Register No.: …… Name: ……..

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

FOURTH SEMESTERB.TECH DEGREE EXAMINATION (Regular), JULY 2022
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. What are design constraints? How to identify them?
2. How do we select the "best possible design" from the generated design alternatives?
3. Discuss how to manage the conflicts in a team executing the design thinking process.
4. How does the design thinking approach help engineers in creating innovative and efficient designs?
5. Explain the role of mathematics and physics in design engineering process.
6. What are factors to be considered in preparing technical reports to communicate a design efficiently?
7. Describe the concept of reverse engineering in the design process.
8. List the various procedures that reverse engineering entails?
9. How to estimate the cost of a particular design?
10. How do ethics play a decisive role in engineering design?

PART B

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

MODULE I

11. Design two alternatives of a chair suitable for elderly people, and narrow down to the best design based on objectives and constraints. Sketch both the designs. (14)

OR

12. Identify the objectives, functions and constraints for designing a safety ladder. Illustrate the various stages of the design process. Provide suitable sketches. (14)

MODULE II

13. Design an effective traffic system for a busy junction without human intervention. Illustrate the various stages involved in design thinking. Sketch the final design. (14)

OR

14. Night driving is a difficult task for drivers since they have to face the threat of high beam from oncoming vehicles and lack of visibility resulting in loss of control of vehicles. Empathize about this design problem and arrive at a solution using the (14)

design thinking process, so that people of all age groups can experience same level of driving at all times. Illustrate the solution using sketches.

MODULE III

15. Design a trolley for super market that can be handled easily. Draw the detailed 2D drawings of the same with design detailing, scale drawings and dimensions. Use only hand sketches. (14)

OR

16. Prepare a technical report for a newly designed website for online ticketing with neat diagrams for presenting to a client. (14)

MODULE IV

17. Apply value engineering to a bicycle, and design an electric bike. Illustrate the solution using sketches. (14)

OR

18. Design smart waste bins to be kept at bus stops for waste collection enabling source separation (degradable and non-degradable). 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. (14)

MODULE V

19. 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. (14)

OR

20. Describe how to estimate the cost of an electric kettle and list the various parts. Show how the economics will influence the engineering designs. Use hand sketches to support your arguments. (14)

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