

Register No.: ..... Name: .....

**SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)**

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

**FOURTH SEMESTER B.TECH DEGREE EXAMINATION (R), MAY 2023****COMMON TO CH,CE,FT,ME****(2020 SCHEME)****Course Code : 20EST200****Course Name: Design and Engineering****Max. Marks : 100****Duration: 3 Hours****PART A*****(Answer all questions. Each question carries 3 marks)***

1. Compare Engineering design with other kinds of design.
2. How does a design engineer represent functions to develop a design?
3. Compare convergent and divergent thinking strategies.
4. How can design thinking improve the innovation quotient of an organization?
5. List the various methods for conveying Engineering design.
6. Illustrate the need for mathematical models in Engineering design.
7. Compare Project-based learning with Problem-based learning.
8. How does nature inspire Engineering designs?
9. Explain the role of economics in influencing Engineering designs?
10. Describe the decisive role of ethics in Engineering design.

**PART B*****(Answer one full question from each module, each question carries 14 marks)*****MODULE I**

11. a) What is an objective tree? Explain with the help of an example (5)  
b) Illustrate with necessary sketches the design space for a table lamp. (9)

**OR**

12. With necessary sketches explain the processes involved in designing an electronic notice board. (14)

**MODULE II**

13. Illustrate the design thinking approach for designing a wheelchair. (14)  
Describe each stage of the process and the iterative procedure involved.  
Use hand sketches to support your arguments.

**OR**

14. Design a mop used for cleaning floors with adjustable heights so that it is easier to handle at different places by different people. Create all possible designs and then refine them to narrow down to the best design. Show how the divergent-convergent thinking helps in the process. (14)

**MODULE III**

15. With the help of 2D sketches, communicate graphically the design of a water jet pump to be used for car washing with due consideration with design detailing, material selection, scale drawings, dimensions and tolerances. (14)

**OR**

16. Explain the terms (i) Prototype and (ii) Models. Elaborate on proof of concepts. What are the different ways of communicating the result of a design? Explain with a use-case of your choice with necessary sketches. (14)

**MODULE IV**

17. Discuss any four aesthetics and ergonomics factors in the design of a chair. Use hand sketches wherever necessary. (14)

**OR**

18. Explain modular approach in design engineering. How does it help in bringing efficient designs? Give practical applications. (14)

**MODULE V**

19. How does Engineering design vary with respect to production methods, life span and reliability? Illustrate with necessary examples and sketches. (14)

**OR**

20. Describe various cost estimation techniques. Explain the significance of cost estimation. Explain how to estimate the cost of an automatic sanitizer dispenser system. Draw the sanitizer dispenser system and label its parts. (14)

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