

Sheet (7)  
CNC M/C Tools  
Part program – Milling/Turning Machine

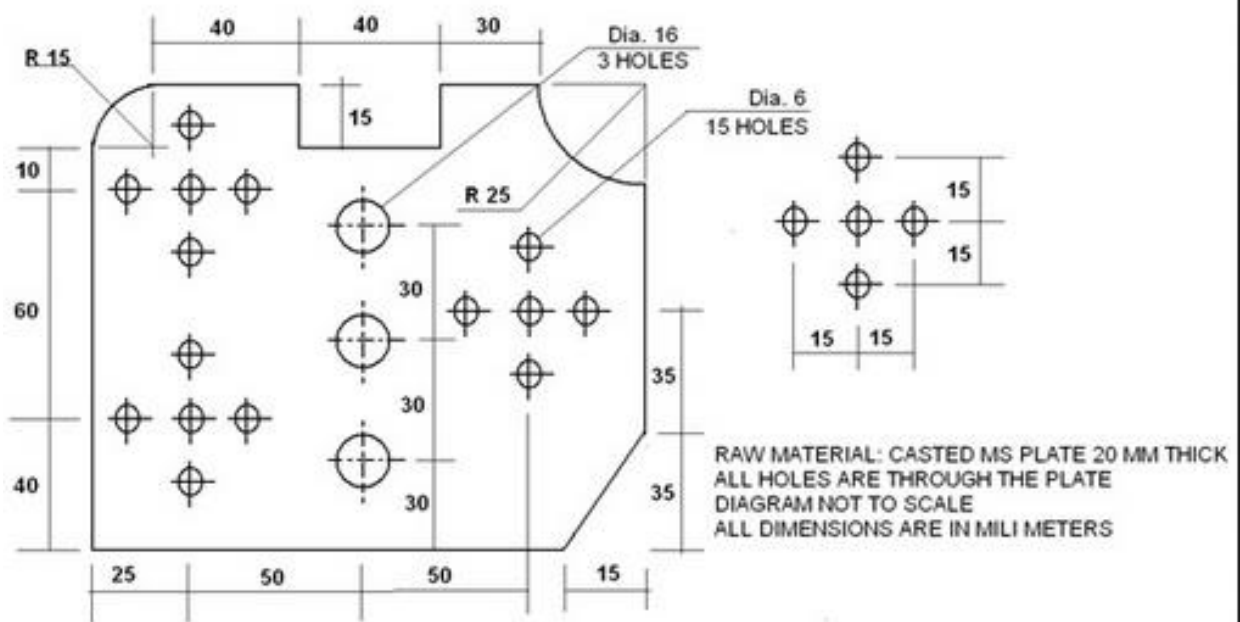
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1) Construct the part program for machining the part shown in figs below. The CNC milling machine has the following format:-  
N3 G2 X3.2 Y3.2 Z3.2 I3.2 J3.2 K3.2 F4 S4 T2 M2

given that the machine is equipped with the following tools:-

- C. carbide insert shell end mill 50 mm diam., five teeth, located in turret No.1.
- HSS slot drill 6 mm dia., located in turret No. 2.
- HSS end mill 12 mm diam located in turret No. 3.
- HSS end mill 3 mm diam located in turret No. 6.
- Twist Drill 6 mm diam located in turret No. 9
- Twist Drill 16 mm diam located in turret No. 4
- Center Drill No. 2 located in turret No. 5

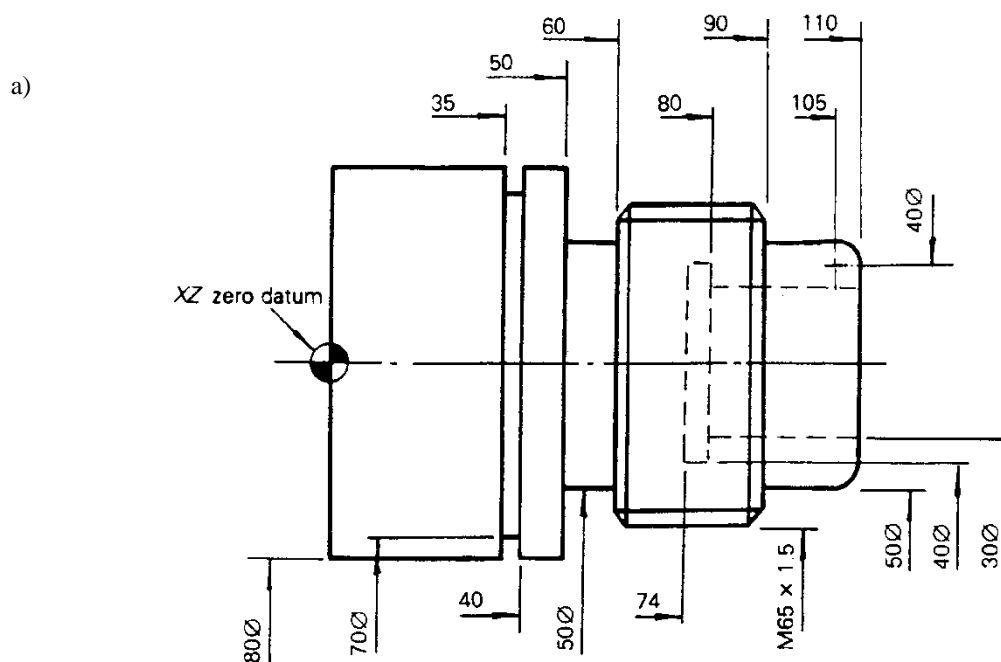
Assume that the top surface of the raw material is at 150 mm below Z zero, and the machine support the tool length and diameter compensation



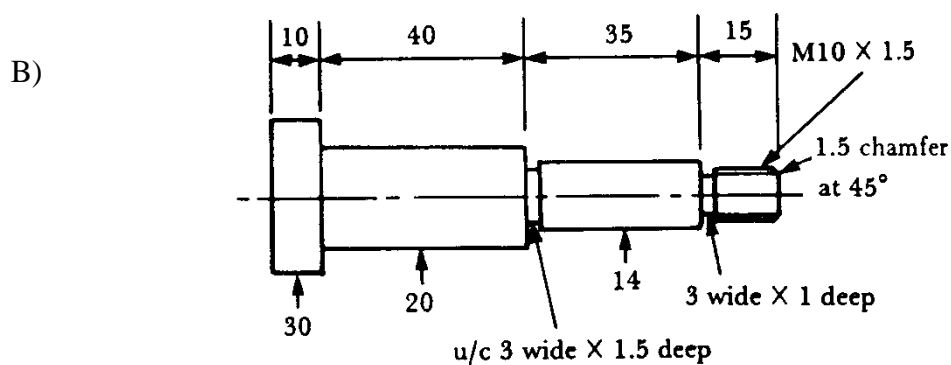
2- It is required to produce the workpieces show in the figures below . The machine used is a CNC turning machine has the following format:-

**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.



All dimensions in mm



Mild steel bar 30 diameter