



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

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

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**

Fourth Semester B.Tech Degree Supplementary Examination June 2023 (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  | Define engineering design.  | (3) |
| 2  | What is the importance of systematic design.                      | (3) |
| 3  | What are the most popular techniques used in convergent thinking. | (3) |
| 4  | Describe three steps to facilitate design thinking in your team.  | (3) |
| 5  | What is visual communication in design                            | (3) |
| 6  | Why prototyping is important in the design process                | (3) |
| 7  | Explain life cycle design.  | (3) |
| 8  | Describe how aesthetics is important in design process            | (3) |
| 9  | Explain design ethics and why is it important.                    | (3) |
| 10 | What is sustainable engineering                                   | (3) |

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

- |    |   |      |
|----|---|------|
| 11 | Explain in detail the different stages of a design process.   | (14) |
| 12 | Find the customer requirements for designing a new wrist watch. Identify the design constraints. Explain, how were the design objectives finalized considering the design constraints? Use hand sketches. | (14) |

**Module 2**

- |    |   |      |
|----|---|------|
| 13 | Explain the five stages of design thinking process in detail and justify why design thinking is a nonlinear process.  | (14) |
| 14 | Create three numbers of possible designs for a pocket sized umbrella and then refine them to the best design using divergent thinking and convergent thinking | (14) |

**Module 3**

- |    |   |      |
|----|---|------|
| 15 | What are the different types of sketches used by designers to communicate their design? How will you graphically communicate the design of a creative coloring book with design detailing, material selection, scale drawings and dimension. Use hand sketches. | (14) |
|----|---|------|

- 16 Why do designers use mathematical modeling in the design process? Show an example of how mathematics and physics play a role in design. (14)

**Module 4**

- 17 What is meant by modular design? Apply the modular design concept to design a bicycle. (14)
- 18 What is the importance of project-based learning and problem-based learning? Use project based learning method to design a modern city for the year 2030. (14)

**Module 5**

- 19 Describe the importance of evaluating economic considerations in product development with an example. (14)
- 20 Illustrate the changes in design of a solar powered street light in terms of production, use, and sustainability with the help of sketches (14)

\*\*\*\*\*

**Ktunotes.in**