

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

## **SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)**

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

### **THIRD SEMESTER B.TECH DEGREE EXAMINATION (S), FEBRUARY 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. List any three constraints that can occur in design process of a lunch box.
2. What are the basic vocabularies in engineering design?
3. Explain how conflict in team environment helps in better design of products.
4. Compare convergent thinking and divergent thinking.
5. How does prototyping help to identify the best possible solution for the problem?
6. "Sketching is a powerful tool in design engineering". Justify this statement.
7. Explain biomimicry in design with an example.
8. Compare between project-based learning and problem-based learning in design.
9. What is the significance of sustainability in engineering design?
10. How can we estimate the cost factor of a particular design?

#### **PART B**

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

##### **MODULE I**

11. Explain the design process through designing a handbag for women of age group 15-25 years. Use hand sketches to support your idea. (14)

**OR**

12. An electric car recharging station has to be designed. Find the customer requirements and explain how it can be materialized. Include the detailed layout of the station (14)

##### **MODULE II**

13. Explain the five different stages of design thinking? Illustrate it with the help of a face mask design (14)

**OR**

14. Show how divergent and convergent thinking process will help to (14)

choose the best design from a list of possible solutions, considering bulbs as a case study.

**MODULE III**

15. Explain the general guidelines for technical communication. Justify each point with an example. (14)

**OR**

16. Design an office chair and communicate your design using sketches with design detailing, material selection, scale drawings and dimensions. (14)

**MODULE IV**

17. a) Apply the ergonomic design concepts to design a knife for various purposes. Illustrate each design with a neat sketch? (10)  
b) Write the significance and the aspects of life cycle design? (4)

**OR**

18. Apply value engineering to a pen and design a lightweight pen torch. Illustrate the solution using sketches. (14)

**MODULE V**

19. Illustrate the changes in design of disposable tea cup in terms of production, use and sustainability. (14)

**OR**

20. An umbrella has to be designed for daily use. Show how the cost will vary based on the material, design and labor using suitable neat hand sketches (14)

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