Coimisiún na Scrúduithe Stáit
State Examinations Commission

LEAVING CERTIFICATE EXAMINATION, 2025

ENGINEERING – TECHNOLOGY PROJECT: DESIGN

Higher Level – 150 marks

PROJECT MUST BE COMPLETED BY FRIDAY 14th MARCH, 2025

PLEASE READ CAREFULLY

General directions to candidates

1. The project you design, make and submit for examination must be unique and be **your own individual work**, carried out in the school under the supervision of the teacher.

   Your own individual work is intended to include the intellectual activity of design along with the practical activities of making the model and compiling a design folio.

   Proof of **your own individual work** must be obvious from both the model and folio presented for examination otherwise marks will be lost.

   Note: Digital drawings or other manufacturing details, if presented for assessment, must be included in hard copy format in your design folio.

   Note: Where computer aided manufacture (CAM) is used, supporting CAD drawings must be included in your design folio to authenticate **your own individual work**.

2. A detailed Marking Scheme is included on this paper. Your teacher will help you to familiarise yourself with the Marking Scheme.

3. Read the Design Brief carefully commencing with the **Introduction**.
   Plan and present your individual solution as outlined in the instructions given under the headings **Design Process** and **Design Realisation**.

4. Your completed project consisting of a model and design folio, **both clearly identified with your examination number**, must be available to the visiting examiner.

Design Brief

1. Introduction

Sustainable urban mobility faces many challenges, among which traffic congestion is one of the most difficult. The European Union Aviation Safety Agency (EASA) in it's 2023 report has tracked, with a view to certifying and licensing, a new air transportation system made possible through the invention of the electric, vertical take-off and landing aircraft (eVTOL). The eVTOL aircraft, may have a vectored thrust design with rotors which can tilt to change the direction of thrust. Or a dedicated system of rotors, for vertical lift and land, separate to a system of wing borne thrust rotors. Central to the design is a passenger compartment to house a pilot and passengers. Volocopter in Germany are introducing their model VoloCity air taxi into service in Paris and Rome in 2024. Future Mobility Campus Ireland (FMCI) has predicted Ireland's first electric air taxis will be capable of carrying four passengers, with initial tests set to be carried out by 2027.

Design a model vertical take-off and landing aircraft to the general specifications below. The eVTOL should be your own unique design and should:

(a) Have a fuselage compartment with seating for pilot and passenger;

(b) Incorporate at least four electronically operated rotors;

(c) Include an automated door for access.

Presentation of the completed project should ensure that:

(a) All main operating features are **clearly visible without dismantling**;

(b) The longest dimension does not exceed **400 mm**;

(c) Electric power does not exceed **9 volts**.

Special Note: (i) It is not required that the Model should fly.
(ii) Modified toys or recycled projects are not acceptable.

2. Design Process (40 marks)

A design folio must be compiled which will detail your:

(a) **Analysis of the given brief** and **investigation of possible solutions**;

Note: You must reference and acknowledge all research sources used such as: publications including books, professional journals and government reports; online sources and other types of media; any material generated using artificial intelligence (AI) software or applications; and material from specialist organisations and relevant individuals. To include such material without properly referencing the source will be considered plagiarism. In addition, the copying from, or reproduction of, material from such sources may also be considered plagiarism.

Any case of suspected copying, plagiarism (which includes the use of AI software), improper assistance, or procurement of work prepared by another party will be thoroughly investigated.

(b) **Criteria for selection of your own individual solution**;

(c) **Production drawings/plans**;

Note: Digital drawings or other manufacturing details, if presented for assessment, must be included in hard copy format in your design folio.

Note: Where computer aided manufacture (CAM) is used, supporting CAD drawings must be included in your design folio to authenticate **your own individual work**.

(d) **Testing and evaluation** of your design solution;

(e) Special instructions, if required, regarding the testing of the solution by the examiner.

Note: **Marks are awarded as shown in Marking Scheme (Page 4 of 4).**
Computer-aided design (CAD) should be used where possible.

3. Design Realisation (110 marks)

Using appropriate materials and processes, make the model according to your own individual design plans. Computer aided manufacture (CAM) technology should be used, where appropriate, to enhance manufacture.
You are expected to demonstrate a range of appropriate skills to manufacture and assemble all the parts, subject to the following guidelines:

(a) Standard components may be used to support the assembly and interconnection of various parts;

(b) Unnecessary recycling will result in lost marks. Recycling will be acceptable **only** in cases where a complex part cannot readily be made in the school;

(c) **Bought-in electronic solutions will result in lost marks**;

(d) Adhesives, if used, should be applied sparingly.

Note: Marks are awarded as shown in Marking Scheme (Page 4 of 4).

4. Project Presentation

Your completed project consisting of the model and design folio, **both clearly identified with your examination number**, must be available to the visiting examiner.

Marks are awarded for quality of presentation and finished appearance of both the model and design folio.

MARKING SCHEME

HIGHER LEVEL	
MARKING CRITERIA - FOLIO	
Analysis of brief	5 marks
Investigation of solutions	10 marks
Criteria for selection of solution	5 marks
Production drawings/plans	10 marks
Testing and evaluation	5 marks
Presentation of folio	5 marks
TOTAL	**40 marks**

Note: Digital drawings or other manufacturing details, if presented for assessment, must be included in hard copy format in your design folio.

Note: Where computer aided manufacture (CAM) is used, supporting CAD drawings must be included in your design folio to authenticate **your own individual work**.

HIGHER LEVEL	
MARKING CRITERIA - MODEL	
Model satisfies brief	5 marks
Constraints observed	5 marks
Mock-up/Inventiveness	10 marks
Function (does it work?)	10 marks
Choice of materials	10 marks
Choice of processes	10 marks
Suitability of assembly techniques	10 marks
Suitability of parts and functions	10 marks
Application of skills	10 marks
Safety considerations	10 marks
Quality of work	10 marks
Presentation of model	10 marks
TOTAL	**110 marks**