

**BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE, PILANI**

**First Semester 2023-24**  
***Product Design (DE G531)***  
**Comprehensive Examination**

**Max<sup>m</sup> Time:** 3 hrs

**Max<sup>m</sup> Marks:** 40

**Date:** 07-12-2023

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**Note: No marks will be awarded for decisions taken without explanation. All abbreviations have their usual meanings as applicable in product design.**

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**PART A (Closed Book)**

- Q 1 a) What is a technology s-curve? How does it help in new product development? [2]  
b) Discuss various types of designs with suitable examples. [3]
- Q 2 a) Show, with the help of a figure, that the optimum design parameter may not be suitable for a robust design. [2]  
b) Discuss the various types of noises to be considered while designing a product for robustness. [3]
- Q 3 a) What should be the focus area of a designer during DFM (Design for Manufacture) while designing (i) a metalworking product (ii) a composite product? [2]  
b) Write any four concept generation techniques. Discuss any one of these with its advantages and disadvantages. [3]
- Q 4 a) Why design for minimum number of parts is important? What are the guidelines/rules for the existence of a separate part in a product? [2]  
b) Why modern-day products should be designed taking care of environment? What are the important environmental issues we should take care of during the design of a smart phone? [3]
- Q 5 Why benchmarking is important in product design? Explain the various steps followed during benchmarking of a product design. [5]
- Q 6 Discuss various types of function-based and manufacturing-based modularities. [5]

**PART B (Open Book)**

- Q 1 Generate concepts for an electric vehicle for the functions which are different than the conventional automobiles. Which of these concepts is best and why? [7]
- Q 2 What are the two major takeaways for you from this course? In other words, what are the major two learnings from this course which would be useful for you in your career. [3]

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