Design Brief

1. Introduction

Formula One (F1) is the pinnacle of, uniquely regulated, single-seater car racing. The design of F1 cars has extended the limits of engineering manufacturing with the use of carbon fibre construction technology for the monocoque, the introduction of the V6 Turbo-Hybrid power unit, and a kinetic energy recovery system (KERS). The power unit has proven to be more thermally efficient, quieter and produces less CO2 emissions while producing faster speeds. Crucial to the performance envelope of F1 cars is the aerodynamic design of the wings, bodywork, diffusers and bargeboards which are all designed to maximise downforce and vehicle stability. Central to the design philosophy of the immediate F1 car is the introduction of a drag reduction system (DRS) which will heighten the excitement of the sport by allowing more close racing and over-taking.
Design a model Formula 1 racing car to the general specifications below. The car should be your own unique design and should:

(a) Have a variable speed rear propulsion unit;
(b) Include driver head protection;
(c) Incorporate a driver activated drag reduction system (DRS) in the rear wing structure;
(d) Have a rear light warning system.

Presentation of the completed project should ensure that:

(a) All main operating features are clearly visible without dismantling;
(b) The longest dimension of the vehicle does not exceed 400mm;
(c) Electric power does not exceed 9 volts.
Special Note: 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: When using research sources, including the internet, the sources must be acknowledged. Research material directly copied from the internet or from other sources and presented as your own work will not receive any marks.
(b) Criteria for selection of your own individual solution:
(c) Production drawings/plans;
(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 folio.