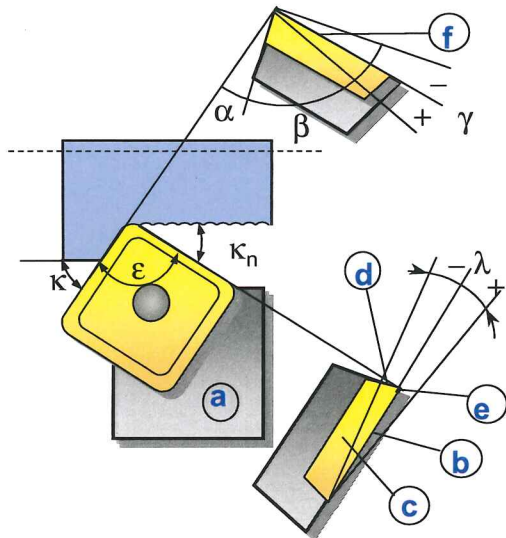


MEC-E7002 Manufacturing methods I
25.5.2018

Answer shortly, use clear and readable fonts.

1. Name a) major cutting edge, b) relief (clearance) angle, c) rake angle. Explain the purpose and effect of each to the cutting (chip removal) and tool strength.



2. Explain basic automation issues for machine tools. Describe typical automation techniques for turning and milling machines. In other words: What are the objectives of automation and which practical solutions are targeted at them?

3. Fill in the following table concerning characteristics of cutting tool materials so, that 1 = largest, 3 = smallest and 2 = in between.

Mater./Char.	Hardness	Toughness	Heat resistance	Density	Modulus of elasticity
Tungsten carbide (WC)					
High speed steel (HSS)					
Ceramic					

4. Describe shortly (Related machine and/or method, resulting product or feature, main characteristics from application point of view):

- Press brake
- Turret punch press
- Progressive die
- Transfer tool
- Deep drawing

5. Describe shortly (tool and method, resulting feature or quality):

- STS drilling
- Boring
- Honing
- Broaching
- Reaming