Product Design and Development (315367)

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

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) Name any four types (variants) of products for which the generic product development process is modified.

b) Define product architecture. Name its two types.

c) State any two differences between design by evolution and design by innovation.

d) State any four factors that affect Design for Manufacturing (DFM).

e) Define value engineering. State any two of its objectives.

f) Draw any four symbols used in QFD and state their meaning.

g) State any two differences between SLA and SLS 3-D printers.

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

a) Explain the concept classification tree with a suitable example. State its benefits.

b) Differentiate between modular and integral product architecture. (Any four points)

c) State the design considerations for the following controls: i) Rotary knob ii) Lever iii) Toggle switch.

d) Draw the block diagram showing the main elements of industrial design and explain the need for industrial design.

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

a) Explain the following characteristics of successful product development with example: i) Product quality ii) Product cost iii) Development time iv) Development cost.

b) Explain the term DFM with a suitable example of reducing the number of parts in an assembly.

c) Explain roof ranking and body ranking in QFD with a suitable example.

d) Explain the construction and working of a Stereolithography (SLA) 3-D printer with a neat sketch.

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

a) What is a concept combination table? Explain with an example of an electric bicycle.

b) Explain the following aspects of aesthetics in product design: i) Symmetry ii) Colour iii) Continuity iv) Impression.

c) Explain the four steps of planning for a prototype with a suitable example.

d) Explain the SCAMPER technique of creative thinking with an example.

e) What is a patent? State the rights of a patent holder and the importance of patents.

Q.5 Attempt any TWO of the following: **12**

a) Taking an electric kettle as an example, explain the steps in the process of identifying customer needs.

b) Explain how the product life cycle of an electric two-wheeler (e-scooter) is determined. Assume suitable sales data.

c) What is the Value Engineering Job Plan (VEJP)? Explain its phases with the example of a table lamp.

Q.6 Attempt any TWO of the following: **12**

a) Explain the generic product development process with a neat flow chart.

b) Draw a House of Quality for a mixer grinder, linking customer complaints (noise, jar leakage, motor heating, high price) to technical requirements.

c) State the advantages, disadvantages and applications of rapid prototyping.

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