



Coimisiún na Scrúduithe Stáit
State Examinations Commission

LEAVING CERTIFICATE EXAMINATION, 2018

ENGINEERING – TECHNOLOGY PROJECT: DESIGN

Higher Level – 150 marks

PROJECT MUST BE COMPLETED BY FRIDAY 9th MARCH, 2018

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 folio.

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

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

Polaris Industries have been continuously expanding the design envelope of their range of vehicles for the past sixty years. Recognising the potential for technological advancement and product diversification from their first snowmobile model, their production teams have designed and manufactured a range of cutting edge vehicles. Included in that range are the Victory and Indian motorcycle brands. In 2015 Polaris launched the *Slingshot*, a transformer - part car, part motorcycle - having two seats side by side. Named the *Polaris Slingshot Three-Wheeled Roadster*, it is a high performance vehicle, classified as an autocycle. Power transmission is through a carbon fibre reinforced belt which is connected to the rear wheel.

Design a model Roadster to the general specifications outlined below.
The Roadster should be your own unique design and should:

- (a) Be a three-wheeled, two seat autocycle;
- (b) Have a propulsion unit driving the single rear wheel;
- (c) Include a steering mechanism;
- (d) Incorporate aerodynamic features.

Special Note: Modified toys or recycled projects are not acceptable.

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**.

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**;
- (b) **Criteria for selection of your own individual solution and production drawings/plans**;
- (c) **Testing and evaluation** of your design solution;
- (d) Special instructions, if required, regarding the testing of the solution by the examiner.

**Note: Marks are awarded as shown in Marking Scheme (Page 3 of 3).
Computer-aided design (CAD) should be used where possible.**

3. Design Realisation (110 marks)

Using appropriate materials, make the model according to your own individual design plans. Computer numerical control (CNC) technology should be used, where possible, to support manufacture. You are required 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 3 of 3).

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 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

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