UNIVERSITI MALAYSIA PERLIS

Manual for Writing Exam Paper Using LaTeX
[Manual Menulis Kertas Peperiksaan Menggunakan LaTeX]

by

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Please make sure that this manual has **TWENTY-TWO (22)** printed pages including this front page before you start reading.

*[Sila pastikan manual ini mengandungi **DUA PULUH DUA (22)** muka surat yang bercetak termasuk muka hadapan sebelum anda membaca.]*

Table of Contents

1 Introduction

This section provide explanations of the important commands available in the `finalxm.sty` package with some examples. Put all files in a folder as LaTeX will generate a number of files.

1.1 Package Installation

The simplest installation require no technical knowledge. The `finalxm.sty` can be used inside a folder containing your `finalxm.tex` file. But as you will create a number of files very semester for mid-term & final examinations, this method seems not quite right.

Another method is to put your `finalxm.sty` in the custom TEXMF root directories that are in-compliant with the LaTeX tree directory system (TDS).

1.1.1 MiKTeX

(a) Create a directory, say **~/texmf**, which serves as the new TEXMF root directory. For example, **D:/Dropbox/texmf**.

(b) Create TDS-compliant subdirectories (ie. **D:/Dropbox/texmf/tex/latex/**)

(c) Start MiKTeX Console and open the **Settings** page.

(d) Click the **Directories** tab.

(e) Click the Add button and browse to **/texmf** created earlier in step (a).

(f) Copy/move `finalxm.sty` file to **~/texmf/tex/latex/**

1.1.2 MacTeX and TeX Live

(a) Create a directory **~/Library/texmf** in your home directory, if there is not one there already.

(b) Install the various package files into subdirectories of texmf as follows:

    (i)   All .bst and .bib files into **texmf/bibtex** (or subdirectories)

    (ii) All font-related files into **texmf/fonts** (or subdirectories)

    (iii) All documentation files into **texmf/docs**

    (iv) All other files (.sty, .cls, .tex, etc.) should go into **texmf/tex**.

1.2 Package

The `finalxm.sty` uses a number of packages. You need to install these packages to compile your tex file. If you have setup the MikTeX to install the missing package on-the-fly, then you need not to worry. You can also opt to install these packages manually using the MikTeX console.

```
\RequirePackage[T1]{fontenc}
\RequirePackage[utf8]{inputenc}
\RequirePackage{mathptmx}          % closest to times new roman
\RequirePackage{latexsym, amsmath, amssymb, textcomp} % typesetting
    mathematical symbols, formulae and equations.
\RequirePackage{siunitx}          % si unit
\RequirePackage[a4paper, top=2.54cm, left=2.54cm, right=2.54cm, bottom=3.17
    cm, footskip=0.6cm]{geometry}
\RequirePackage{fancyhdr}          % header
\RequirePackage{enumitem}          % enumerate questions
\RequirePackage{fmtcount, zref-lastpage} % for page number
\RequirePackage[dvipsnames]{xcolor}     % font color
\RequirePackage{graphicx, caption}       % figure table
\RequirePackage{float}  % for figure table float
\RequirePackage{booktabs}          % for table
\RequirePackage{tabularx}
\RequirePackage[bookmarksopen=true]{hyperref}
\RequirePackage[capitalize, nameinlink]{cleveref} %reference
```

The `finalxm.sty` has two options, `minutes` and `answers`. The `minutes` option will show the duration of examination in both hours and minutes. While, the `answers` option make all answer visible in the `.pdf` output.

Start the preamble codes as shown below in your `main.tex` file. In this case, the duration of examination will only take argument for \@durationhr that indicate total hours to answer the question.

```
\documentclass[12pt]{article}
\usepackage{finalxm}
```

If you need minutes, indicate the option for `finalxm.sty` package as shown in the preamble code below. Then, please define \durationmin in your `main.tex`, just below the \@durationhr.

```
\documentclass[12pt]{article}
\usepackage[minutes]{finalxm}
```

You can write the answers to all questions in the documents and have the option of showing the answer by executing the `answers` option of the `finalxm.sty` package. The preamble codes is shown below. Refer to the 5 Section in page 19 for guideline on writing the answers scheme. The duration of exam will be replaced by **ANSWER SCHEME**.

```
\documentclass[12pt]{article}
\usepackage[answers]{finalxm}
```

Next, define the parameter of your exam in the codes below.

```
%%%%%%%%%%%%%%%%%%%%%%%%
%%% SETUP TITLE PAGE %%%
%%%%%%%%%%%%%%%%%%%%%%%%
\mtefe{Akhir}                     % Akhir, Pertengahan
\semester{Kedua}                  % Pertama, Kedua
\sidang{2017/2018}
\examMonthYear{Jun 2018}
\courseCode{ENT390}
\courseNameEn{Bioinstrumentation 1}
\courseNameBM{Bioinstrumentasi 1}
\pagesbm{TIGA PULUH SATU}              % used if the number of pages
    exceeds 30
\durationhr{2}          % duration of exam
\makeatletter
\if@minutes
        \durationmin{30 Minit}  % MUST be enabled using \usepackage[minutes
            ]{finalxm}
\fi
\makeatother
```

You need to modify \pagesbm IF ONLY the total number of pages of your document exceeds 30 pages.

The command \question will generate output:

QUESTION 1
[SOALAN 1]

Each time you call the \question command, the question numbering is being increased by 1. For example,

```
\question
\question
\question
```

will generate output:

QUESTION 1
[SOALAN 1]

 QUESTION 2
[SOALAN 2]

 QUESTION 3
[SOALAN 3]

If you want the question is numbered such as **QUESTION A1** based on the parts of the question, you need to declare parts by calling the \newparten command. \newpartbm is used for the translation of \newparten command. The command:

```
\newparten{Answer all questions}

\newpartbm{Jawab semua soalan}

\partQuestion

\partQuestion

\newparten{Answer any THREE (3) questions}

\newpartbm{Jawab mana-mana TIGA (3) soalan}

\partQuestion

\partQuestion
```

will generate:

Part A : Answer all questions
[Bahagian A : Jawab semua soalan]

QUESTION A1
[SOALAN A1]

QUESTION A2
[SOALAN A2]

Part B : Answer any THREE (3) questions
[Bahagian B : Jawab mana-mana TIGA (3) soalan]

QUESTION B1
[SOALAN B1]

QUESTION B2
[SOALAN B2]

Note that the \newparten command will reset the question numbering. There is a special command to suppress the question number from being reset, \newpartenx. Note the difference between previous command.

```
\newparten{Answer all questions}

\newpartbm{Jawab semua soalan}

\partQuestion

\partQuestion

\newpartenx{Answer any THREE (3) questions}

\newpartbm{Jawab mana-mana TIGA (3) soalan}

\partQuestion

\partQuestion
```

Part A : Answer all questions
[Bahagian A : Jawab semua soalan]

QUESTION A1
[SOALAN A1]

QUESTION A2
[SOALAN A2]

Part B : Answer any THREE (3) questions
[Bahagian B : Jawab mana-mana TIGA (3) soalan]

QUESTION B3
[SOALAN B3]

QUESTION B4
[SOALAN B4]

\newparten command **MUST** be declared to enable the \partQuestion command, otherwise it will cause errors during compilation.

2 List of important commands to note.

`\makecover`:	make the cover page.
`\setmainstyle`:	setup the document style.
`\newparten {sometext}`:	start new part AND reset the question number.
`\newpartenx {sometext}`:	start new part without reseting the question number.
`\newpartbm {sometext}`:	translation of current part.
`\listbeginx`:	start numbering WITHOUT space before the command. Refer to page 11.
`\listbegin`:	start numbering WITH space before the command. Refer to page 12.
`\listclose`:	close the `\listbegin` and `\listbeginx` commands.
`\answer`:	open environment to write your answer in blue color, small font.
`\translation {sometext}`:	format translation in the curly bracket.
`\translationbf {sometext}`:	format translation in **bold** in the curly bracket.
`\qmarks {5}`:	put 5 marks for the current question.
`\item yourquestion`:	start the question with proper numbering within `\listbegin` and `\listbeginx`.
`\label {somelabel}`:	put label to the current part of the question.
`\ref {somelabel}`:	reference to `\label {somelabel}`. Refer to example in page 11.
`\cref {somelabel}`:	reference to figure or table.
`\Cref {somelabel}`:	reference to `Rajah` or `Jadual`.
`\clearpage`:	start new page.
`\smallskip`:	Inserts a small space in vertical mode (between two paragraphs).
`\medskip`:	Inserts a medium space in vertical mode (between two paragraphs).
`\bigskip`:	Inserts a big space in vertical mode (between two paragraphs).
`\vskip somevalue`:	Inserts a vertical space specified by the somevalue ie. 4em.

3 Write Questions in a Single File

You can make a whole question from a single tex file. It is pretty straight forward.

```
%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%%% MAIN BODY START HERE %%%
%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% setting for header style
\setmainstyle

% PART A
\newparten{Answer all questions} \\
\newpartbm{Jawab semua soalan}\\
\bigskip

% QUESTION 1
\question
\listbeginx     % start 1st level question
        \item \label{chemical} What chemical reactions you expect to see at
            these electrodes?

        \translation{Apakah tindak balas kimia yang anda jangka dapat
            dilihat pada kedua-dua elektrod}

        \qmarks{4}      % define marks

        \listbeginx     % start 2nd level question
                \item Based on \ref{chemical}, explain what will happen if
                    the electrodes were shorted together. Explain what will
                    happen if the electrodes were shorted together.

                \translation{Terangkan apakah yang akan berlaku apabila
                    kedua-kedua elektrod disambung?. Terangkan apakah yang
                    akan berlaku apabila kedua-kedua elektrod disambung?}

                \qmarks{2} % define marks
        \listclose % close 2nd level question

        \item Explain what will happen if both electrodes is shorted.

        \translation{Terangkan apakah yang akan berlaku apabila kedua-kedua
            elektrod disambung?}

        \qmarks{3} % define marks
\listclose % close 1st level question
```

```
% QUESTION  2
\clearpage       % start new page
\question

% question without enumerate list
Silver/silver chloride (Ag/AgCl) electrodes are commonly used in biological
    measurement.\\
\translation{Elektrod Argentum/Argentum chloride (Ag/AgCl) digunakan secara
    meluas didalam pengukuran biologi}  \\
\qmarks{5}

\listbegin      % start 1st level question
      \item \label{halfmembrane} State the definition of half-membrane

      \translation{Nyatakan definisi separuh-membran}\\
      \qmarks{2}

      \item \label{itm:net} Elaborate the basic mechanisms that
          contribute to condition in \ref{halfmembrane}, and write its net
          potential.\\ % use label to reference to the list item
      \translation{Kembangkan mekanisma asas yang menyumbang kepada
          keadaan di \ref{halfmembrane}, dan tuliskan upaya bersih.}\\
      \qmarks{4}

      \listbegin % start 2nd level question
            \item \label{itm:ref2nd} Second level item that refer to \
                ref{itm:net}. Use 10~\si{\mega\ohm} here. But noted on
                the use of \si in translation.

            \translation{ini adalah level kedua. Gunakan \emph{10~\si{\
                mega\ohm}} disini. Perhatikan perbezaan penggunaan \si
                disini dan diatas.}

            \listbeginx % start 3rd level question
                  \item Another level. This is third level. This is
                      third level. This is third level. This is third
                      level.

                  \translation{Ini adalah level ketiga. Ini adalah
                      level ketiga. Ini adalah level ketiga. Ini
                      adalah level ketiga. Ini adalah level ketiga.
                      Ini adalah level ketiga}

                  \listbeginx  % start 4th level question
                        \item Another level. This is fourth level.
                            This is fourth level. This is fourth
                            level. This is fourth level.\\
                        \translation{Ini adalah level keempat. Ini
                            adalah level keempat. Ini adalah level
                            keempat. Ini adalah level keempat.}
                  \listclose % close 4th level question
            \listclose % close 3rd level question
      \listclose % close 2nd level question
\listclose       % close 1st level question
\paperend
```

Part A : Answer all questions

[Bahagian A : Jawab semua soalan]

QUESTION 1

[SOALAN 1]

(a) What chemical reactions you expect to see at these electrodes?

[Apakah tindak balas kimia yang anda jangka dapat dilihat pada kedua –dua elektrod]

(4 Marks /*Markah*)

   (i)   Based on (a), explain what will happen if the electrodes were shorted together. Explain what will happen if the electrodes were shorted together.

[Terangkan apakah yang akan berlaku apabila kedua – kedua elektrod disambung?. Terangkan apakah yang akan berlaku apabila kedua – kedua elektrod disambung?]

(2 Marks /*Markah*)

(b) Explain what will happen if both electrodes is shorted.

[Terangkan apakah yang akan berlaku apabila kedua – kedua elektrod disambung?]

(3 Marks /*Markah*)

QUESTION 2
[SOALAN 2]

Silver/silver chloride (Ag/AgCl) electrodes are commonly used in biological measurement.
[Elektrod Argentum/Argentum chloride (Ag/AgCl) digunakan secara meluas didalam pengukuran biologi]

(5 Marks /*Markah*)

(a) State the definition of half-membrane
   [Nyatakan definisi separuh-membran]

(2 Marks /*Markah*)

(b) Elaborate the basic mechanisms that contribute to condition in (a), and write its net potential.
   [Kembangkan mekanisma asas yang menyumbang kepada keadaan di (a), dan tuliskan upaya bersih.]

(4 Marks /*Markah*)

   (i) Second level item that refer to (b). Use 10 MΩ here. But noted on the use of in translation.
      [ini adalah level kedua. Gunakan 10 MΩ disini. Perhatikan perbezaan penggunaan disini dan diatas.]

      (A) Another level. This is third level. This is third level. This is third level. This is third level
         [Ini adalah level ketiga. Ini adalah level ketiga. Ini adalah level ketiga. Ini adalah level ketiga. Ini adalah level ketiga. Ini adalah level ketiga]

         (I) Another level. This is fourth level. This is fourth level. This is fourth level. This is fourth level.
            [Ini adalah level keempat. Ini adalah level keempat. Ini adalah level keempat. Ini adalah level keempat.]

-oooOooo-

The complete code to generate an exam paper using this method is shown.

```
\documentclass[12pt]{article}
\usepackage{finalxm}

%%%%%%%%%%%%%%%%%%%%%%%%%%
%%% SETUP TITLE PAGE %%%
%%%%%%%%%%%%%%%%%%%%%%%%%%
\mtefe{Akhir}                    % Akhir, Pertengahan
\semester{Kedua}                 % Pertama, Kedua
\sidang{2017/2018}
\examMonthYear{Jun 2018}
\courseCode{ENT390}
\courseNameEn{Bioinstrumentation 1}
\courseNameBM{Bioinstrumentasi 1}
\duration{3}             % duration of exam
\pagesen{SIX}            % total number of pages in en
\pagesbm{ENAM}           % total number of pages in bm

\begin{document}
% cover page

%\begin{titlepage}
\makecover
\instructionen{
This question paper has \textbf{TWO (2)} parts. Answer \textbf{all}
    questions in \mbox{\textbf{Part A}} and \mbox{\textbf{THREE (3)}}
    question in \mbox{\textbf{Part B}}. Each question contributes 25 marks.%
}
\instructionbm{%
Kertas soalan ini mengandungi \textbf{DUA (2)} bahagian. Jawab \textbf{
    semua} soalan di \mbox{\textbf{Bahagian A}} dan \mbox{\textbf{TIGA (3)}}
     soalan di \mbox{\textbf{Bahagian B}}. Setiap soalan menyumbang 25
    markah.%
}

%\end{titlepage}
```

```
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%%% MAIN BODY START HERE %%%
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
\setmainstyle

% PART A
\newparten{Answer all questions}

\newpartbm{Jawab semua soalan}

\bigskip
\question

put question 1 here...

% PART B
\clearpage      % start new page
\newpartenx{Answer any THREE (3) questions}

\newpartbm{Jawab mana-mana TIGA (3) soalan}

\bigskip
\question

put question 2 here...

\clearpage      % start new page
\question

put final question 3 here....

\paperend

\end{document}
```

4   Write Question in a Separate File

The result in page 11 and 12 can be achieve alternatively using `main.tex` file and separate file for `question1.tex` and `question2.tex`.

```
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%%% MAIN BODY START HERE %%%
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
\setmainstyle

% PART A
\newparten{Answer all questions}

\newpartbm{Jawab semua soalan}

\bigskip
\input{question1}
\input{question2}

% PART B
\newparten{Answer any THREE (3) questions}

\newpartbm{Jawab mana-mana TIGA (3) soalan}
\bigskip

\input{question3}

\paperend
```

Additional command below generate:

```
% PART B
\newparten{Answer any THREE (3) questions}

\newpartbm{Jawab mana-mana TIGA (3) soalan}

\bigkip
\input{question3}
```

Part B : Answer any THREE (3) questions
[Bahagian B : Jawab mana-mana TIGA (3) soalan]

QUESTION 3
[SOALAN 3]

The complete code to generate an exam paper using the method separating the question from the `main.tex` is shown.

```
\documentclass[12pt]{article}
\usepackage{finalxm}

%%%%%%%%%%%%%%%%%%%%%%%%%%
%%% SETUP TITLE PAGE %%%
%%%%%%%%%%%%%%%%%%%%%%%%%%
\mtefe{Akhir}                    % Akhir, Pertengahan
\semester{Kedua}                 % Pertama, Kedua
\sidang{2017/2018}
\examMonthYear{Jun 2018}
\courseCode{ENT390}
\courseNameEn{Bioinstrumentation 1}
\courseNameBM{Bioinstrumentasi 1}
\duration{3}              % duration of exam
\pagesen{SIX}            % total number of pages in en
\pagesbm{ENAM}           % total number of pages in bm

\begin{document}
% cover page

%\begin{titlepage}
\makecover
\instructionen{
This question paper has \textbf{TWO (2)} parts. Answer \textbf{all}
    questions in \mbox{\textbf{Part A}} and \mbox{\textbf{THREE (3)}}
    question in \mbox{\textbf{Part B}}. Each question contributes 25 marks.%
}
\instructionbm{%
Kertas soalan ini mengandungi \textbf{DUA (2)} bahagian. Jawab \textbf{
    semua} soalan di \mbox{\textbf{Bahagian A}} dan \mbox{\textbf{TIGA (3)}}
     soalan di \mbox{\textbf{Bahagian B}}. Setiap soalan menyumbang 25
    markah.%
}

%\end{titlepage}

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%%% MAIN BODY START HERE %%%
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
\setmainstyle

% PART A
\newpartenx{Answer all questions}

\newpartbm{Jawab semua soalan}
\bigskip

\input{question1}

% PART B
\newpartenx{Answer any THREE (3) questions}

\newpartbm{Jawab mana-mana TIGA (3) soalan}
```

```
\bigskip

\input{question2}
\input{question3}
\input{question4}
\input{question5}

\paperend

\end{document}
```

In the `question1.tex`, put you question for example,

```
\partQuestion
%\question

Silver/silver chloride (Ag/AgCl) electrodes are commonly used in biological
    measurement.

\translation{Elektrod Argentum/Argentum chloride (Ag/AgCl) digunakan secara
    meluas didalam pengukuran biologi}

\qmarks{5}

\listbeginx      % start 1st level question
        \item \label{halfmembrane} State the definition of half-membrane

        \translation{Nyatakan definisi separuh-membran}

        \qmarks{2}

        \item \label{itm:net} Elaborate the basic mechanisms that
            contribute to condition in \ref{halfmembrane}, and write its net
             potential. % use label to reference to the list item

        \translation{Kembangkan mekanisma asas yang menyumbang kepada
            keadaan di \ref{halfmembrane}, dan tuliskan upaya bersih.}
        \qmarks{4}

        \listbeginx % start 2nd level question
                \item \label{itm:ref2nd} Second level item that refer to \
                    ref{itm:net}. Second level item. second level item.

                \translation{ini adalah level kedua. ini adalah level kedua
                    . ini adalah level kedua.}

                \listbeginx % start 3rd level question
                        \item Another level. This is third level. This is
                            third level. This is third level. This is third
                            level.

                        \translation{Ini adalah level ketiga. Ini adalah
                            level ketiga. Ini adalah level ketiga. Ini
                            adalah level ketiga. Ini adalah level ketiga.
                            Ini adalah level ketiga}
```

```
                        \listbeginx  % start 4th level question
                                \item Another level. This is fourth level.
                                    This is fourth level. This is fourth
                                    level. This is fourth level.

                                \translation{Ini adalah level keempat. Ini
                                    adalah level keempat. Ini adalah level
                                    keempat. Ini adalah level keempat.}
                        \listclose % close 4th level question
                    \listclose % close 3rd level question
                \listclose % close 2nd level question
\listclose        % close 1st level question
```

5   Answer Scheme

You can also put your answer script here using `answer` command. Note that the answers will only be visible when `answers` option is called (refer to section 1.2 in page 3).

```
\question

Silver/silver chloride (Ag/AgCl) electrodes are commonly used in biological
    measurement.

\translation{Elektrod Argentum/Argentum chloride (Ag/AgCl) digunakan secara
    meluas didalam pengukuran biologi}\\
\listbegin       % start 1st level question
        \item \label{halfmembrane} State the definition of half-membrane

        \translation{some translation here}

        \qmarks{2}

        \answer{Put answer to this question here
        }

        \item \label{itm:net} Elaborate the basic mechanisms that
            contribute to condition in \ref{halfmembrane}, and write its net
             potential. % use label to reference to the list item

        \translation{some translation here}

        \qmarks{2}

        \answer{Put answer to this question here
        }

        \listbegin % start 2nd level question
                \item \label{itm:ref2nd} Second level item that refer to \
                    ref{itm:net}. Second level item. second level item.

                \translation{ini adalah level kedua. ini adalah level kedua
                    . ini adalah level kedua.}

                \qmarks{3}

                \answer{Put answer to this question here}\\
                \listbegin % start 3rd level question
                        \item Another level. This is third level. This is
                            third level. This is third level. This is third
                            level.\\
                        \translation{Ini adalah level ketiga. Ini adalah
                            level ketiga. Ini adalah level ketiga. Ini
                            adalah level ketiga. Ini adalah level ketiga.
                            Ini adalah level ketiga.}
                \listclose % close 3rd level question
        \listclose       % close 2nd level question
\listclose      % close 1st level question
\clearpage
```

QUESTION 4
[SOALAN 4]

Silver/silver chloride (Ag/AgCl) electrodes are commonly used in biological measurement.
[Elektrod Argentum/Argentum chloride (Ag/AgCl) digunakan secara meluas didalam pengukuran biologi]

(a) State the definition of half-membrane
   [some translation here]

(2 Marks /*Markah*)

[ANSWER]
Put answer to this question here

(b) Elaborate the basic mechanisms that contribute to condition in (a), and write its net potential.
   [some translation here]

(2 Marks /*Markah*)

[ANSWER]
Put answer to this question here

   (i)   Second level item that refer to (b). Second level item. second level item.
       [ini adalah level kedua. ini adalah level kedua. ini adalah level kedua.]

(3 Marks /*Markah*)

   [ANSWER]
   Put answer to this question here

   (A) Another level. This is third level. This is third level. This is third level. This is third level.
       [Ini adalah level ketiga. Ini adalah level ketiga. Ini adalah level ketiga. Ini adalah level ketiga. Ini adalah level ketiga. Ini adalah level ketiga.]

6   Landscape on Specific Page

pdflscape.sty can make the pdf page on landscape orientation. However, this package and other package such as typearea, can't rotate the header and footer correctly. As a workaround, we need to disable the header and footer. This is the best solution for the time being.

```
\newgeometry{top=2.54cm, bottom=−2.5cm, left=1cm, right=2.54cm}
\begin{landscape}
        \thispagestyle{empty}
        \begin{figure} % H means, to put figure here after the code
                \includegraphics[scale=0.68]{bodeplot_appendix}
                \label{fig:bode}
        \end{figure}
\end{landscape}
\restoregeometry
```

Bode Diagram

Magnitude (dB)

Phase (deg)

10^{-1} 10^{0} 10^{2} 10^{3}