CHAPTER 6

FUNDAMENTALS OF METAL CUTTING

Questions:

1. Show with the aid sketch the specification of centre lathe.
2. List the cutting conditions that required driving the cutting tool to produce the desired machined surface in turning operation.
3. List the components that carried out the following motions in lathe machine: feed, speed, and depth of cut.
4. Show a labeled sketch of workpiece fixed between centers.
5. What is the difference between the right-hand and left-hand single point cutting tools.
6. Show with the aid sketch the clearance and rake angles of a general-purpose, high-speed steel single-point turning tool.
7. Define the back-rake angle and front clearance angle of single-point turning tool.
8. Sketch a single edge cutting tool and label the a) face, b) flank, c) nose, d) cutting edge, e) shank.
9. Sketch a workpiece fixed by chuck only.
10. Illustrate with the aid of sketch the direction of feed motion in longitudinal, cutoff, and face turning processes.
11. Calculate the revolutions per minute (rpm) of a lathe machine that required to turning steel bar with 32 mm diameter at 17 m/min cutting speed. (Ans. N=169 rpm)
12. What spindle speed would be required to turn a 200 mm diameter cast-iron component using HSS cutting tool at a cutting speed of 28 m/min. (Ans. N=45 rpm)
13. What is the cutting time in minutes for one pass over a 67-mm length of 53.3 mm diameter rod when the allowable cutting speed is 26 m/min with a feed of 0.12 mm/rev.?
14. Calculate the cutting time in turning operation for steel bar with 85 mm diameter and 144 mm length to 69 mm diameter. Given that: feed = 0.5 mm/rev., cutting speed = 28 m/min., permissible depth of cut = 4 mm.
15. State the effect of back-rake angle on the direction of chip flow.
16. Give a reason why the clearance angle on cutting tools should not be excessive.
17. Give a reason why the clearance angle on cutting tools should not be small.

18. Sketch one method of producing a taper on a centre lathe.
19. Explain the difference between the “live” and “dead” centers.
20. What is the purpose of a gap bed on a centre lathe?
21. What type of work can best be carried out on a faceplate and how would it be held in position.
22. Explain with the aid sketch why it is important to set the cutting tool on the centre lathe machine.
23. For what type of workpiece the collet chuck can be used in turning operation.
24. Describe the procedure on a centre lathe to produce a center hole in a workpiece.
25. State two uses of a tailstock on a centre lathe.
26. Calculate the cutting time in turning operation for steel bar with 100 mm diameter and 200 mm length to 88 mm diameter. Given that: feed = 0.2 mm/rev., cutting speed = 25 m/min., permissible depth of cut = 3mm (Fig. 6.26)

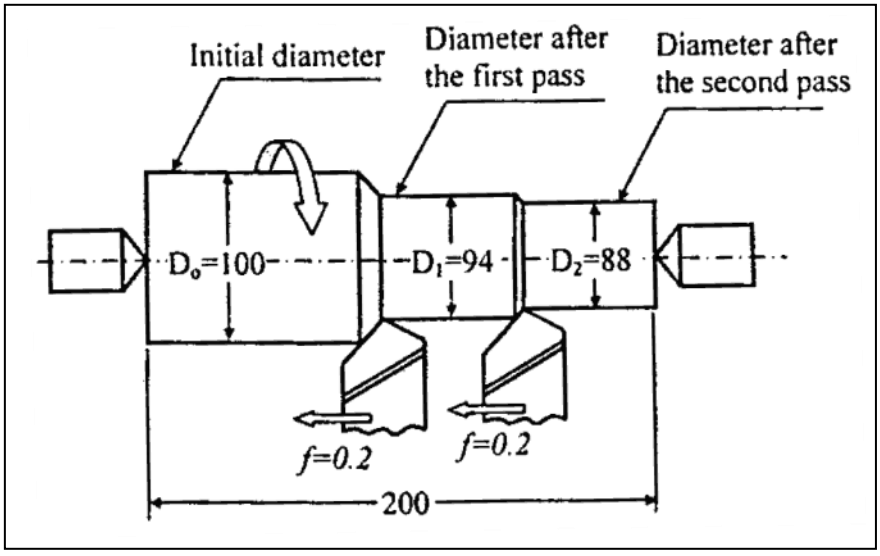

Fig. 6.33 Two passes turning.