LaTeX exam paper macros for 2007/8

The LaTeX macros for setting Prelims and Final Honour School papers reside in three files: `exam_mac.tex`, `headers.sty` and `exam.cls`. The files can be anywhere on your machine's TeX search path (for example the current directory). Templates for each A, B, or C paper are in a file such as `a3.tex`; all the responsible examiner has to do is type questions in between `\begin{question}` and `\end{question}`. In recent years the file-naming convention has been `a1.tex, a2.tex, .., c7.tex` for the mainstream papers, and `s1.tex,.., s18.tex` for the short options. The short-option paper is obtained by doing `latex s`; the file `s.tex` is just a series of \include statements, the individual options being in files `s1.tex, s2.tex`, etc. Initially these statements are commented out: uncomment the one associated with your option. To produce the BT paper type `latex bt`.

A good macro set not only saves typing but makes it easier to achieve consistent, professional typesetting. Here is a summary of the action of most of the macros that are defined in `exam_mac.tex`.

(a) **Marks** If you type `\oxmarks5`, whether in a displayed equation or not, TeX will put [5] in the right margin. You can put the 5 in squiggly brackets if you like, and if you want a double-digit mark you *must* enclose it in squigglies: `\oxmarks{10}` to get [10].

(b) **Units** Units should be in Roman characters and preceeded by a half space. There are macros to do this (don't add the space yourself), so `$4\m, 5\GeV, 25\kmps$`, produces $4\,\mathrm{m}$, $5\,\mathrm{GeV}$, $25\,\mathrm{km\,s^{-1}}$. Notice that they need to be used in math mode. The currently defined unit macros are listed in Table 1. If the macro you want isn't there, get the Chairman to add it to `exam_mac.tex`.

(c) **Roman letters** In equations only variables should be italic, so it's useful to be able to produce certain Roman letters easily in math mode. The commonest Roman letters, d, D, e, and i can be obtained by preceeding the letter by \, so `\d y/\d x` produces $\mathrm{d}y/\mathrm{d}x$. Similarly $\mathrm{e} = 2.718\ldots$ and $\mathrm{i} = \sqrt{-1}$ should be Roman and are written `\e=2.718` and `\i=\sqrt{-1}`. Any Roman letter x can, of course, be obtained by typing `{\rm x}`.

(d) **Elementary particles** We sometimes use the symbols for elementary particles in equations and then we want to get Roman letters. Table 2 lists the definitions, which cover common particles and the quarks.

(e) **Vectors** Vectors should be set in boldface by typing `\va` to get $\mathbf{a}$ etc and so on for any upper or lowercase Roman letter. Bold Greek letters can be obtained by typing `\vtheta` to get $\boldsymbol{\theta}$, etc. Dot products should be written `\va\cdot\vb` for $\mathbf{a}\cdot\mathbf{b}$.

Bold nabla is obtained with `\vnabla` so `\vnabla\times\vE=-\pa\vB/\pa t` produces $\nabla\times\mathbf{E} = -\partial\mathbf{B}/\partial t$. You can also write `\curl\vE` for $\mathrm{curl}\,\mathbf{E}$ and `\Div\vE` for $\mathrm{div}\,\mathbf{E}$.

(f) **Caligraphic letters** Uppercase caligraphic letters can be obtained by typing `\cZ` for $\mathcal{Z}$.

Table 1: Defined units macros

\AA	Å						
\mA	mA	\A	A				
\mb	mb	\dB	dB	\C	°C		
\eV	eV	\keV	keV	\MeV	MeV		
\GeV	GeV	\TeV	TeV				
\g	g	\kg	kg				
\Hz	Hz	\kHz	kHz	\MHz	MHz	\GHz	GHz
\J	J	\kJ	kJ	\MJ	MJ		
\ha	ha	\K	K				
\Pa	Pa	\hPa	hPa	\kPa	kPa		
\fm	fm	\nm	nm	\micron	μm		
\mm	mm	\cm	cm	\m	m	\km	km
\mps	$\mathrm{m\,s^{-1}}$	\kmps	$\mathrm{km\,s^{-1}}$				
\pN	pN	\N	N				
\pc	pc	\kpc	kpc	\Mpc	Mpc		
\rad	rad	\sr	sr				
\ps	ps	\ns	ns	\ms	ms	\s	s
\T	T	\mV	mV	\V	V		
\mW	mW	\W	W	\kW	kW	\GW	GW
\kWh	kWh						
\yr	yr	\Myr	Myr	\Gyr	Gyr		
\MEarth	$M_\oplus$	\REarth	$R_\oplus$	\MSun	$M_\odot$	\RSun	$R_\odot$
\Im	Im	\Re	Re				

Table 2: Macros for elementary particles

\e	e	\neu	n	\pr	p	\Ka	K
\uq	u	\dq	d				
\sq	s	\cq	c	\bq	b	\tq	t

(g) Displayed equations Displayed equations are introduced by `\[` and finished with `\]`. Multiple-line equations have to be obtained with `\begin{eqnarray}` etc. This is one of the worst aspects of LaTeX (TeX has `\eqalign`, which works much better). In particular by default in `eqnarray` there is too much space around =. This defect can be remedied by typing `\arraycolsep=0.35mm`. Use braces to ensure that this command does not apply to tables.

(h) **Periods** At one time Oxford papers used a centred dot for a decimal point. In recent years this convention has been abandoned. If you absolutely must use a centred dot for a decimal point `\point` provides it: `\pi=3\point14159` produces $\pi = 3{\cdot}14159$.

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