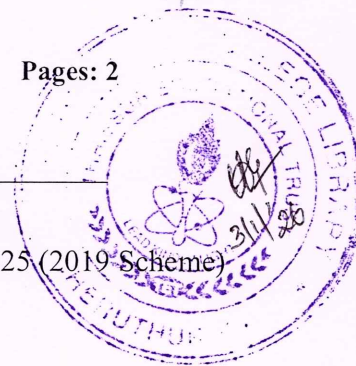


Reg No.: \_\_\_\_\_

Name: \_\_\_\_\_

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**

B.Tech Degree S3 (FT/WP/PT) (S1 PT) (S,FE) Examination November/December 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  | What are the key steps in the design process?  | (3) |
| 2  | Enumerate the features of a sustainable product.   | (3) |
| 3  | Define design rights within the context of engineering?  | (3) |
| 4  | Explain how engineering drawings and sketches are used for design communication?   | (3) |
| 5  | In the context of design engineering, how does project-based learning differ from problem-based learning?                      | (3) |
| 6  | State the function of proofing in engineering design.  | (3) |
| 7  | Using the design of an umbrella as an example, describe two distinct ergonomic considerations and one aesthetic consideration. | (3) |
| 8  | Describe the use of Reverse Engineering in the design process.   | (3) |
| 9  | How is biomimicry integrated into the product design and development process?  | (3) |
| 10 | Name two specific stages of a product's life cycle that designers consider to reduce environmental impact.                     | (3) |

**PART B***(Answer any one full question from each module, each question carries 14 marks)***Module 1**

- |    |  |      |
|----|--|------|
| 11 | Show the designing of a shoe rack. Use hand sketches to illustrate the various stages of the design process.   | (14) |
| 12 | List the customer requirements for designing an intelligent waste recycling bin. Show how the design objectives were finalized considering the design constraints? | (14) |

**Module 2**

- |    |   |      |
|----|---|------|
| 13 | Design a portable juicer cum chopper. Illustrate the various stages involved in design thinking. Sketch the final design.   | (14) |
| 14 | Users can find it difficult to open and close wireless headphone cases with one hand, and they may also struggle to remove the earbuds. Empathize about this design problem and arrive at a solution using the design thinking process. Illustrate the solution using sketches. | (14) |

**Module 3**

- 15 Design a length adjustable mop to clean ceiling fan. Draw the detailed 2D drawings of the same with design detailing, scale drawings and dimensions. Use only hand sketches. (14)
- 16 Describe the role of mathematical modelling in design engineering. Show how mathematics and physics play a role in designing a simple kitchen dish wash liquid dispenser. (14)

**Module 4**

- 17 Explain the aesthetic, ergonomic and safety considerations incorporated in the design of a laptop stand. (14)
- 18 Apply value engineering to a table fan, and design a light cum portable table fan. Illustrate the solution using sketches. (14)

**Module 5**

- 19 Describe how to estimate the cost of a pen stand and list the various parts. Show how the economics will influence the engineering designs. Use hand sketches to support your arguments. (14)
- 20 Examine the changes in the design of a mobile cover in terms of production methods, reliability issues and environmental factors. Use hand sketches and give proper rationalization for the changes in design. (14)

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