Sheet (6)
CNC M/C Tools
Part program – Turning Machine

3- It is required to produce the workpieces show in the figures below . The machine used is a CNC turning machine has the following format:-

**N5 G3 X±3.3 Z±3.3 I±3.2 K±3.2 F4 S4 T4 M2**

- Suggest the required tooling for machining each part in a form of table and the proper machining values.

- Construct the part program.
- Calculate the production rate give that :
    - the ATC (automatic tool changer) capacity is 12 –station, and indexing time is 0.45s
    - the rapid traverse speed is 600 m/min.
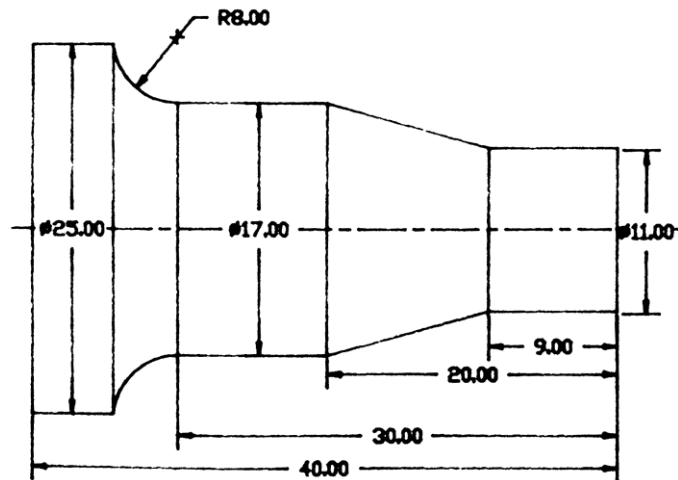
A)
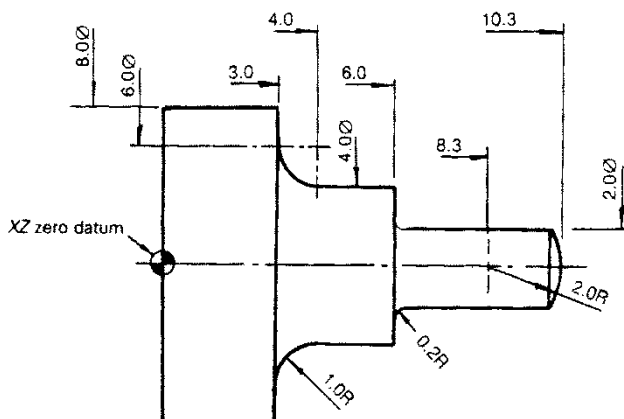
Workpiece Material is free cutting brass bar with 6 m length and 10 mm diameter.
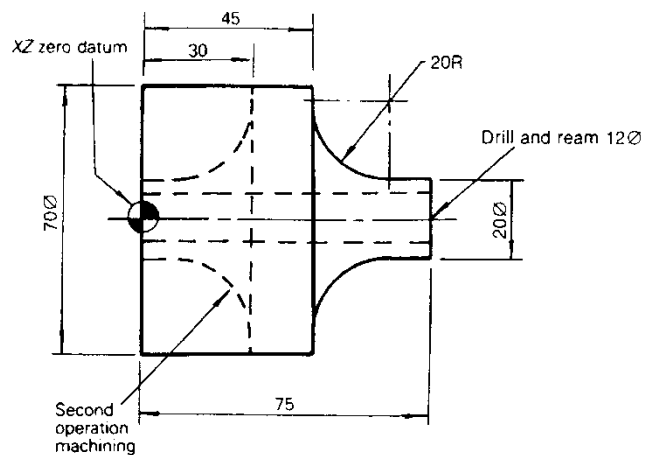
B)
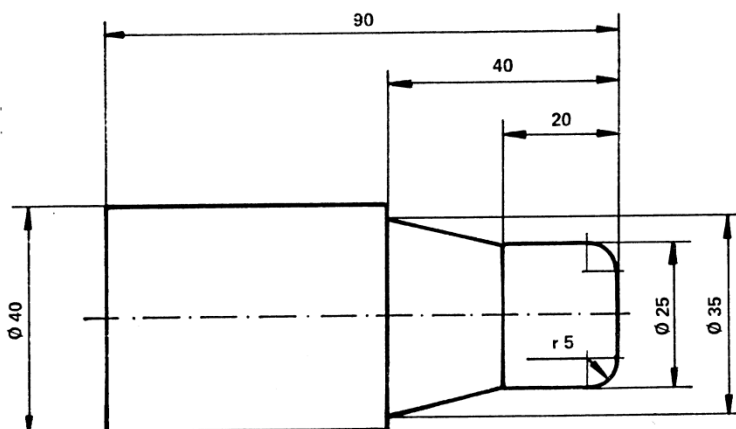
Workpiece Material is free cutting brass bar with 6 m length and 40 mm diameter.

C)

Workpiece Material is free cutting brass bar with 6 m length and 25 mm diameter.

D)

workpiece made from free cutting brass bar with 6 m length and a 70 mm diameter

Notes: The Machine uses   - G53 for Zero Offset off
                                  - G54 for Zero Offset #1
                                  - G55 for Zero Offset #2
                                  - G56 for Zero Offset #3
                                  - G57 for Zero Offset #4
                                  - G58 for Zero Offset #5
                                  - G59 for Zero Offset #6

Description of G Commands

Absolute and incremental measures for G00

G00 Positioning (Rapid Traverse)

Format
N.... G00 X(U)... Z(W)...

The slides are traversed at maximum speed to the programmed target point.
Incremental and absolute commands can be used at the same time.

Note
- A programmed feed F will be suppressed while G00.
- The maximum feed is defined by the producer of the machine.
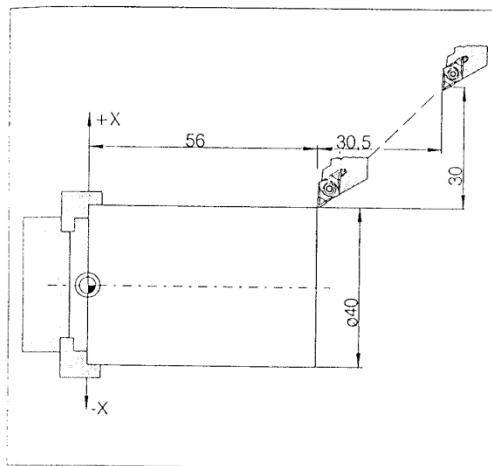- The feed override switch is limited to 100%.

Example

absolute G90
N50 G00 X40 Z56

incremental G91
N50 G00 U-30 W-30.5

S ...... Start point
E ...... End point

Absolute and incremental measures for G00

G01 Linear Interpolation (Feed)

Format
N... G01 X(U)... Z(W).... F....

Linear slide movements (face, longitudinal, taper turning) at the programmed feedrate.

Example

absolute G90
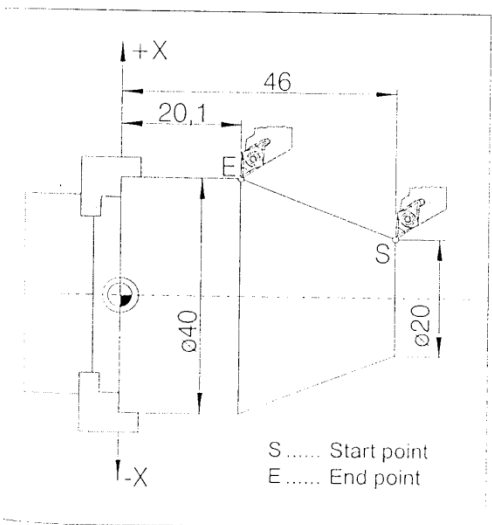N.. G95

.....
N20 G01 X40 Z20.1 F0.1

incremental G91
N.. G95 F0.1

.....
N20 G01 X20 W-25.9

D 3

EMCO