

Student Number: _____ Name: _____

CAD

1. Explain the biggest advantage of visualizing the design concept in three dimension using 3D CAD system instead of 2D CAD system.
 - *To use the 3-D data in downstream application like NC, inspection and etc.*
 - *For easy understanding*
2. What is the advantage of using the parametric modeling capability of a solid modeling system in visualizing a design concept?
 - *Model is created by using the geometric constraints and dimensional data, so it is easy to modify the model*
3. Describe the advantage of non-manifold modeling systems over conventional solid modeling systems.
 - *Conventional solid modeling system only allows complete modeling, not allow partial modeling. However non-manifold modeling makes all the combination of solid / surface / wireframe modeling.*
4. List the advantage of using NURBS curve instead of Bezier curve.
 - *Conic curve can be represented exactly*
 - *Curve shape can be changed by changing the weight (h_i)*
 - *Increasing weight has an effect of pulling curve toward associated CP (local – modification)*
5. What is the most popular value of the order of B-spline curve and its reason?
 - *$k=4$, Satisfy the C2 Continuity*

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CAM

6. Explain the function of each character in the NC code.

- *N: Line number*
- *M: Miscellaneous commands*
- *G: Prepare the controller for a given operation*
- *F: Cutter feed rate*
- *S: Specify spindle speed*
- *T: Tool selection command*

7. Describe briefly the reverse engineering.

Three-dimensional data which is captured in computerized form from physical models or products

8. Explain briefly the advantages and disadvantages of rapid prototyping (two items each)

- *Advantages:*

- No need to define a blank geometry*
- No need to define set-ups and material handling*
- No need to consider jigs, fixtures, and clamping*
- No need to design mold and die*

- *Disadvantages:*

- Stair-step, expensive, low accuracy, need to post-process, limitation of materials, low mechanical strength*

9. List the “general principles” of DFM (list 4 items).

- *Minimum number of parts*
- *Standard parts*
- *Modular design*
- *Multi-functional parts*
- *The same parts to various products*
- *Maximum surface roughness and tolerance*
- *Avoid secondary process*
- *Use materials easy to manufacture*
- *Consider number of parts to be manufactured*
- *Avoid many components*
- *Minimize handling of parts*