**DEN 432**

**Week 4 Test**

**January 2024**

**Please select your answers, save this quiz, and email it to:** [**derek.podobas@natuniv.edu**](mailto:derek.podobas@natuniv.edu)

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**Due before midnight on 2/4/2024**

**Question 1 of 50**

Which of the following guidelines apply to the Evaluation of Component Retrieval?

* Avoid component characteristics that complicate retrieval
* Design components for a specific type of retrieval and mating
* All of these
* None of these

**Question 2 of 50**

Is this statement true: a single part costs nothing to manufacture?

* True
* False

**Question 3 of 50**

Usually, it is beneficial to be consistent in the use of manufacturing methods:

* True
* False

**Question 4 of 50**

The first additively manufactured part costs $15 to make. The second one will cost:

* $15
* $150
* $0.15
* Impossible to say

**Question 5 of 50**

Every fastener adds costs and reduces strength:

* True
* False

**Question 6 of 50**

All of these are DfM guidelines for machined parts except:

* Specify the smoothest surface the machine can make no matter what
* Design a part to be easy to hold
* Use generous fillets and chamfers
* Design so that whole part can be created on one machine

**Question 7 of 50**

Which of these should be considered in a Design for Sustainability:

* Disposal of a part
* Transportation of the product
* Energy consumed during its production
* Energy consumed during its design
* All of these
* None of these

**Question 8 of 50**

When thinking about the risk that a product will fail, a designer should think about which of the following?

* What is the probability of failure
* What will be the impact on the user
* How to increase the MTBF
* None of these
* All of these

**Question 9 of 50**

Where can the Design for Sustainability be applied?

* Production materials
* Production process
* Transportation and logistics
* Energy generation
* Disposal
* All of these
* None of these

**Question 10 of 50**

Design your tooling and operations to be simple:

* True
* False

**Question 11 of 50**

Designers multiply their calculated stresses on a part by a " factor of safety" because:

* You may be able to use less expensive material, which may fail sooner
* You may not be able to anticipate all ways that a product will be used
* Because there is no such thing as a perfect design
* None of these
* All of these

**Question 12 of 50**

Ergonomics should be ignored during the design process if they add to the cost point of a product:

* True
* False

**Question 13 of 50**

You are designing a consumer device that has a part that often wears out. As a designer, which course of action would you choose?

* Design that part so it is hard for a customer to remove
* Design that part so it is easy to pull out and replace by a customer
* All of these
* None of these

**Question 14 of 50**

You could make a plastic part that has extensive internal structure (structure not visible from any place outside the part) by:

* Injection molding
* CNC machining it
* Casting it in one piece
* None of these
* All of these

**Question 15 of 50**

There is no such a thing as a perfect product:

* True
* False

**Question 16 of 50**

You are creating a product that, if fails, can hurt people. You have a very limited R&D budget. Hence, which TRL level technologies should you use?

* 1
* 5
* 8 or 9

**Question 17 of 50**

Design for Assembly is only important when the cost of assembly is a significant component of the overall cost of production:

* True
* False

**Question 18 of 50**

Which of the following method would be best to use if you are working on a prototype of a kitchen cabinet handle?

* Injection molding
* Sand casting
* 3D printing

**Question 19 of 50**

All of these are DfM guidelines for injection-molded parts except:

* Use draft angles
* Make walls thin
* Have walls of varying thickness
* Have rounded corners

**Question 20 of 50**

Which of the following could sensibly be made with sand casting?

* A cast-iron skillet
* A delicate small piece of jewelry
* A seamless hollow sphere
* None of these
* All of these

**Question 21 of 50**

Which of the following adds the most labor to an assembly process?

* Components that tangle
* Components that nest tightly
* Components that are oriented correctly for the assembly worker
* None of these
* All of these

**Question 22 of 50**

A company should always make all the parts that it uses in its products:

* True
* False

**Question 23 of 50**

To do a dimensional analysis, we should reduce each term we are looking at into what units?

* Force and acceleration
* Mass, length, and time
* Lift and drag
* Torque, speed, and gearing

**Question 24 of 50**

A part has a manufacturing tolerance of +/- 0.05. This means that all such parts have the diameter of 0.05mm:

* True
* False

**Question 25 of 50**

3D printed parts are:

* Created one layer at a time
* Are carved out of a block of material by CNC equipment
* Can only be made of plastic
* None of these

**Question 26 of 50**

Which of the following Design for Assembly guidelines apply?

* End-to-end symmetry is desired
* Symmetry around the axis of insertion is desired
* Non-symmetrical components should be clearly such
* All of these
* None of these

**Question 27 of 50**

Which design is easiest to assemble (in general):

* One with many parts
* One with the fewest possible parts
* One with no parts
* None of these

**Question 28 of 50**

You are doing a failure mode analysis for a hand cart that will be used in a garden. Which of the following scenarios would you not considered in your analysis?

* Small children using it as a go-cart
* People carry heavy building materials
* People adding an engine to it to drag race in the desert
* All of these
* None of these

**Question 29 of 50**

Injection molding is manufacturing method that is used in long production runs:

* True
* False

**Question 30 of 50**

Which of the following components will add the MOST work to an assembly process?

* One that is end-to-end symmetrical
* One that is end-to-end asymmetrical (small variance)
* One that is end-to-end asymmetrical (large variance)

**Question 31 of 50**

Once you have your design finalized it would be impossible to change it.

* True
* False

**Question 32 of 50**

The prevailing American manufacturing philosophy is: "continuous improvement"- continue to eliminate variations:

* True
* False

**Question 33 of 50**

Which of the following components will add the LEAST work to an assembly process:

* One that is end-to-end symmetrical
* One that is end-to-end asymmetrical (small variance)
* One that is end-to-end asymmetrical (large variance)
* None of these
* All of these

**Question 34 of 50**

Which of the following are identified by the Design for Reliability guidelines?

* The function affected
* Specific failure modes
* The effects of failures
* The causes of failures
* The required corrective actions
* All of these
* None of these

**Question 35 of 50**

Which of the following Design for Assembly guidelines are applicable to machined components?

* If all possible, avoid machining operations
* Specify the most liberal surface finish and tolerances
* Design a component so it can be machined using one tool only
* Design components to be easy to hold
* Use generous fillers and chamfers
* All of these
* None of these

**Question 36 of 50**

The Red Bead experiment illustrates the effects of not understanding the methods and principles of SPC:

* True
* False

**Question 37 of 50**

Which of the following apply to the Failure Risk Assessment and Risk Management?

* Identify the objectives of analysis
* Identify failure modes
* Model the failure logic
* Compute expected values
* Decide on mitigation
* All of these
* None of these

**Question 38 of 50**

Design perfection is achieved not when there is nothing more to add, but rather when there is nothing more to take away (and still hear the V of C):

* True
* False

**Question 39 of 50**

A Bill of Material is:

* A permission to load explosives on a truck
* A list of all the parts that are needed to make a product
* Another name for the cost of goods sold
* None of these
* All of these

**Question 40 of 50**

The rule of thumb states: Eighty percent of cost is typically incurred by 20% of components:

* True
* False

**Question 41 of 50**

A company is making 100,000 identical units of plastic handles. Each handle is a few inches long. Which manufacturing technology would be the most appropriate one?

* 3D printing
* Metal stamping
* Injection molding
* Hand carving
* None of these
* All of these

**Question 42 of 50**

Should you design a part in such a way that it must be repositioned often during its assembly process?

* No
* Yes

**Question 43 of 50**

Assume that you are a manager at "Steelcase". What would your biggest concern about Ecovative's product be?

* Smell
* Moisture resistance
* Customer acceptance
* Staining
* All of these
* None of these

**Question 44 of 50**

An inaccurate model is inaccurate no matter how small the variation:

* True
* False

**Question 45 of 50**

Which of the following are guidelines for evaluation of component mating?

* Design components to mate through straight-line assembly.

All from the same direction.

* Make use of chamfers and leads to facilitate proper insertion

and alignment

* Maximize component accessibility
* All of these

**Question 46 of 50**

You are deciding how to make a bookshelf at the lowest possible cost. Which of the following would you take under consideration?

*  Material Cost vs. Material Strength
* Available small run manufacturing techniques
* Environmental impact
* All of these
* None of these

**Question 47 of 50**

Costs generally increase exponentially with tighter tolerances:

* True
* False

**Question 48 of 50**

Which of the following are the Design for Assembly guidelines?

* Overall component count should be minimized
* Use the minimum number of separate fasteners
* Design the product with a base
* Do not require the base to be repositioned during assembly
* Make the assembly sequence efficient
* All of those
* None of those

**Question 49 of 50**

The Japanese manufacturing philosophy is: "good enough"- this is why the tolerances are specified:

* True
* False

**Question 50 of 50**

Is this statement true: a single part costs nothing to assemble?

* True
* False

**End of this test**