8. Manufacturing Processes

Starter Quiz ·

University Mechanical Engineering Name: _____ Score: _____

1. Hole 30.000-30.021 mm, shaft 29.980-29.993 mm: maximum clearance (micrometres)?

   _____ um

2. Casting modulus of a 200 x 100 x 20 mm plate (two decimals, mm)?

   _____ mm

3. Spindle speed for a 50 mm bar at 150 m/min (rpm, whole number)?

   _____ rpm

4. Throat of a 6 mm equal-leg fillet (two decimals, mm)?

   _____ mm

5. Layers in a 60 mm part at 0.2 mm?

   _____

6. Re-centring the grinder changes:

   ☐ Cp but not Cpk

   ☐ both

   ☐ Cpk but not Cp

   ☐ neither

7. RSS gives a smaller stack than worst case because:

   ☐ all parts at their worst limit together is rare

   ☐ worst case double-counts

   ☐ RSS ignores some parts

   ☐ RSS uses smaller tolerances

8. A riser must:

   ☐ sit at the thinnest section

   ☐ freeze after the casting

   ☐ freeze before the casting

   ☐ be as small as possible

9. Halving the feed makes the roughness:

   ☐ the same

- ☐ double
- ☐ a half
- ☐ a quarter

10. Doubling the overlap of a lap bond:
    - ☐ exactly doubles it
    - ☐ has no effect
    - ☐ raises strength by less than double
    - ☐ halves it

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Answers ·

University Mechanical Engineering

1. **41 um**

   Largest hole minus smallest shaft.

2. **7.69 mm**

   V over A = 400 000 over 52 000.

3. **955 rpm**

   1000 v over pi D.

4. **4.24 mm**

   0.707 times 6.

5. **300**

   60 over 0.2.

6. **Cpk but not Cp**

   Cp depends only on the spread.

7. **all parts at their worst limit together is rare**

   Independent errors partly cancel.

8. **freeze after the casting**

   It feeds shrinkage only while it is still liquid.

9. **a quarter**

   R_a grows with f squared.

10. **raises strength by less than double**

    The stress peaks at the overlap ends.