

National Exams May 2011

07-Mec-B5, Product Design & Development

THREE (3) hours duration

NOTES:

1. If doubt exists as to the interpretation of any question, the candidate is urged to submit with the answer paper, a clear statement of any assumptions made.
2. This is an OPEN BOOK EXAM. No calculator is permitted.
3. FIVE (5) out of the SEVEN (7) questions constitute a complete exam paper.

The first FIVE (5) questions as they appear in the answer book will be marked.
4. Each question is of equal value.
5. Most questions require an answer in essay format. Clarity and organization of the answer are important.

Question (1) (20 Marks)

- A. Outline how government regulations impact the design process and the final design.
- B. Provide THREE (3) general examples of design aspects that are regulated when designing a car.
- C. How do government regulations differ from industry standards?
- D. At what stages in the design process should industry standards and government regulations be considered?

Question (2) (20 Marks)

- A. Identify THREE (3) sources of design information that are internal to a company.
- B. Identify THREE (3) sources of external design information.
- C. Compare and contrast the relative reliability of internal versus external sources of information.
- D. Outline modern methods for communicating design information within a company.

Question (3) (20 Marks)

- A. When and for what purpose would a company use a Non-Disclosure Agreement (NDA)?
- B. Outline Five (5) different options for securing Intellectual Property (IP), where they are used as well as the advantages and disadvantages of each.

Question (4) (20 Marks)

- A. Describe the THREE (3) main stages in the life of a product that need to be considered when designing a product for its full life cycle.
- B. List and describe FIVE (5) factors that should be considered when calculating the life cycle costs associated with a new product?

Question (5) (20 Marks)

- A. Define design.
- B. What skills are required to be a good designer?
- C. What are the advantages and disadvantages of working with a design team versus using a single designer on a project?

Question (6) (20 Marks)

- A. Propose THREE (3) questions you would ask a manufacturing engineer when specifying a tolerance for a component.
- B. Describe the main concepts behind Design for Manufacturing and Assembly (DFMA) and outline how they can be used to improve the design of a product.

Question (7) (20 Marks)

- A. Outline a typical design process.
- B. What role does iteration play in the design process?
- C. Identify key stages in the design process where iteration is often required.
- D. Outline THREE (3) ways competing designs can be assessed and compared.