ENTRI

APJ Abdul Kalam Technological University

Third Semester B.Tech Degree Examination December 2020
EST200: Design and Engineering.

Part A

Answer all questions. Each question carries 3 marks.

1. **Discuss the importance of design constraints? (p. 1)**
2. **Describe how to select the "best possible design" from the generated design alternatives. (p. 1)**
3. **Discuss how to manage the conflicts in a team executing the design thinking process. (p. 1)**
4. **How does the design thinking approach help engineers in creating innovative and efficient designs? (p. 1)**
5. **Clarify the part of mathematics and physics in the design engineering process. (p. 1)**
6. **What are factors to be considered in preparing technical reports to communicate a design efficiently? (p. 1)**
7. **Describe the use of value engineering in the design process. (p. 1)**
8. **How does intelligence in nature inspire engineering designs? (p. 1)**
9. **How to estimate the cost of a particular design? (p. 1)**
10. **How do ethics play a decisive role in engineering design? (p. 1)**

Part B

Answer any one full question from each module. Each question carries 14 marks.

Module 1

1. **Design two alternatives of a chair suitable for a five-year-old child, and then to narrow down to the best design based on objectives and constraints. Sketch both the designs. (p. 1)**
2. **Identify the objectives, functions and constraints for designing a water level indicator. Illustrate the various stages of the design process. Provide suitable sketches. (p. 1)**

Module 2

1. **Design a water bottle that can be opened with one hand. Illustrate the various stages involved in design thinking. Sketch the final design. (p. 2)**
2. **During the Covid-19 pandemic, people have to wear a mask, but wearing a mask is not comfortable. Empathize about this design problem and arrive at a solution using the design thinking process, so that people can select the level of protection provided by masks according to different situations. Illustrate the solution using sketches. (p. 2)**

Module 3

1. **Design a foldable steel table. Draw the detailed 2D drawings of the same with design detailing, scale drawings and dimensions. Use only hand sketches. (p. 2)**
2. **Prepare a technical report for a newly designed website for online training of students with neat diagrams for presenting to a client. (p. 2)**

Module 4

1. **Apply value engineering to a pen, and design a lightweight pen torch. Illustrate the solution using sketches. (p. 2)**
2. **Design waste bins to be kept at bus stops for waste collection enabling source separation. The bin should be theft-resistant and protect the contents of the bin from external weather conditions. Design the bins with ergonomic consideration for waste collection workers. Sketch the design using hand drawings. (p. 2)**

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Module 5

1. **Design a fan which automatically reduces speed or stops when the temperature reduces during the night for energy conservation. Use hand sketches to support your design. (p. 2)**
2. **Describe how to estimate the cost of a pen and list the various parts. Show how the economics will influence the engineering designs. Use hand sketches to support your arguments. (p. 2)**