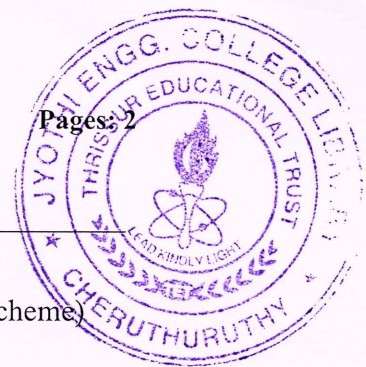


Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S4 (S,FE) (FT/WP) Examination January 2026 (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 | Outline the significance of understanding customer requirements in design process | (3) |
| 2 | Explain and differentiate conceptual design and detailed design? | (3) |
| 3 | State the role of divergent-convergent questioning in design thinking. | (3) |
| 4 | Discuss how to manage conflicts in a design team for betterment of design? | (3) |
| 5 | Show how engineering sketches and drawings convey designs. | (3) |
| 6 | What is mean by Proofing in Engineering Design. | (3) |
| 7 | Distinguish between project-based learning and problem-based learning in design engineering. | (3) |
| 8 | What is meant by Modular design? | (3) |
| 9 | Explain how economics influence the engineering designs? | (3) |
| 10 | Discuss the different design rights and how can an engineer put it into practice? | (3) |

PART B

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

Module 1

- | | | |
|----|--|------|
| 11 | Examine with an example in detail about (a) Setting Design Objectives(b) Identifying Constraints(c) Establishing Functions (d) Generating Design Alternatives and Choosing a Design. | (14) |
| 12 | Illustrate the design of a wrist watch going through the various stages of the design process. Use hand sketches to illustrate the process. | (14) |

Module 2

- | | | |
|----|---|------|
| 13 | Elaborate the design thinking approach for designing a classroom for college students with minimum resources. Depict each stage of the process and the iterative procedure involved. Use hand sketches. | (14) |
| 14 | Draw a number of designs alternatives and then narrow down to the best design | (14) |

for a wheel chair used in hospitals. What's the role of convergent-divergent thinking during this process. Support your arguments using hand sketches.

Module 3

- 15 Describe the role of mathematical modelling in design engineering. (14)
- 16 Show the Graphical design of a tripod for holding mobile phones and cameras. (14)
Provide a detailed design and communicate it through 2D drawings. Use only hand sketches.

Module 4

- 17 Examine how concepts like value engineering , concurrent engineering and reverse engineering influence engineering designs? (14)
- 18 Show the design of a simple chair and then show how the design varies under considerations 1) aesthetics and 2) ergonomics. Give hand sketches and explanations to support the changes in designs. (14)

Module 5

- 19 Examine the changes in the design of a Hand Bag with constraints of 1) maintainability, 2) life span requirement, 3) reliability issues and 4) environmental factors. Use hand sketches and give proper arguments for the changes in design. (14)
- 20 With an example show how the engineering designs is influenced by economics. Use proper sketches to validate it. (14)
