

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S3 (FT/WP/PT) S1 (PT) (S,FE) Examination May 2025 (2019 Scheme)

**Course Code: EST200****Course Name: Design and Engineering**

Max. Marks: 100

Duration: 3 Hours

PART A*Answer all questions. Each question carries 3 marks*

Marks

- 1 List the main objectives and constraints of a bus door as applicable for aged person. (3)
- 2 Describe how to finalize the design objectives. (3)
- 3 Design thinking is a non-linear, iterative process. Justify the statement with an example. (3)
- 4 Explain the importance of empathizing with customers in design thinking process. (3)
- 5 Describe the role of mathematical modelling in design engineering. (3)
- 6 State the function of prototyping and proofing in engineering design. (3)
- 7 Describe how the concept of concurrent engineering influence engineering designs. (3)
- 8 Distinguish between project-based learning and problem-based learning in design engineering. (3)
- 9 "Design for recycling is the need of the hour". Illustrate the concept. (3)
- 10 How do ethics play a decisive role in engineering design? (3)

PART B*Answer any one full question from each module. Each question carries 14 marks***Module 1**

- 11 Describe the concept of generating design alternatives and choosing a design through designing a coffee mug with the help of sketches. (14)
- 12 Show the designing of a bookshelf going through the various stages of the design process. Use hand sketches to illustrate the processes. (14)

Module 2

- 13 Most people in our country are reluctant in wearing helmets while riding two-wheelers. Empathize about this problem and arrive at a solution using the design thinking process, so that people do not refrain from wearing helmets. Use hand (14)

sketches to illustrate your design.

- 14 Design a mobile charger which can safely hold the mobile phone while charging. Illustrate the various stages involved in design thinking. Sketch the final design. (14)

Module 3

- 15 Design a study table for school children by taking safety into consideration. Draw the detailed 2D drawings of the same with design detailing, scale drawings and dimensions. Use only hand sketches. (14)
- 16 Prepare a technical report of a newly designed mobile application for engaging effective online classes for the students. Use sketches to illustrate the report. (14)

Module 4

- 17 Apply value engineering to a simple electric kettle. Illustrate the design changes using sketches. (14)
- 18 Show the design of a simple floor cleaning mop and then depict how the design changes when aesthetics and ergonomics are taken into consideration. Give hand sketches and explanations to justify the changes in designs. (14)

Module 5

- 19 Examine the changes in the design of an umbrella in terms of production methods, reliability issues and environmental factors. Use hand sketches and give proper rationalization for the changes in design. (14)
- 20 Describe how to estimate the cost of a water bottle for school kids and list the various parts. Show how the economics will influence its design. Use hand sketches to support your arguments. (14)
