by `\part` commands, and with the distribution of marks within the question being indicated by `\partmarks{n}`; the class will check that the marks in `\partmarks` do add up to the question goal given as an argument in `\begin{question}{markgoal}`. Within the question there can be one or more `solution` environments, which are not displayed in the final version (obviously), but which do appear in draft modes. You’ll most typically have a `\partmarks` macro and a `solution` environment for each `\part`, but they don’t have to match up, and you can have the entire solution at the end if you prefer. The `\partmarks*{n}` command adjusts the position of the marks indicator, in a way intended to be useful after equations or itemized lists. Note that `\partmarks` ends a paragraph: this is probably good style, but if you insist on mid-paragraph marks, then a following `\noindent` will be useful.

One common exam or test question type is a multiple-choice question. This is indicated by a `\begin{mcq}` environment, which contains a list of questions indicated by `\item`, including precisely one correct answer, indicated by `\answer` (this is of course formatted identically to the others, unless the `[showsolutions]` option is present). This environment starts with a question, which is followed by a the list of possible answers. Before you can use the `mcq` environment, you must call `\multiplechoicereasons{n}` to indicate how many options are required in each question. It’s OK to have a `solution` within an `mcq` environment, perhaps to provide commentary on or explanation of the correct answer.

You can include a `questiondata` environment at (typically) the end of the question: this is intended for extra equations or constants which are useful for the examinee.

The `figure` and `table` environments act differently from the way they usually act in \LaTeX : ‘floats’ don’t float. In each case, the content is forced to be always ‘here’, and in addition is also tied to the text which follows it, so that a page break will not occur immediately after a figure or table. There are *no* figure or float options permitted in this class’s ‘floating’ environments (that is, option `[h]` is neither necessary nor permissible). If you need to tune the page breaking, then you should use `\goodbreak`, `\vspace` or, in extremis, `\newpage`. The `\caption{text}` command works as usual; the figure and table numbering sequences continue through the solutions, if they’re shown, but this isn’t expected to be a problem.

Figures can be included with `\includegraphics` as usual, as long as the ‘graphicx’

package has been included at the top of the master file. If you want to include complete pages from a PDF (most typically containing a scanned handwritten model answer), then you can do so by including the ‘pdfpages’ package at the top of the file, and then `\includepdf[pages={-}]{filename}` inside a `solution` environment. See the documentation of the ‘pdfpages’ package for more information.

Include marginal notes with `\comment{remark}` – these show up in drafting modes (`[draft]` and `[compose]`), but not in the final version. The `\author{name}` command is just a type of comment. If you need to make more noise, then `\shout{remark}` inserts a highlighted *remark* in the flow of text (so it can be used anywhere) and includes the remark in a prominent list of exclamations at the end of the document.

At the bottom of each page, you see a faint identification code, such as ‘QM/123-456’. This consists of an exam identifier, extracted from the exam preamble, plus a code which changes each time L^AT_EX is run. This helps you avoid collation accidents, and to distinguish between slightly different versions of the printed document.

Various convenience commands

Macro `\vec{v}` is redefined to give bold-font vectors, rather than vectors with arrows, which is the (weird) L^AT_EX default. This should work for bold greek as well as roman.

Macros `\dd` and `\ddd`: `\dd` is a roman d, as used for differentials; `\ddd` is the same with a preceding thinspace, as used within integrals; for example

$$\int f(x)\ddd x = \int f(x)\, \dd x = \int f(x) dx$$

You can typeset derivatives neatly:

$$\begin{array}{ll} \text{\Diff1{a}{b}} & \frac{da}{db} \\ \text{\Diff1[2]{a}{b}} & \frac{d^2a}{db^2} \\ \text{\Diff1*{a}{b}} & da/db \\ \text{\Diff1*[2]{a}{b}} & d^2a/db^2 \end{array}$$

The unstarred versions are for displayed equations, the starred ones for inline maths. There is analogous support for partial derivatives with `\Partial{a}{b}`.

Macros `\units{expr}`, `\units*{expr}`: These typeset physical units in an upright shape, with tilde or dot acting as a separator between units. Since this is typeset in maths mode, all other spacing is ignored. For example, `\v=10\units{m.\mu s^{-1}}` gives $v = 10 \text{ m } \mu\text{s}^{-1}$. The unstarred version includes some leading space; the starred

version can be used when referring to the unit by itself, where it is not qualifying a number (eg labelling an axis with units $\text{\$B/\units*T\$}$, or B/T). These macros might be replaced, in the future, by a recommendation to use the `siunitx` package.

For some other useful symbols, see the table below:

| | | |
|-------------------------|--------------------|---|
| <code>\e</code> | $e^{i\pi} + 1 = 0$ | the exponential is typeset in an upright rather than an italic shape, as in $\text{\$e^{i\pi} + 1 = 0\$}$. |
| <code>\au</code> | 10 au | astronomical units: $10\text{\units{\au}}$. |
| <code>\lambdabar</code> | λ | the Compton wavelength, as a lambda with a bar through it. |

Extra: Creating complete exams

As a question author, you are typically only concerned with one or two single questions, and that is why this brief guide concentrates exclusively on the `[compose]` mode. But you might be interested to see how your text appears in the final exam. A template master file is below. For more detail, see the complete documentation in `exam-n.pdf`.

```

1  \documentclass{exam-n}
2
3  \exambanner{Examination for the degree of Master of Examinations}
4  \universitycoursecode{EX-666}
5  \schoolcoursecode{Exams001}
6  \coursetitle{Advanced setting of exams}
7  \degreedescriptions{Examinations 3}
8
9  \examdate{2012 December 25}
10 \examtime{12:00 -- 23:00}
11 \rubric{Be creative, but not vindictive}
12
13 \numquestions{1}
14
15 \begin{document}
16 \maketitle
17
18 \includequestion{template-question}
19
20 \end{document}

```

The `exam-n` class currently supports class option `[A1]`. These automatically include a suitable constants sheet in the formatted paper.

On the following pages, you can see the result of L^AT_EXing the sample file on p.1, and of processing the master file above. As you can see, the [compose] mode by default shows solutions, and collects the `\shout{text}` remarks to the end. In the [final] mode (which is the default mode), solutions disappear, but the shouted-out alerts remain, just to make sure no-one can miss them.

SHOWING SOLUTIONS

Author: Frieda Bloggs

1 Dummy question

(a) Show that, under the action of gravity alone, the scale size of the Universe varies according to

$$\ddot{R} = -\frac{4\pi G\rho_0}{3R^2}. \quad [4]$$

Is $\ddot{R} = d^2R/dt^2 > 10 \text{ au s}^{-2}$?

Solution: This can be solved by remembering the answer.

(b) Explain the nature of being. [16]

Solution: Om.

[Total: 20 OK]

NOTE: Dummy question

SHOUTS: 1 (see end)

no logo available

2012 December 25
12:00 – 23:00

EXAMINATION FOR THE DEGREE OF MASTER OF EXAMINATIONS

Examinations 3

Exams001

[EX-666]

Advanced setting of exams

Be creative, but not vindictive

Answer each question in a separate booklet

Candidates are reminded that devices able to store or display text or images may not be used in examinations without prior arrangement.

Approximate marks are indicated in brackets as a guide for candidates.

1 Dummy question

(a) Show that, under the action of gravity alone, the scale size of the Universe varies according to

$$\ddot{R} = -\frac{4\pi G\rho_0}{3R^2}. \quad [4]$$

Is $\ddot{R} = d^2R/dt^2 > 10 \text{ aus}^{-2}$?

(b) Explain the nature of being. [16]

[Total: 20]

End of Paper

NOTE: Dummy question