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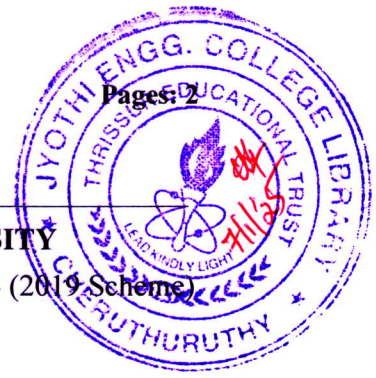
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Reg No.: _____

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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S4 (S, FE) / S4 (WP) (S) Examination December 2024 (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 | Explain any three types of design constraints to be considered in the design process. | (3) |
| 2 | Establish any three functions to be considered in the design of a pencil sharpener. | (3) |
| 3 | Explain the role of prototyping in finalizing a design. | (3) |
| 4 | List out any 3 divergent uses of a knife. | (3) |
| 5 | Explain any three guidelines to be followed for a technical communication. | (3) |
| 6 | Describe the importance of mathematical modelling in engineering design. | (3) |
| 7 | Explain the significance of life cycle design approach in engineering design. | (3) |
| 8 | Write note on value engineering. | (3) |
| 9 | Differentiate between reliability and maintainability of a product. | (3) |
| 10 | Describe the importance of sustainable development considering the present global climatic scenario. | (3) |

PART B

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

Module -1

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|----|--|------|
| 11 | Explain the design process to finalize best alternative design, using the example of a scissors. Use hand sketches to support your idea. | (14) |
| 12 | Show the designing of a hanging mechanism to carry up to 5 carry bags (weighing 2 kg each) comfortably while walking, going through the various stages of the design process. Use hand sketches to illustrate the processes. | (14) |

Module -2

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|----|---|------|
| 13 | Illustrate the design thinking approach for designing a safety shoe to be used in construction sites. Describe each stage of the process. Illustrate the solution using sketches. | (14) |
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- 14 Construct a number of possible designs and then refine them to narrow down to the best design for an umbrella. Show how convergent-divergent thinking helps in the process. Illustrate with hand sketches. (14)

Module -3

- 15 Design an automatic coffee vending machine to be installed at public places. Draw the detailed 2D drawings of the same with design detailing, material selection and dimensions. Use only hand sketches. (14)
- 16 Explain the general guidelines for technical communication. Justify each point with an example. (14)

Module -4

- 17 Apply the concept of modular design approach in the design of a study table. Use hand sketches to justify your design. (14)
- 18 Demonstrate the design of a cradle for babies less than 2 years and then depict how the design changes when considering 1) aesthetics and 2) ergonomics into consideration. Give hand sketches and explanations to justify the changes in design. (14)

Module -5

- 19 Examine the changes in the design of a hangar for drying clothes with constraints of 1) production methods 2) life span requirement 3) reliability issues and 4) environmental factors. Use hand sketches and give proper rationalization for the change in design. (14)
- 20 A toy car suitable for an age group of 5-8 years is to be designed. Show how economics will influence the engineering designs. Use hand sketches to support your arguments. (14)
