Worked-Out Solutions – CNC Practice Test

1. Chamfer .100 x 45°

   Solution: Length = $\sqrt{.100^2 + .100^2}$ = $\sqrt{(0.01 + 0.01)}$ = $\sqrt{0.02} \approx 0.141$ in

2. Tool travels 12 in X, 5 in Y

   Solution: Angle = $\tan^{-1}(5/12) \approx 22.62°$

3. Diagonal of 3x4 part

   Solution: Diagonal = $\sqrt{(3^2 + 4^2)}$ = $\sqrt{(9 + 16)}$ = $\sqrt{25}$ = 5 in

4. Drill at 15°, vertical depth 1.5 in

   Solution: Horizontal = 1.5 / tan(15°) $\approx$ 1.5 / 0.2679 $\approx$ 5.60 in

5. Radius of 1.250 in diameter

   Solution: Radius = 1.250 / 2 = 0.625 in

6. G83: Peck 0.100, Z-1.000

   Solution: 1.000 / 0.100 = 10 pecks

7. Flatness .003 in

   Solution: Tools: Surface plate + dial indicator

8. G54 purpose

   Solution: Sets work coordinate system origin

9. 2.500 ± .010

   Solution: Range = [2.490, 2.510]

10. Decimal of 3/16

    Solution: 3 ÷ 16 = 0.1875

11. 4 slots of .750

    Solution: 4 x .750 = 3.000 in

12. 0.060

Solution: Shop lingo: sixty thousandths

13. 0.995 in feature vs 1.000 ±.010

   Solution: Range = [0.990, 1.010]; 0.995 is within spec

14. Spindle speed 4000

   Solution: Code: S4000 (used with M03)

15. Cosine 60° usage

   Solution: $\cos(60°) = 0.5$; find adjacent in right triangle

16. Move from (0,0) to (6,8)

   Solution: Distance = $\sqrt{6^2 + 8^2} = \sqrt{100} = 10$ in

17. G90

   Solution: Absolute positioning mode

18. 2.0 in stick-out

   Solution: Risk: chatter, tool deflection

19. G95 F.008

   Solution: Feed = 0.008 in/rev

20. 1.000 ±0.005

   Solution: Range = [0.995, 1.005]

21. G00 Z2.0 after drilling

   Solution: Rapid retract to Z = 2.0

22. Taper 0.5 Z over 6 in

   Solution: Angle = $\tan^{-1}(0.5/6) \approx 4.76°$

23. Drill point at (3,4)

   Solution: Radial = $\sqrt{3^2 + 4^2} = \sqrt{25} = 5$ in

24. G43 H02 Z.1

   Solution: Apply H02 tool offset, move to Z = 0.1

25. G28

Solution: Returns axes to machine zero/home

26. Measured 0.998, tol ±0.003

Solution: Range = [0.997, 1.003]; 0.998 is in spec

27. Tangent 45°

Solution: $\tan(45°) = 1$; used for 1:1 slope calculations

28. Bore 1.500 ± .002, part = 1.502

Solution: Range = [1.498, 1.502]; accepted

29. 30° to X, X travel = 10

Solution: $Z = 10 * \tan(30°) = 10 * 0.577 \approx 5.77$ in

30. Improper coolant

Solution: Overheating, tool wear, poor surface finish