Product Design and Manufacturing

Assignment Week-1

1. _____ is a systematic, creative and iterative process that results in developing components and systems in Product Realization Process.
   a) Problem Definition
   b) Engineering Design
   c) Analytical Process
   d) Creative Process

2. Which team of designer and developer of product can expand up to dozens, hundreds or even thousands of teammates having a common goal?
   a) Core team
   b) Extended team
   c) External team
   d) None of these

3. The DFM concept includes careful and organized study of all the various issues and mandates the integration of all the relevant data.
   a) True
   b) False

4. Interchangeability is a process of ensuring that manufactured parts should be within a specific _____.
   a) color range
   b) tolerance limit
   c) weight category
   d) temperature range

5. What is the third phase in the S curve?
   a) Slow growth phase
   b) Rapid growth phase
   c) Leveling off phase
   d) None of these

6. Formulating the problem is the last step in Krick's basic engineering problem-solving process.
   a) True
   b) False

7. What is considered most crucial for consumer faith in a product, according to the information provided?
    a) Brand reputation
    b) Limited functionality
    c) Unsatisfactory performance
    d) Functionality and performance

8. Production-consumption cycle is one of the most important features of socio-ecological system.
    a) True
    b) False

9. Which of the following is an example of mass production?
    a) Customized furniture
    b) Handmade crafts
    c) Manufacturing smartphones
    d) One-of-a-kind artwork

10. After a maturity period, the product is characterized by a growth in sales and profits only.
    a) True
    b) False

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Assignment Week-2

1. A _____ is the identification of the need that is unfulfilled.
   a) product
   b) problem
   c) weight
   d) value

2. The morphology of design is the study of the chronological structure of design projects.
   a) True
   b) False

3. Which is the third process in the production-consumption cycle?
   a) Transportation
   b) Consumption
   c) Planning
   d) Designing

4. What are the key factors of successful products in product development?
   a) Distinctiveness
   b) Customer focus and market orientation
   c) Preparedness
   d) All of these

5. An aspect of durability is maintenance and repair.
   a) True
   b) False

6. Which key factor develops an intensive understanding of the trait of the market.
   a) Customer focus and market orientation
   b) Preparedness
   c) Distinctiveness
   d) Time

7. What is the fourth process in the product-consumption cycle of morphology of design?
   a) Design for safety
   b) Disposal of the retired product
   c) Planning the warehouse systems
   d) Finding design alternative

8. The cost analysis is done to analyze the achievements of the product.
    a) True
    b) False

9. In developing provisional designs, innovative ideas generated through imagination or through real life is called as:
    a) Direct analogy
    b) Symbolic analogies
    c) Fantasy analogies
    d) Indirect analogies

10. Which of the following factors is not included in the design for consumption?
    a) Designing to reduce the rate of obsolescence
    b) Design for operational economy
    c) Design for reliability
    d) Design for safety

Product Design and Manufacturing

Assignment Week-3

1. Which design principle involves the application of phi and fractals in aesthetic design?
   a) Forms/shapes
   b) Material strength
   c) Proportions
   d) Colors

2. The psychological impact of a line is not influenced by its direction and weight.
   a) True
   b) False

3. Which term refers to a hue with added black?
   a) Tint
   b) Tone
   c) Shade
   d) Complement

4. What is the most common characteristic of neutral colors in terms of representation using hue?
   a) Exciting
   b) Calming
   c) Unifying
   d) Mixed cool/warm

5. Feeling of strength and weight of size is associated with the illusion of depth.
   a) True
   b) False

6. How many kinds of visual designs are there in balance?
   a) Four
   b) Two
   c) Three
   d) Five

7. In the context of design, ratio majorly defines the overall _____ with respect to its surroundings.
   a) size
   b) weight
   c) mass
   d) space

8. _____ is the variation of the duration of sounds/visual elements or other events over time.
    a) Harmony
    b) Rhythm
    c) Unity
    d) Belongings

9. What are the reasons for the customer purchasing a product?
    a) The product performs well
    b) Simple to utilize
    c) Well-known to them
    d) All of these

10. Product Development groups should make utilization of market studies customer meetings, and conceptualizing.
    a) True
    b) False

Product Design and Manufacturing

Assignment Week-4

1. Who is credited with the developing the Function Analysis Technique (FAST) diagramming during the 1960s?
   a) Mr. Lawrence D. Miles
   b) Mr. Charles Bytheway
   c) U.S. Navy Bureau of Ships
   d) General Service Administration (GSA)

2. The Creative phase develops ideas for alternative ways to perform each function selected for further study.
   a) True
   b) False

3. _____ organizes awareness training programs and workshops conducted by Certified Value Specialists?
   a) INVEST
   b) QFD
   c) HOQ
   d) None of these

4. Value Engineering is a problem-solving technique.
   a) True
   b) False

5. Value Analysis (VA)/Value Engineering (VE) is _____ oriented.
   a) Item
   b) function
   c) Cost
   d) Object

6. The Information Phase involves only individual efforts and not teamwork.
   a) True
   b) False

7. All functions should be classified into two levels of importance, which are:
   a) Primary and secondary
   b) Verb and noun
   c) Internal and external
   d) Direct and indirect

8. Secondary functions support the primary function but do not directly accomplish it.
    a) True
    b) False

9. Functions having VIP Index more than ‘1’ are called as:
    a) True Value
    b) Poor Value
    c) High Value
    d) Real Value

10. The objective of the evaluation phase of the Value Engineering Job Plan is to analyze the result to the creative phase.
    a) True
    b) False

Product Design and Manufacturing

Assignment Week-5

1. Usually screening, ranking, and cost optimization processes are used to arrive at the best combination of materials.
   a) True
   b) False

2. In _____ process, metal bites are forced by a mechanically or hydraulically actuated ram through a die hole of the desired shape or around a punch.
   a) Extrusion
   b) Casting
   c) Rolling
   d) 3D printing

3. _____ is a machining process that uses a toothed tool, called a broach, to remove material.
   a) Broaching
   b) Shaping
   c) Planning
   d) Forging

4. The tertiary process of manufacturing consists of finishing processes, such as surface treatments and heat treatments.
   a) True
   b) False

5. _____ involves heating steel and then keeping it at that temperature for a period of time and then cooling it in air.
   a) Annealing
   b) Normalizing
   c) Tempering
   d) Hardening

6. _____ consists of finishing processes such as surface treatments and heat treatments.
   a) Primary process
   b) Secondary process
   c) Tertiary process
   d) None of these

7. Facing is a special case of turning in which the major motion is perpendicular to the axis of rotation.
   a) True
   b) False

8. _____ is the difference between the price at which the product is sold and the cost of providing the product.
   a) Value
   b) Cost
   c) Profit
   d) Design

9. Which of the following is an example of hidden cost?
   a) Product's gain or loss of market share
   b) Company's stock price changes
   c) Position in the market for future
   d) All of these

10. Software development is not a consideration in design and development costs.
    a) True
    b) False

Product Design and Manufacturing

Assignment Week-6

1. What is the primary focus of Design for Manufacturing?
   a) Maximizing part complexity
   b) Minimizing manufacturing operations
   c) Increasing part production cost
   d) Ignoring assembly processes

2. Lack of communication between product developers and the related departments is a common problem associated with the implementation of the design review process.
   a) True
   b) False

3. What is the primary advantage of minimizing the number of components in a product?
   a) Increased assembly costs
   b) Improved reliability
   c) Complex disassembly
   d) Higher work-in-process

4. _____ of a product is a function of design parameters that are both intensive and extensive in nature.
   a) Assembly
   b) Marketing
   c) Supply
   d) None of these

5. A Disassembly Sequence Plan (DSP) uses mathematical techniques such as linear programming, dynamic programming, and graphical tools for disassembly.
   a) True
   b) False

6. _____ consists of assessing the end value to be realized by disassembling the product.
   a) Assembly analysis
   b) Product analysis
   c) Both of these
   d) None of these

7. Predictive maintenance is based on the actual condition of the equipment rather than time or age factors.
   a) True
   b) False

8. Which of the following is reason for not implementing DFMA?
    a) No Time
    b) Low Assembly Costs
    c) Low Volume
    d) All of these

9. The goal of Total Productive Maintenance (TPM) is:
    a) Zero Defects
    b) Zero Breakdowns
    c) Zero Accidents
    d) All of these

10. For planning a system review, a reviewer assesses risk levels by examining the firm's compliance with industry regulations.
    a) True
    b) False

Product Design and Manufacturing

Assignment Week-7

1. Xerox's commitment is to generate waste material that cannot be recycled or remanufactured.
   a) True
   b) False

2. Which is the technique for assisting management in costing and designing an environmentally effective manufacturing facility.
   a) Waste reduction
   b) Life Cycle Analysis
   c) Regeneration
   d) Acceptance sampling

3. Which factor considers the ease of repairing a product when determining its quality?
   a) Serviceability
   b) Aesthetics
   c) Conformance to Standards
   d) Features

4. Reducing or eliminating waste is not considered an ongoing effort in effective large-volume manufacturing.
   a) True
   b) False

5. A _____ item is a unit of product that does not satisfy one or more of the specifications of that product.
   a) Conforming
   b) Nonconforming
   c) Both of these
   d) None of these

6. In adjustment chart, what is the process called when EPC is implemented?
   a) Manual Process Control (MPC)
   b) Automated Process Control (APC)
   c) Static Process Control (SPC)
   d) Dynamic Process Control (DPC)

7. In the factorial design, factors are varied together in such a way that all possible combinations of factor levels are tested.
   a) True
   b) False

8. The control chart should be applied:
   a) To the control error
   b) To the sequence of adjustment to the manipulated variables
   c) Both of these
   d) None of these

9. Which R is called as the golden child in Three R's?
   a) Reuse
   b) Reduce
   c) Repair
   d) Recycle

10. The third major source of waste is the materials and activities that are part of the value-added operations and processes used to manufacture the product.
   a) True
   b) False

Product Design and Manufacturing

Assignment Week-8

1. Which type of patent is granted for plant variety made through asexual reproduction of plant varieties?
   a) Utility patent
   b) Design patent
   c) Plant patent
   d) None of these

2. Which approach to problem-solving follows a step-by-step procedure?
   a) Analytical approach
   b) Creative approach
   c) Both of these
   d) None of these

3. Synthesis' is the step where alternative solutions to problems are generated.
   a) True
   b) False

4. Which characteristic involves being open-disapproved versatile in the approach to an issue?
   a) Availability
   b) Flexibility
   c) Originality
   d) Problem security

5. What term is used for the intersection of a column and a row in a morphological box?
   a) Morphological field
   b) Dimension
   c) Parameter
   d) Value

6. The solution space is derived through the process of cross-consistency assessment.
   a) True
   b) False

7. Which method emphasizes innovation with an open mindset and starting from scratch?
   a) Globalization
   b) Clean slate approach
   c) Complexity
   d) Traditionalism

8. Which of the following is upstream input in Value Chain Model of Frugal Innovation?
   a) Capital
   b) Skills
   c) Labor
   d) All of these

9. The Delphi method helps the group reach consensus without the influence of strong members of the group.
   a) True
   b) False

10. Which of the following 'blocks to creativity' believes that all indulgence in fantasy is a waste of time.
   a) Cultural block
   b) Emotional block
   c) Perceptual block
   d) None of these

Product Design and Manufacturing

Assignment Week-9

1. Most Additive Manufacturing machines employ a layer-based approach.
   a) True
   b) False

2. What is the essential displaying system accessible to make 3D outlines?
   a) Wireframe
   b) Surface
   c) Solid Modelling
   d) All of these

3. In which modeling techniques the geometrical database is wealthier and give data on surface associating model edges?
   a) Surface modeling
   b) Wireframe modeling
   c) Solid modeling
   d) Geometric modeling

4. What is the primary focus of part building in Rapid Prototyping?
   a) Manual adjustment
   b) Automated processes
   c) Crafting
   d) Hand-held process

5. The 3DW process relies on cut CAD files for building models.
   a) True
   b) False

6. In_____, a surge of liquid material is shot out from a sprout?
   a) Holographic Interference Solidification
   b) Ballistic Particle Manufacture
   c) Solid Ground Curing
   d) Beam Interference Solidification

7. In FDM, what is the material extrusion rate typically dependent upon?
   a) Nozzle color
   b) Nozzle temperature
   c) Nozzle speed
   d) Nozzle size

8. A MJM machine constructs models utilizing a stage change printing yet connected in three measurements.
   a) True
   b) False

9. What is the purpose of the excess material in LOM and PLT during the build process?
   a) It forms the final part
   b) Acts as a support structure
   c) Enhances UV lights exposure
   d) Provides color variation

10. Stereolithography (SL), depends on a photosensitive fluid sap which shapes a strong polymer when presented to bright (UV) light.
   a) True
   b) False

Product Design and Manufacturing

Assignment Week-10

1. A plant layout study is unnecessary when setting up a new plant.
   a) True
   b) False

2. Which of the following factors in plant layout design is associated with the attributes of product such as size, shape and weight?
   a) Intricacy of the product
   b) Processing time
   c) Production volume of the product
   d) Product physical characteristics

3. Which of the following is an advantage of process or functional layout?
   a) Flexibility
   b) Cost
   c) Motivation
   d) All of these

4. In functional layout, since there are various machines accessible it does not exhibit much equipment failure.
   a) True
   b) False

5. _____ layout is suggested for an item that is too overwhelming to move.
   a) Fixed-position
   b) Cellular
   c) Product
   d) None of these

6. Which of the following is not an advantage of fixed position layout?
   a) Promotes quality
   b) Highly flexible
   c) Space constraint
   d) Minimum material movement

7. What does the ‘travel speed’ setting controls in slicing software mean?
   a) Regulating filament extrusion speed
   b) Adjusting the speed between print locations
   c) Changing layer height
   d) Enhancing print preview accuracy

8. What does the ‘Support Type’ setting in Cura determine?
    a) Type of material used for support
    b) Placement of support structures
    c) Adhesion to the build plate
    d) Cooling fan speed

9. What is the purpose of the TECHB V30's enclosure (if applicable)?
    a) Enhance aesthetic appeal
    b) Maintain a controlled printing environment
    c) Increase print speed
    d) Improve touchscreen responsiveness

10. Product layouts are flexible and can react to changes in items or process plan.
    a) True
    b) False

Product Design and Manufacturing

Assignment Week-11

1. Which CIM component is associated with the design of products using computer technology?
   a) CAM
   b) CAPP
   c) CAD
   d) CNC

2. Which of the following is not a component of manufacturing facilities?
   a) Production line
   b) Stand-alone workstation and worker
   c) Plant layout
   d) Marketing strategies

3. Cost accounting is a part of manufacturing control function in manufacturing support.
   a) True
   b) False

4. Which type of manufacturing system is most suitable for batch production?
   a) Fixed automation
   b) Programmable automation
   c) Flexible automation
   d) Customer-engineering automation

5. Which of the following activities is carried out in manufacturing of discrete products?
   a) Material handling
   b) Inspection and testing
   c) Coordination and control
   d) All of these

6. Agriculture and mining are examples of tertiary industries in manufacturing.
   a) True
   b) False

7. What term refers to the number of different products or part designs produced in a plant?
   a) Production complexity
   b) Product diversity
   c) Variety reduction
   d) Product variety

8. _____ is defined as the portion of time a productive resource is used relative to the time available under the definition of plant capacity.
   a) Work-in-process
   b) Utilization
   c) Automation
   d) Plant variety

9. In a closed-loop control system, the output variable is not compared with an input parameter.
   a) True
   b) False

10. In which of the following level of automation CNC machine tools and similar production equipment, industrial robots, material handling equipment can be done.
   a) Machine level
   b) Plant level
   c) Device level
   d) Enterprise level

Product Design and Manufacturing

Assignment Week-12

1. Which of the following processes involve obtaining a geometric CAD model from scanned 3D points?
   a) Forward engineering
   b) Reverse engineering
   c) Digital engineering
   d) Rapid prototyping

2. The prototype is developed before the creation of a CAD model in the reverse engineering process.
   a) True
   b) False

3. What is the first fundamental step in which the acquired image is created in the software as a set of points?
   a) Mesh Generation
   b) Alignment
   c) Post processing
   d) Acquisition

4. The mesh generation converts a set of 3D points to data constituted by a set of triangles.
   a) True
   b) False

5. When data is generated by RE hardware, what does RE software turns it into?
   a) 2D cross-sectional images
   b) 3D geometric models
   c) Rapid prototyping models
   d) Destructive models

6. What is the primary limitation of Coordinate Measuring Machine (CMM) in digitizing complex surfaces?
   a) Lack of scanning speed
   b) Lack or accuracy
   c) Lack of number DOF
   d) Lack of continuous deflection output

7. Commercial software is not involved in point processing tasks in RE.
   a) True
   b) False

8. Which of the following is not an advantage of non-contact mode of RE?
   a) No physical contact
   b) Inability to detect colors
   c) God accuracy and resolution
   d) Fast digitizing of substantial volumes

9. _____ benchmarking examines how companies compete and is ideal for corporations with a long-term perspective.
   a) Performance
   b) Strategic
   c) Process
   d) None of these

10. Performance metrics in benchmarking gives numerical standards against which a client's own processes can be compared.
    a) True
    b) False