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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Third Semester B.Tech Degree Regular and Supplementary Examination December 2022 (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	List the objectives and constrains for designing a school bag for school students.	(3)
2	State how engineering design is different from other kinds of design.	(3)
3	How to perform design thinking as a team managing the conflicts?	(3)
4	Explain divergent-convergent questioning in design thinking.	(3)
5	List the factors to be considered in preparing oral presentations to communicate designs effectively to clients.	(3)
6	How does prototyping help to predict whether the design will function well or not?	(3)
7	Relate how designs are inspired from nature.	(3)
8	How the life cycle design approach influences design decisions?	(3)
9	What are design rights and how can an engineer put it into practice?	(3)
10	Describe the role of ethics in the design of any two products.	(3)

PART B

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

Module 1

11	Show the designing of a length adjustable mop to clean ceiling fan. Use hand sketches to illustrate the various stages of the design process.	(14)
12	In certain situations, users require extra length for their mobile charger cable. But offering extra cable length becomes an issue while normal usage. Develop a design to effectively solve this problem. Use necessary hand sketches. Also give the objectives and constraints of your design.	(14)

Module 2

13 Design a suitable product for easy cleaning of dust from the chalkboards in a classroom. Illustrate the various stages involved in design thinking. Sketch the final design. (14)

14 Construct two possible designs of a dining table set that occupies minimum space when not in use and then refine them to narrow down to the best design. Show how the divergent-convergent thinking helps in the process. Provide your rationale for each step by using hand sketches only. (14)

Module 3

15 Graphically communicate the design of a foldable ladder for electricians. Draw the detailed 2D drawings of the same with design detailing, material selection, scale drawings and dimensions. Use only hand sketches. (14)

16 Describe the role of mathematical modelling in design engineering. Show how mathematics and physics play a role in designing a simple paper cutting scissor. (14)

Module 4

17 Design a nature inspired solar lamp for the students residing in urban areas. These students do not have proper availability of electricity and cannot afford highly priced products. Illustrate your design with sketches. (14)

18 Apply modular engineering to a conventional bicycle and design a bicycle which can used in different terrains. Illustrate the design using sketches. (14)

Module 5

19 Examine the changes in the design of a footwear in terms of production methods, reliability issues and environmental factors. Use hand sketches and give proper rationalization for the changes in design. (14)

20 Describe how to estimate the cost of a residence house in design stage. Show how the economics will influence its design. Use hand sketches to support your arguments. (14)

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