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Engineering – Ordinary Level

How to get an O1 in the Leaving Cert Engineering Exam

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by Gráinne E.

Gráinne Enright is an electronic engineer and teacher. Gráinne has corrected state exams and written mock papers, and has mentored and patented prize winning technical projects in the Young Scientist competition.

Leaving Cert Engineering is a mixture of theory and practical work. It involves quite a bit of metalwork and metals-related theory, but also includes other areas such as plastics, mechanisms, robotics and electronics. The practical side is composed of a Practical Exam, which usually takes place in May, and a Project, which runs from October to March. The Theory Exam takes place in June. The Theory Exam contains quite a bit of choice in the exam paper topics and long questions.

Contents

How to Get Great Results

You can get great results if you spend your time on where the marks are going. Look at the diagram below. The size of the boxes shows the importance of each area:

- Don't spend all your time on building your project! - leave lots of time to write up your project folder, and to study for your exam!
- 40% of all your marks are going for the Theory Exam. So, you should really spend at least 40% of your time on your theory, and practicing exam questions!
- Only 22% of your marks are going for your built project. Make sure you do a good job, but you need to be careful not spend too much time on it.
- You get an extra 8% for your Project Folder write-up. This is almost as much as a whole long exam question, so it's worth doing a good job here.
- You can get up to 30% by doing a good practical exam - the same marks as for your project. So, it's well worth putting effort into getting prepared for this practical exam. More on this later.

Where you Get Your Marks in Ordinary-Level Engineering					
THEORY EXAM 40% (Exam in June)			PRACTICAL 30% (Exam in May)	PROJECT 30% (October to March)	
Q1 A Short Qs – Answer 6 out of 8	Q1 B Short Qs - Answer 3 out of 5	Answer 3 Long Questions out of 6 (Q2 to Q7)	Use tools, drawings and pre-built components to manufacture parts and an assembly.	Build a Working Model of your project	Write up a Folio document
6%	7%	27%	30%	22%	8%

The Theory Exam – How to Do Well

The Theory Exam is really important, because it is 40% of your marks.

Top Tips for Revising & the Exam

- ✓ Do lots and lots of previous ordinary-level exam questions.
- ✓ Understand the choices you have in the exam paper (see below)
- ✓ Read through the full exam paper. Time yourself for each section / question.

Get to Know the Topics and the Choices in the Exam

The diagram below shows you how many questions you have to answer, what topics they are usually on, and what kind of choices you have.

- You have to do Question 1A Short Questions, but you only have to answer 6 out of the 8 questions
- You have do Question 1B Short Questions, but you only have to answer 3 out of the 5 questions
- You have to answer 3 long questions out of the remaining 6 long questions in the paper (Q2, Q3, Q4, Q5, Q6, Q7)

Note = within the long questions there is often a choice as well. For example, there may be two (d) parts, on different topics, and you can choose which (d) part to answer. Read the questions carefully and watch out for the OR words in the instructions.

Ordinary-Level Exam Paper - Structure and Choices					
Instructions: *Answer Question 1 (Section A and Section B) and three other questions*					
Question	Type	Choices	Sub-questions	Topics	%
1. A	Short Questions	Answer 6 out of 8 Qs	(a) to (h)	Any Topic	6%
1. B	Short Questions	Answer 3 out	(i) to (m)	Any Topic	7%
Instructions: *Answer 3 out of the 6 long questions below*:					
2.	Long Question	Answer all parts	(a), (b), (c), (d)	Furnaces and Materials	9%
3.	Long Question	Answer (a), (b), (c)	(a), (b), (c)	Heat Treatment	7%
		Answer (d) OR Alt (d)	(d)	Heat Treatment	7%
			Alt (d)	Robotics	2%
4.	Long Question	Answer all parts	(a), (b), (c), (d)	Welding	9%
5.	Long Question	Answer all parts	(a), (b), (c)	Plastics and plastic manufacturing	9%
6.	Long Question	Answer (a) and (b)	(a), (b)	Machine Tools	7%

7.	Long Question	Answer (c)	(c)	Machine Tools	2%
		OR Alt (c)	Alt (c)	CNC, CAD / CAM	2%
		Answer (a) and (b)	(a), (b)	Metrology	7%
		Answer (c)	(c)	Metrology	2%
		OR Alt (c)	Alt (c)	Electronic components / simple circuits	2%

The Short Questions (Question 1, Section A and B)

- The short questions cover all the core topics on the course / book. However, the good thing is the questions and the answers are not long or complicated. So, the best way to revise for the short questions is just to do lots of them. You'll soon begin to see the kinds of questions that come up, and you'll start to get good at them.
- If you know the answer, it is quick to write down. If you don't know the answer, you can look it up on Studyclix (show marking scheme), look it up in the book, or ask your teacher - and you'll know it for next time.
- Note that the short questions include a wide variety of questions on non-metalwork-related areas. The answers to these questions are not difficult though, so it is well worth making sure you have revised it and done practice short questions.

Core Long Questions (Questions 2 to 7)

- The best way is to do lots and lots of previous ordinary-level exam questions. Exam paper booklets and Studyclix are good for this.
- First practice all six long questions from the exam - from a number of previous exam papers, to see where you are strongest in, and where you need to study more.
- You can choose not to study certain topics for the exam long questions - because in previous years there has always been a choice of topics in those questions - see diagram above. But there is a small a risk if you do not study all areas for the exam.

Time Yourself in the Exam

- You have 2.5 hours in total.
- First read though the entire paper so that your brain knows what's coming up, and so you get a first idea about which long questions you might like to do.
- Allow yourself just under 30 minutes to answer each long question or section (this will leave you a few minutes at the end).
- If you run over time on a section, move on to the next section, you may be able to come back to them later.
- Do the short questions first (Q. 1 Section A and Section B). You can pick up marks easier there.
- Look at all remaining long questions again (Questions 2 to 7). Decide and mark which three questions you are going to do.
- Use all the time you have, do not leave early. Go back to any skipped questions, check previous answers. If you have time , do another long Q, you will be marked on your best answers.

How to Do Well in the Practical Exam (30%)

The practical exam is worth 30% at ordinary level. (It is the same practical exam as higher-level, except it is worth more at ordinary-level). It is composed of two parts listed below.

Parts to the Practical Exam		
	Description	When
Pre-Practical Work	Make components that are needed for the Practical Exam, based on a set of drawings and specifications.	To be complete by a specified date in April.
Practical Exam	6 hours to manufacture an assembly, based on a set of drawings and specifications.	Take place on a specified date in May.

Pre-Practical Work (manufacturing some components)

- You can do these in class so no exam pressure.
- But make sure you start these early, and make sure they are ready well in advance of the required date. Do not leave till the last week! You may make mistakes on them and have to start all over from scratch.
- Needs to be complete before a set date in April.
- The better you manufacture these components, the better and easier the Practical Exam will go for you.
- Double check all the drawings and measurements, mark-out, and check the marking out before you use any tools on it, and again after using the tools.
- Get your finishes smooth.
- Do not use machines and tools other than those you are allowed to.

Prep for the Practical Exam (well before May!)

- Look at previous years' higher-level practical exams. Make sure you understand the drawings and instructions.
- Make the objects from previous years' higher-level practical exams in class.
- Make sure you have all parts and tools and equipment needed for the practical - according to the list provided.

The Practical Exam (6 hours in May)

- Read the drawings and instructions very carefully.
- Decide what order to make the parts in, taking into account the materials and tools needed, and how they need to fit together in a final assembly.
- Make a plan for your time, including:
  - ✓ Time to mark out and make each component
  - ✓ Time to create the final assembly (and any sub-assemblies) and for final polishing and finishing
- Measure twice! Check your marking out before and after using tools.
- Think about how the examiners are going to mark your practical exam:
  - ✓ Marks will be going for each part - so make sure you make all parts.
  - ✓ Marks will be going for the main features on eachZ part - e.g. holes, slots, profiles, lathe work, bench work.
  - ✓ Marks are going for the final assembly, and if it functions, and for the overall quality of finish and polish.
  - ✓ For example: if there were four main parts, 20% of the marks may go for each part, and the final 20% may go for the final assembly and the overall finish. This can vary, however.

How to Do Well in the Project (30%)

The project is worth 30% for ordinary-level. You get a Project Brief (short document) in October, and you need to deliver two things in early April.

Parts of the Project		
Project Element	% of Total Subject Marks	
A Built Design / Working Model	22%	To be complete by a certain date in April.
A Project Folder (Folio) document	8%	

The project brief will give you a design and a drawing to build. You can choose to do your own version of the design, as long as you keep within any rules that are written down in the project brief.

The project will usually contain mechanisms and electronics / motors and switches etc., so you need to understand these, and the components you have available to build with.

Key Tips for your Project

- Do not spend most of your time on building your project. It's only 22% of your grade. Leave lots of time for writing up your project folder, for practicing exam questions, and for preparing for your practical exam.
- Make out a plan (schedule) for your project at the start - what you need to get done by when.
- Ask your teacher regularly for advice on your project, on what you should be doing next
- Use a template for your Project Folder and fill it in, ideally as you go along.
- Make sure your project folder includes the following things:
  - ✓ A plan (schedule) for your project - the stages of your project and when you need to get them done by.

- ✓ If you are going with a slightly different design, describe this, include diagrams and reasons.
- ✓ Parts lists and working drawings
- ✓ Write up how you are going to manufacture the design:
    1. Materials to be used
    2. Manufacturing Processes, Steps
    3. Assembly Steps
    4. Finishing Treatments
- ✓ How you tested the built project, what you had to fix or change.
- ✓ Write up your evaluation of the whole project - what worked well, what would you do differently next time
- ✓ You get marks for your folder being neat and in a good order.

Before you complete or build your design, check your design against the type of checklist that the examiner will be using below. Check it again while building it.

Checklist - what Examiners will be looking for in your Built Project (Model)
✓ Is it / does it do what was asked for in the project brief? Does it work?
✓ Did it observe the constraints specified in the project brief (e.g. not using bought-in parts, sizes, voltages, any other restrictions in the project brief).
✓ Does it use a range of good / appropriate materials in the design?
✓ Does the design use good / appropriate component parts?
✓ Does it show a good use of different processes used to manufacture it and assemble it?
✓ Did it use CNC processes in the manufacturing?
✓ Does it show a good level of skill in the manufacture and assembly?
✓ Does it show a high quality of manufacture / assembly and a high quality of finish?
✓ Does it show that health and safety were taken in to account?

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Summary of the Top Tips

- ✓ Remember where you get your marks. Work and allocate your time accordingly.
- ✓ 40% of your grade is going for your Theory Exam - do enough preparation!
- ✓ Do lots and lots of previous exam questions.
- ✓ In the theory exam, time yourself for each exam section and each long question.
- ✓ Make sure you have made all the components you need for the Practical Exam well before the deadline.
- ✓ Practice for the Practical Exam by building similar items, e.g. from previous years' Practical Exams.
- ✓ Start your Project early, plan it out, and finish well on time. Do not spend most of your time on the project.
- ✓ Don't forget about your Project Folder. It will need a bit of time to do well, but it's worth it, because there are good marks going for it.
- ✓ Use a template or good example for your project folder (folio) and fill out all the sections.

Finally, I would like to wish you the best of luck in the exam! You will be fine. ☺