Al-Faisal College

2025

Course: Year 7 Engineering

Time of Issue: Term 3 Week 11

Topic: Car Engineering and Technologies

Deadline: Term 4 Week 4

Type of Task: Practical + Written

Task description	Weighting	30%
You will work by yourself and create a presentation to propose a design of a concept car. Your proposal should include the information related to your concept car and the design of your concept. You will then try to apply some of your concepts to design a rubber band racer. Your rubber band racer will be marked based on reliability, design and performance.		
Total Marks		/50

Outcomes assessed:

- Designs, communicates and evaluates innovative ideas and creative solutions to authentic problems or opportunities (TE4-1DP)
- Plans and manages the production of designed solutions (TE4-2DP)
- Selects and safely applies a broad range of tools, materials and processes in the production of quality projects (TE4-3DP)
- Investigates how the characteristics and properties of tools, materials and processes affect their use in designed solutions (TE4-9MA).

Presentation

1. **<u>Identifying the problem (23 marks)</u>:**

In order to present your car design project, follow the guidelines below:

Design situation (10 marks):

Answer the following questions in your presentation:

a. Describe the main purpose and functions of the car you are designing
b. Describe new ideas or technologies that you want your car to have
c. Who are your target customers? What do they usually like in a car?
d. What is the price range of your car?

a. ***Criteria for success (5 marks):***

These are the factors to make a good car:

a. Reliability
b. Design
c. Comfort
d. Utility
e. Performance
f. Cost efficiency
g. Safety

Provide a 40 points analysis of all of the factors above. Safety factors should be at least 5 points due to safety regulations from the government. Explain your choices based on your answers in the design situation.

Design brief (8 marks):

Provide your choices on the 4 parts of the car you have learned: Car exterior, interior, powertrain and running gear. Link your choices to your points allocation in the criteria for success:

- Exterior: Body types, Body size (big or small), Car design (Your car drawing)
- Interior: Seat materials, Interior materials, Entertainment systems, Interior technologies
- Powertrain: Engine choice (ICE or Hybrid or Electric), Engine configuration.
- Running gear: Suspension choice (softer or harder suspension), Tires choice (which type of tires works best for your purpose).

2. **Design (6 marks):**

You will need to provide a 2D design draft for your presentation. Use an A4 paper to design the exterior of your car. The design should show the side design of the car. The design has to be in pencil and the photos should be taken and added to your presentation for your assignment.

Submit your presentation as a Powerpoint file before the deadline. The presentation should include both part 1 and 2 above. You will then present in class during lesson time from week 4 onwards. YOUR PRESENTATION TIME IS 5 MINUTES MAXIMUM.

Rubber band racer

3. **Create a rubber band racer (15 marks):**

While it can be unrealistic to make your concept car a reality, you can apply some of your ideas into designing a rubber band racer with 2 parts: a base that will provide the motion for the racer using rubber band and a chassis design using cardboard that can be attached onto your racer. You will then be given a chance to race your car in a drag race with a fixed distance.

Your racer must be made within a range of dimensions as follows: minimum 10 cm wide and 10 cm long to maximum 20 cm wide and 30 cm long. The car can only be powered by rubber band and NO MOTORS ALLOWED. The body of the car should be made with materials that can be glued into the base of the car such as cardboard.

Your car design will be marked based on the following criteria:

a. **Reliability**: How reliable your car is while it is being used. Your car should not break down before or while running.
b. **Design**: How good your chassis design is can be a factor to attract people to your car. Keep in mind your body should be made of cardboard or other materials that can be glued onto the base of the car.
c. **Performance**: How fast your car is when racing or how far can your car go in a straight line without curving out of the track.

4. **Make it better (6 marks):**

Write a reflection (maximum 400 words) that answers the following questions:

- Are you satisfied with how your rubber band racer works? Why/why not?
- What are the strengths and weaknesses of your rubber band racer?
- What are the things you can do to improve your rubber band racer?

Your reflection has to be submitted along with your rubber band racer. Your submission can be either on Microsoft Teams or by physical submission. Please remember to put your name in your reflection submission.

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Marking Criteria

I. Presentation

1. Identifying the Problem (23 Marks)

a. Design Situation (10 Marks)

Criteria	Marks	Description
Purpose and Functions	2	The student clearly and accurately describes the main purpose and functions of their concept car. The description includes the car's intended use, its relevance to the current automotive market, and a realistic assessment of its production feasibility. Full marks awarded if all three aspects are covered accurately and clearly.
New Ideas and Technologies	2	The student identifies and explains original and innovative ideas or technologies for their concept car. The explanation includes the uniqueness of the ideas, a demonstration of technical understanding, and a discussion of the potential impact of these innovations. Full marks awarded if these three components are explicitly presented.
Target Customers	2	The student precisely defines their target customer demographic and their preferences. The description provides specific details about the target market and clear, logical justifications for their selection. Full marks are given if detailed market research is seen in the description.
Price Range	2	The student provides a justified price range for their concept car that aligns with the target market and the car's features. The justification demonstrates market awareness and articulates the value proposition of the car at that price point. Full marks are given if a range of prices is shown and justified with information.

Clarity of Writing/Presentation	2	The project idea is conveyed with clarity and coherence in both the PowerPoint slides and the oral presentation. The presentation is well-organized, easy to follow, and effectively communicates the student's vision. Full marks if the presentation is highly organised and students showed clear understanding of the presented topic though questions and answers.

b. Criteria for Success (5 Marks)

Criteria	Marks	Description
40 Points Analysis	5	The student provides a detailed and well-reasoned 40-point analysis across the specified success factors (Reliability, Design, Comfort, Utility, Performance, Cost Efficiency, Safety). Each point allocation is justified, the analysis connects to the design situation, and the student demonstrates a clear understanding of each factor. Safety receives at least 5 points.

c. Design Brief (8 Marks)

Criteria	Marks	Description
Exterior	2	The student specifies the body type, body size, and provides a drawing for the car's exterior design. The choices demonstrate creativity, practical consideration, and alignment with the design situation and criteria for success. The drawing is detailed and accurately represents the car's design.
Interior	2	The student selects and specifies seat materials, interior materials, entertainment systems, and interior technologies. The selections reflect considerations of comfort, functionality, and technological integration. The student provides reasons for why those materials were selected.
Powertrain	2	The student identifies the engine choice (ICE, Hybrid, or Electric) and the engine configuration. The choice demonstrates consideration of efficiency, performance, and environmental factors. The engine choice is justified in terms of the performance requirements and purpose of the vehicle.
Running Gear	2	The student selects and specifies the suspension and tire choices. The selections are appropriate for the car's purpose and reflect considerations of handling and comfort. The tires chosen match the purpose of the vehicle.

2. Design (6 Marks)

Criteria	Marks	Description

Design Drafts	6	The student submits a design that displays detailed and high-quality car exterior designs from the side views. The drawings demonstrate strong drawing skills, design clarity, and accurately include all required views. Photos of the drafts are included in the presentation. The drafts have sufficient detail and design.

II. Rubber Band Racer

1. Create a Rubber Band Racer (15 Marks)

Criteria	Marks	Description
Reliability	5	The racer performs consistently and reliably without breaking down during multiple races. The construction is durable, and the design withstands repeated use. Full marks are given if the racer completes all races without issue.
Design	5	The cardboard chassis design is both aesthetically pleasing and functionally effective. The design demonstrates creativity, good craftsmanship, and secure attachment to the base. Full marks are given to highly creative designs that are well built.
Performance	5	The racer achieves speed and efficiency in the drag race. The racer successfully completes the fixed distance within the required timeframe. Full marks are given to the racers that can clear the minimum time required.

2. Make It Better (6 Marks)

Criteria	Marks	Description
Reflection	6	The 400-word reflection includes: 1. A detailed evaluation of the student's satisfaction with the racer's performance, supported by clear reasoning. 2. A thorough identification and analysis of the racer's strengths and weaknesses. 3. Feasible and well-reasoned suggestions for improving the racer. Each of the three aspects needs to be sufficiently addressed for full marks.

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Year 7 Engineering Assignment Marking Criteria

Part 1: Presentation (29 Marks)

Component	Criteria (Maximum mark)	Marks	Comment
1. Identifying the Problem	**Design Situation (10 marks)**		
	Purpose and Functions (2 marks)		
	New Ideas and Technologies (2 marks)		
	Target Customers (2 marks)		
	Price Range (2 marks)		
	Clarity of Writing/Presentation (2 marks)		
	Criteria for Success (5 marks)		
	40 Points Analysis (5 marks)		

	Design Brief (8 marks)		
	Exterior (2 marks)		
	Interior (2 marks)		
	Powertrain (2 marks)		
	Running Gear (2 marks)		
2. Design	**3 Car design drafts (6 marks)**		

Part 2: Rubber Band Racer (21 Marks)

Component	Criteria	Marks	Description
1. Create a Rubber Band Racer	**Reliability (5 marks)**		
	Design (5 marks)		
	Performance (5 marks)		

2. Make It Better	**Reflection (6 marks)**		

Part 3. Assessment of Outcomes

Outcome	Key Components of the Outcome	Assessment Task from Assignment	Relevant Marking Criteria from Assignment	Teacher's Assessment
TE4-1DP	Designs, communicates and evaluates innovative ideas and creative solutions to authentic problems or opportunities.	**Presentation:** Design Situation, Design Brief, and Criteria for Success + 2D Drawn Design **Rubber Band Racer:** Design	**New Ideas and Technologies:** Originality and innovation in the concept car. **Clarity of Writing/Presentation:** Coherent communication of the project idea. **Drafts:** Detailed and high-quality drawings. **Design (Racer):** Aesthetically pleasing and functionally effective racer.	

TE4-2DP	Plans and manages the production of designed solutions.	**Presentation:** Criteria for Success and Design Brief. **Rubber Band Racer:** Creation of the racer	**40 Points Analysis:** Detailed allocation of points across success factors. **Overall Costs:** Justified and realistic cost estimation. **Reliability (Racer):** Consistent performance without breakdowns.	
TE4-3DP	Selects and safely applies a broad range of tools, materials and processes in the production of quality projects.	**Presentation:** Design Brief (Interior, Powertrain, Running Gear). **Rubber Band Racer:** Creation of the racer using specified materials.	**Interior, Powertrain, Running Gear:** Selection of appropriate materials and components. **Design (Racer):** Good craftsmanship and secure attachment of the chassis. **Reliability (Racer):** Durable construction that withstands use.	

TE4-9MA	Investigates how the characteristics and properties of tools, materials and processes affect their use in designed solutions.	**Presentation:** Criteria for Success and Design Brief. **Rubber Band Racer:** Reflection.	**40 Points Analysis:** Linking choices to factors like performance and reliability. **Interior, Powertrain, Running Gear:** Justification for choices based on comfort, performance, etc. **Reflection:** Analysis of the racer's strengths, weaknesses, and potential improvements.	

Additional comments:

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