06.12.11 Quiz, CAD/CAM

Student num.:_____ **Name:**_____

Write you answers for the each question.

[CAD]

1. Among the roles of CAD system in a product development cycle, which is the most important role and why?

Design geometry. Because you can't proceed the product development cycle without well-defined geometry.

2. List commercial CAE tools you know.

COSMOSWorks, ANSYS, LS-Dyna, Abaqus, MADYMO, PAM-CRASH.

NOT : Autodesk, UG-NX, SolidWorks, CATIA, PRO-E, Delmia

3. Describe the advantage of non-manifold modeling systems over conventional solid modeling systems.

Conventional solid modeling system only allow complete modeling, not allow partial modeling. However non-manifold modeling makes all the combination of solid / surface / wireframe modeling.

4. Answer the following questions for a non-periodic B-spline curve of order 3 defined by control points, $\mathbf{P}_0, \mathbf{P}_1, \mathbf{P}_2, \mathbf{P}_3$.

    (a) Determine the knot values. *t_0=0, t_1=0, t_2=0, t_3=1, t_4=2, t_5=2, t_6=2*

    (b) How many different curves is the B-spline curve composed of? *2 curves*

06.12.11 Quiz, CAD/CAM   **Student num.:**＿＿＿＿＿ **Name:**＿＿＿＿

Write you answers for the each question.

 [CAM]

5. For **injection molding**, describe potential change in original design from the view point of **Design for Manufacturing**. In other words, what would you consider in redesigning if the manufacturing process is decided to be injection molding.

- Draft angle: if the angle of wall is smaller than 0, the manufactured part cannot be pulled out from the mold house.

- Shrinkage: after cooling, the entire product volumes are decreased by material's properties.

6. Explain the following terminology in the **CAM (Computer-Aided Manufacturing)**.

> - Face cut (or Facing):
>
> *Milling of flat plane of part, for the accuracy of plane.*

> - Rough cut (or roughing):
>
> *Machining entire roughly shape of part with low accuracy*

> - Finish cut (or finishing):
>
> *Machining the part with high accuracy for the final design.*

7. Describe advantages and disadvantages of **Rapid Prototyping technology** compared with **conventional CNC machining (milling) technology**.

Pros: Able to make complex geometry

> *Able to work without zigs or fixtures*
>
> *Able to make with undercut volume in the deposition direction*

Cons: more expensive than conventional CNC machining

> *Selective materials are limited.*