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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**B.Tech Degree S8 (R,S) Exam April 2025 (2019 Scheme)****Course Code: RAT416****Course Name: DESIGN FOR MANUFACTURING AND ASSEMBLY****Max. Marks: 100****Duration: 3 Hours****PART A***Answer all questions, each carries 3 marks.*

Marks

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| 1 | Define Design for Manufacturing and Assembly (DFMA). | (3) |
| 2 | What are the steps in the design process? | (3) |
| 3 | List any three criteria for material selection in product design. | (3) |
| 4 | Differentiate between traditional and non-traditional machining processes. | (3) |
| 5 | Explain the importance of surface roughness in machining design. | (3) |
| 6 | What are the advantages of casting simulation? | (3) |
| 7 | List any three design guidelines for sheet metal bending. | (3) |
| 8 | Define forging and explain its major advantages. | (3) |
| 9 | What is manual assembly? List its different methods. | (3) |
| 10 | Explain how part symmetry affects handling time in manual assembly. | (3) |

PART B*Answer any one full question from each module, each carries 14 marks.***Module I**

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| 11 | a) Explain the general design principles for economical production. | (7) |
| | b) Discuss the advantages of DFMA in product design. | (7) |

OR

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| 12 | a) Explain the process selection chart and its importance in design. | (7) |
| | b) Describe the relationship between material selection and process selection. | (7) |

Module II

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| 13 | a) Describe Abrasive Jet Machining with a schematic diagram. | (8) |
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- b) Discuss machinability and its importance in manufacturing. (6)

OR

- 14 a) Explain the classification of machining processes. (7)
b) With a diagram, explain the turning operation in machining. (7)

Module III

- 15 a) What are the important pre-heating and post-heating guidelines in welding design? (7)
b) List the design considerations for casting. (7)

OR

- 16 a) Compare Brazing, Soldering, and Adhesive Bonding. (7)
b) List the benefits and bottlenecks of casting simulation. (7)

Module IV

- 17 a) Differentiate between forward and backward extrusion. (7)
b) Explain the cold extrusion process and its advantages. (7)

OR

- 18 a) What is upset forging? Explain with a diagram. (7)
b) Explain the purpose of heat treatment in forging. (7)

Module V

- 19 a) Discuss the effect of chamfer design on manual insertion. (6)
b) Explain the impact of the following part features on handling time: (8)
- Symmetry
 - Weight
 - Thickness & Size

OR

- 20 a) Explain the design guidelines for component insertion and fastening. (7)
b) List the assembly rules and discuss the major benefits of DFMA (7)
