17782

BRAINWARE UNIVERSITY

Term End Examination 2024-2025
Programme – M.Tech.(RA)-2024
Course Name – MOOC-Product Design and Manufacturing
Course Code - MEC20304C
(Semester II)

Full Marks : 70 **Time : 3:0 Hours**

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A

(Multiple Choice Type Question) 1 x 15=15

1. *Choose the correct alternative from the following :*

(i) Reverse engineering is used to:
a) Analyze and improve existing products
b) Reduce product quality
c) Eliminate innovation in design
d) Avoid competitor analysis

(ii) A key advantage of reverse engineering is:
a) Identifying areas for product improvement
b) Increasing production costs unnecessarily
c) Ignoring customer needs
d) Making design processes more complex

(iii) Design thinking focuses on:
a) Human-centered problem-solving
b) Reducing creativity
c) Avoiding customer feedback
d) Ignoring innovation

(iv) The primary objective of green manufacturing is to:
a) Reduce environmental impact
b) Increase pollution
c) Ignore sustainability
d) Increase waste production

(v) Self-healing materials are used to:
a) Repair minor damages automatically
b) Reduce durability
c) Increase failure rates
d) Increase maintenance requirements

(vi) What does DFMA stand for?
a) Design for Manufacturing and Assembly
b) Design for Material Analysis
c) Development for Maintenance Applications
d) Design for Machine Accuracy

(vii) Which material is commonly used for lightweight automotive components?
a) Aluminum
b) Iron
c) Lead
d) Concrete

(viii) Which is a key advantage of automation in manufacturing?

a) Improved precision and repeatability
b) Higher labor dependency
c) Increased manual errors
d) Reduced product consistency

(ix) Reverse engineering helps in:

a) Analyzing and improving existing designs
b) Avoiding innovation
c) Increasing design failures
d) Ignoring product development

(x) What is the main benefit of using CAD software in product design?

a) Reducing cost
b) Enhancing accuracy and visualization
c) Increasing complexity
d) Avoiding documentation

(xi) What is the primary benefit of using composite materials?

a) Higher weight
b) Better strength-to-weight ratio
c) Increased density
d) Higher material cost

(xii) What is the primary goal of Kaizen in manufacturing?

a) Increase defects
b) Continuous improvement
c) Reduce employee involvement
d) Ignore quality control

(xiii) Compare 'reverse innovation' with traditional innovation.

a) Innovation that moves from developed countries to emerging markets
b) Innovation that starts in low-income countries and then spreads to developed markets
c) Innovation aimed solely at luxury markets
d) Innovation focused on eliminating outdated technologies

(xiv) Recognize the type of patent given for ornamental designs.

a) Utility patent
b) Design patent
c) Plant patent
d) Business method patent

(xv) The main purpose of product costing is to:

a) Minimize environmental impact
b) Calculate the selling price
c) Estimate the material quantity required
d) Determine the total cost involved in producing a product

Group-B

(Short Answer Type Questions) 3 x 5=15

2. Focus how can product costing help in determining the pricing strategy of a product. (3)
3. Explain how does the "Design Thinking" approach enhance creativity in product design. (3)
4. Explain how can modular design contribute to enhanced DFMaint. (3)
5. Dissimilarity between Quality Control (QC) and Quality Assurance (QA). (3)
6. Summarize what is the significance of "casting" as a manufacturing process, and when should it be selected. (3)

OR

Organize how does the choice of material affect the strength and durability of a product. (3)

Group-C

(Long Answer Type Questions) 5 x 8=40

7. Explain the importance of material selection in product design. How do material properties influence product performance and cost. (5)
8. Justify, how can sustainability influence material selection and manufacturing process decisions. (5)

9. Describe how product costing is done in the manufacturing industry. Discuss the different types of costs involved in calculating the total cost of a product. (5)
10. Explain how "Design for Cost" (DFC) principles can influence material selection, manufacturing process selection, and product costing. (5)
11. Explane the concept of "Break-even Analysis" in product costing, and how is it used to determine the optimal production volume. (5)
12. Discuss the importance of tolerances in DFM. How do tighter tolerances impact manufacturing? (5)
13. How does Statistical Process Control (SPC) aid in maintaining product quality during manufacturing? (5)
14. Describe the key factors that should be considered when selecting a manufacturing process for a product. Provide examples of how each factor influences the decision. (5)

OR

Differentiate the relationship between material properties and manufacturing processes and explain how can the wrong material choice lead to manufacturing issues. (5)

****