

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
Fourth Semester B.Tech Degree Examination June 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

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|----|---|-----|
| 1 | What is engineering design? Draw a diagram to represent the engineering design process? | (3) |
| 2 | Explain and differentiate conceptual design and detailed design? | (3) |
| 3 | How prototype will help to identify the best possible solution for the problem? | (3) |
| 4 | Compare convergent thinking and divergent thinking? | (3) |
| 5 | “Sketching is a powerful tool in design engineering”. Justify this statement. | (3) |
| 6 | What is a mathematical model? State the significance? | (3) |
| 7 | Write and differentiate problem based and project based learning? | (3) |
| 8 | Compare sequential design and modular design techniques? | (3) |
| 9 | Explain the cost factor calculation of a particular design? | (3) |
| 10 | Write the role of economics in engineering design? | (3) |

PART B

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

Module 1

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|----|---|------|
| 11 | Design the interface of a simple calculator explaining each stage in the design process. Use hand sketches wherever necessary. | (14) |
| 12 | An electric car recharging station has to be designed. Find the customer requirements and explain how it can be materialised. Include the detailed layout of the station? | (14) |

Module 2

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|----|---|------|
| 13 | Explain the five different stages of design thinking? Illustrate it with the help of a face mask design | (14) |
| 14 | Show how divergent and convergent thinking process will help to choose the | (14) |

best design from a list of possible solutions, considering water jug as a case study.

Module 3

- 15 Explain the general guidelines for technical communication. Justify each point with an example. (14)
- 16 A web page has to be maintained to store the details of covid patients in Kerala districtwise. Design a web page and its popups with neat sketches and necessary documentation. The design must include the specification of softwares required for the page development. (14)

Module 4

- 17 A class room has to be designed in such a way that it should support the faculty for taking both online and offline mode class in the same room. Prepare a bill of material and draw a neat sketch showing the seating arrangement, cable layout, projector and smartboard position, podium, camera and the teacher position. aesthetic, ergonomics and convenience must be considered. (14)
- 18 (a) Write the significance of life cycle design? (4)
- (b) Apply the ergonomic design concepts to design a knife for various purposes. Illustrate each design with a neat sketch? (10)

Module 5

- 19 A table has to be designed as a study table, but it must include a provision to place your computer. Calculate the cost difference if you want to convert it as a dining table. The cost calculation must include labor, material and overheadcosts. (14)
- 20 An umbrella has to be designed for daily use. Show how the cost will vary based on material, design and labor using suitable neat hand sketches? (14)
