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

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

THIRD SEMESTER B.TECH DEGREE EXAMINATION (R,S), DECEMBER 2023
COMMON TO CS,EC,EE,RB
(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. Describe the basic design process.
2. What are design functions? Differentiate between primary and secondary functions.
3. Discuss, in what way can design thinking improve the innovation quotient of an organization?
4. What role does convergent-divergent questioning play in the design process?
5. Enumerate the various methods for conveying Engineering design.
6. Besides creativity and imagination, how is mathematics and physics important in design?
7. Distinguish between problem-based learning and project-based learning in design.
8. Explain how value engineering can be useful in the design process
9. Discuss the role of economics in engineering design.
10. Explain how affordability and pricing affect engineering designs.

PART B

(Answer one full question from each module, each question carries 14 marks)

MODULE I

11. Show the design of a book shelf by going through the various stages of the design process. Use hand sketches. (14)

OR

12. Find the customer requirements for designing a modern restaurant. Finalize the design objectives and state the design constraints. (14)

MODULE II

13. Illustrate the design thinking approach for designing a water bottle for school children. Design each stage of the process and the iterative procedure involved. Use hand sketches. (14)

OR

14. Construct a number of possible designs for a wallet used to keep money and cards. Narrow them down to the best design. Demonstrate how the convergent-divergent thinking helps in the design process. Use hand sketches. (14)

MODULE III

15. Graphically communicate the design of a study table with drawers. Draw the detailed 2D drawings of the same with design detailing, material selection, scale drawings, dimensions, etc. Use hand sketches. (14)

OR

16. Describe the role of mathematical modeling in design. Show how mathematics and physics play a role in designing a system for manually drawing water from a well (a system without using pumps or electricity). (14)

MODULE IV

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

OR

18. Develop some design modification for your back pack, to improve its functionalities as well as product value. sketch the design (14)

MODULE V

19. Design a candle holder to improve the life of the candle and reuse of wax. Sketch the design of the product. (14)

OR

20. Describe how to estimate the cost of a particular design for ANY one of the following: 1) a car, or 2) a house. Show how economics will influence the engineering designs. Considering alternate choice, report the cost estimate in tabular form. (14)

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