

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

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

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**

Fourth Semester B.Tech Degree Regular and 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 How is engineering design different from other kinds of design?                                | (3)   |
| 2 Explain how to identify customer requirements of design.                                       | (3)   |
| 3 Explain the term design functions as applicable to engineering design.                         | (3)   |
| 4 How does design thinking approach help engineers in creating innovative and efficient designs? | (3)   |
| 5 Briefly explain the role of basic principles of mathematical modelling in design.              | (3)   |
| 6 What are the factors considered in communicating designs through oral presentation?            | (3)   |
| 7 Examine how engineering students can learn design engineering through projects.                | (3)   |
| 8 Distinguish how aesthetics and ergonomics change engineering designs.                          | (3)   |
| 9 Show how designs are finalized based on the aspects of production methods.                     | (3)   |
| 10 Tell how 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 Design a study table for a child upto 5 years old specifying objectives, functions and constraints through various stages of design processes. Use hand sketches to illustrate the process. (14)
- 12 Choose the best design for a laptop stand for avoiding overheating, also incorporate the customer requirements. Show how design objectives were finalized considering the constraints also. (14)

**Module 2**

- 13 Construct a number of possible designs and then refine them to narrow down to the best design for a baby seater in a car. Show how convergent-divergent thinking helps in the process. Illustrate with hand sketches. (14)

- 14 Design a carry bag for shopping purposes. Illustrate the various stages involved in design thinking. Sketch the final design. (14)

**Module 3**

- 15 Draw the detailed drawing of a foldable bed with design detailing, scale drawings and dimensions. Use hand sketches. (14)
- 16 Explain the steps for oral presentation for marketing your own product within limited budget? Illustrate with an example and suitable figures. (14)

**Module 4**

- 17 Show the design of a kid friendly craft and then depict how the design changes when considering 1) aesthetics and 2) ergonomics into consideration. Give hand sketches and explanations to justify the changes in designs. (14)
- 18 Design a smart umbrella which has automatically folding and unfolding mechanism during heavy rain and sunlight with the concept of bio mimicry and sustainability. Use hand sketches to support your arguments. (14)

**Module 5**

- 19 Examine the changes in the design of a hand purse with constraints of 1) production methods 2) life span requirement 3) reliability issues and 4) environmental factors. Use hand sketches and give proper rationalization for the change in design (14)
- 20 Describe how to estimate the cost of a particular design of a smart bus for public use with wifi and proper cleaning facility. List the various components used. Show how economics will influence the engineering designs, use hand sketches to support the arguments. (14)

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