

Product Design and Development (315367)

MSBTE Diploma · K-Scheme · Model Question Paper — Set C

Time: 3 Hours**Max. Marks: 70****Instructions:**

1. All questions are compulsory.
2. Answer each next main question on a new page.
3. Illustrate your answers with neat sketches wherever necessary.
4. Figures to the right indicate full marks.
5. Assume suitable data, if necessary.
6. Mobile phone, pager and any other electronic communication devices are not permissible in the examination hall.

Q.1 Attempt any FIVE of the following:**10**

- a) State any four characteristics of successful product development.
- b) Define modular product architecture. Give two examples.
- c) Define ergonomics. State its necessity in product design.
- d) Define product life cycle. Name its stages.
- e) Explain use value and esteem value with one example each.
- f) What is Voice of Customer (VOC)? State any two methods of collecting it.
- g) State the principle of the layer-by-layer approach in rapid prototyping.

Q.2 Attempt any THREE of the following:**12**

- a) Explain design by evolution and design by innovation with one real-world example of each.
- b) Explain the seven-step method for testing a product concept.
- c) Explain the process of establishing the product architecture of an adjustable spanner.
- d) What is aesthetics? State its necessity in product design and list its aspects.

Q.3 Attempt any THREE of the following:**12**

- a) Explain the importance of control drawings and control models in industrial design. State the types of models used.
- b) Explain any four design principles for manufacturability.
- c) Explain the procedure of problem identification in value engineering.
- d) Explain the construction and working of a Fused Deposition Modelling (FDM) 3-D printer with a neat sketch.

Q.4 Attempt any THREE of the following:**12**

- a) What is component standardization? Explain with examples and state its advantages.
- b) Draw the flow chart of the concept development process (front-end activities) and explain it.
- c) Explain with a neat sketch the structure of the House of Quality and how it links customer complaints to technical requirements.
- d) Differentiate between FDM, SLA and SLS 3-D printers. (Any four points)
- e) State the need and importance of QFD in product development.

Q.5 Attempt any TWO of the following:

12

- a) Explain how the product life cycle of a smartphone model is determined. Assume suitable sales data and draw the PLC curve.
- b) Explain the types of rapid prototypes — proof-of-concept, looks-like and works-like. Explain the steps of planning for prototyping.
- c) Explain the phases of the Value Engineering Job Plan (VEJP) with the example of a gas-stove lighter.

Q.6 Attempt any TWO of the following:

12

- a) Explain the steps of identifying customer needs, including data collection, organising the data and establishing relative importance, with the example of a school bag.
- b) Draw the House of Quality for a front-loading washing machine with roof ranking. Customers want clean clothes, low water use, low noise, quick wash and low price.
- c) Explain concept screening. Apply it to five concepts of a mobile-phone holder for a motorcycle and select the concepts to be developed further.

Note: This is a **model question paper prepared by Ananda Technologies** only for practice and exam preparation, based on the pattern of previous MSBTE question papers and the K-scheme syllabus. It is **not an official MSBTE paper**, and it does **not** mean that these questions will come in the exam. Answers follow standard textbook points; marks shown are indicative. Free for students — anandatechnologies.in