

APJ Abdul Kalam Technological University

**B.Tech Degree Examination paper May 2024 (2019 Scheme)
EST200: Design and Engineering**

Part A

Answer all questions. Each question carries 3 marks. (p. 1)

- 1. Define design objectives to be considered in the design of a table lamp.**
 - 2. Differentiate between conceptual design and detailed design.**
 - 3. List out any three divergent uses of a wired headset.**
 - 4. Explain the importance of the Empathize stage in the design thinking process with the help of an example.**
 - 5. Compare the features of a layout drawing and a detailed drawing.**
 - 6. Enumerate any six points to be considered while preparing a presentation.**
 - 7. Explain the difference between project-based learning and problem-based learning.**
 - 8. Describe how a modular design approach can be applied in the design of a pen.**
 - 9. Write a note on the importance of IPR in ensuring design rights.**
 - 10. Explain how the sustainability aspect can be applied in the design of a handbag.**
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Part B

Answer one full question from each module. Each question carries 14 marks. (p. 1)

Module 1

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- 1. Show the designing of a medicine box to keep medicines sorted for a month of 30 days, going through the various stages of the design process. Use hand sketches to illustrate the processes.**
- 2. Explain the design process to finalize the best alternative design, using the example of a carry bag which can also be converted to a trolley. Use hand sketches to support your idea. (p. 1)**

Module 2

- 1. Illustrate the design thinking process through designing a watch for blind people. Use hand sketches to illustrate the solution. (p. 1)**
- 2. Show how divergent and convergent thinking processes will help to choose the best design from a list of possible solutions, considering a handwash dispenser as a case study. Illustrate the solutions using hand sketches. (p. 2)**

Module 3

- 1. Graphically communicate the design of an electric steamer for cooking. Draw the detailed 2D drawings of the same with design detailing, material selection, scale drawings, and dimensions. Use only hand sketches.**
- 2. Describe the role of mathematical modelling in design engineering. Show how mathematics and physics play a role in designing with the help of an example. (p. 2)**

Module 4

- 1. Develop a nature-inspired design for a solar panel to generate electricity. Relate between natural and man-made designs. Use hand sketches to support your arguments.**
- 2. Demonstrate the design of a kids' study table and then depict how the design changes when considering 1) aesthetics and 2) ergonomics. Give hand sketches and explanations to justify the changes in design. (p. 2)**

Module 5

- 1. Examine the changes in the design of a water bottle 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.**
- 2. A waste bin is to be designed which has separate cabins to segregate different types of waste. Show how economics will influence the engineering designs. Use hand sketches to support your arguments. (p. 2)**