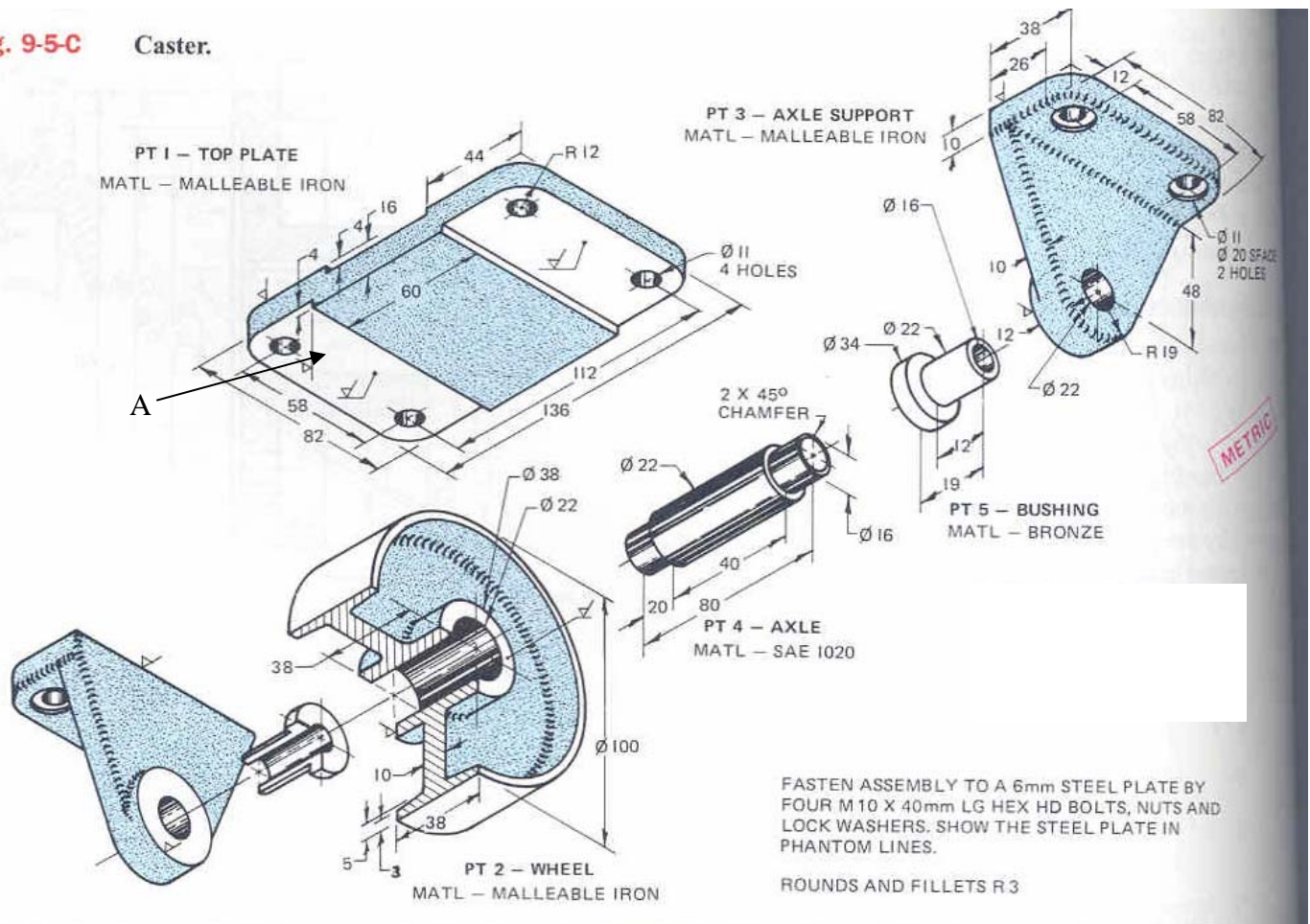


## MECH 313, Mid Term 2005

- 1) For the shown caster, assume that part 5 is medium press fitted into Part3. Use transition fit H7/k6 for parts 2 and 4. Fitting of parts 4 and 5 is a close-running fit. Holes in mentioned parts are finished using standard reamers.

**Fig. 9-5-C** Caster.



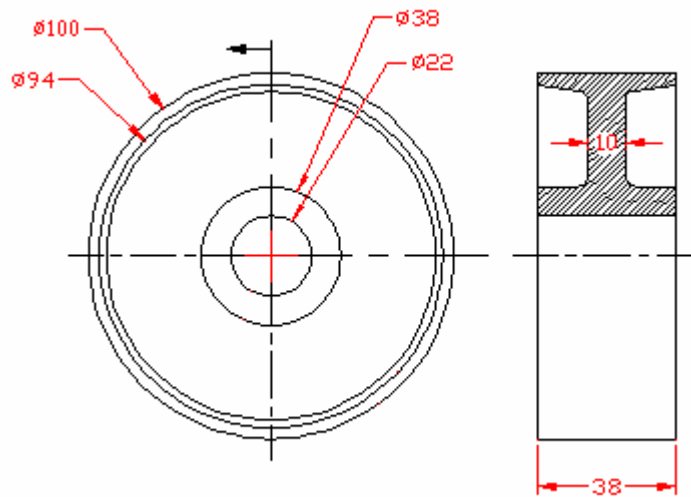
a) Fill out the following table:

Parts	2 (Ø 22)	3 (Ø 22)	4 (Ø 16)	4 (Ø 22)	5 (Ø 16)	5 (Ø 22)
Tolerance Symbol	H7	H7	f7	k6	H8	s6
Hole or shaft size (limits)	22.021 22.000	22.021 22.000	15.984 15.966	22.015 22.002	16.027 16.000	22.048 22.035
Tolerance on part	0.021	0.021	0.018	0.013	0.027	0.013

b) For the mating parts, calculate the clearance or interference. Show the required calculations and use one of the four terms “ min clearance, min interference, max clearance, max interference” in comment.

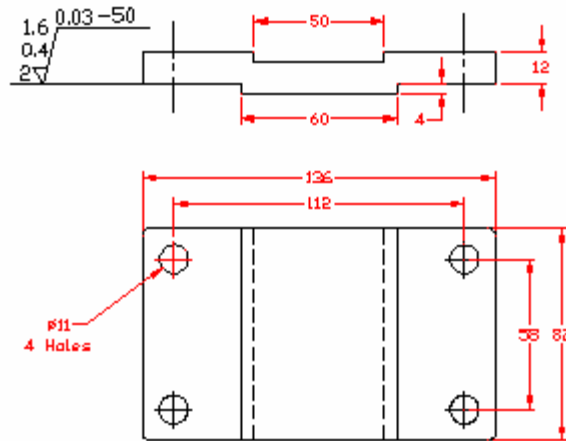
Mating parts	Fit symbol	Calculations	Comment	Calculations	Comment
2 and 4	H7/k6	$22.000 - 22.015 = -0.015$	Max interference	$22.021 - 22.002 = 0.019$	Max clearance
4 and 5	H8/f7	$16.000 - 15.984 = 0.016$	Min clearance	$16.027 - 15.966 = 0.061$	Max clearance
5 and 3	H7/s6	$22.000 - 22.048 = -0.048$	Max interference	$22.021 - 22.035 = -0.014$	Min interference

C) Make a two-view working drawing of the part 2 showing the side view in half-section

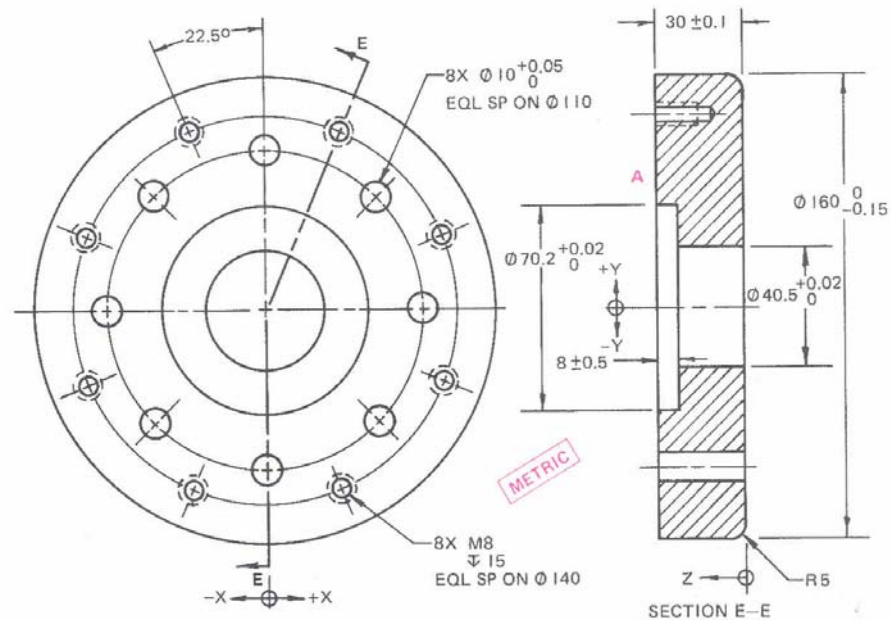


D) Make a two-view working drawing of part 1 and add dimensions to the part. Then add the following information on the part.

The amount of material to be removed on the surface A is 2 mm. Surface finish should have a maximum and minimum roughness values of  $1.6 \mu\text{m}$  and  $0.4 \mu\text{m}$ . Maximum waviness height of  $0.03 \text{ mm}$  for  $50\text{-}\mu\text{m}$  length.

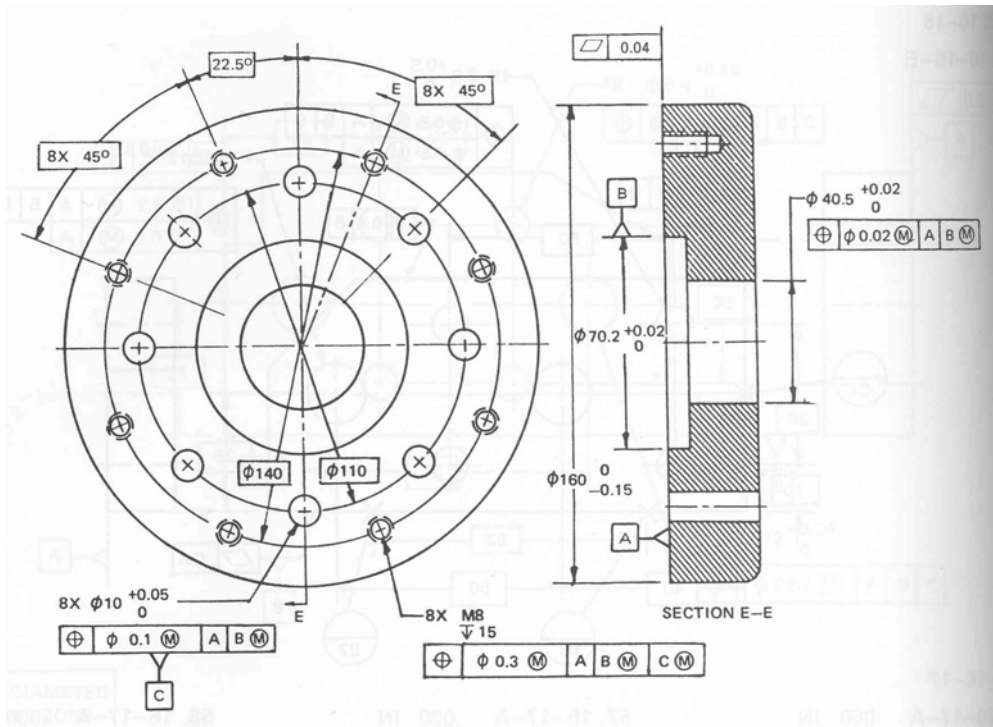


2)



- GEOMETRIC TOLERANCING REQUIREMENTS TO BE ADDED TO DRAWING**
- ALL DATUMS AND TOLERANCES TO BE ON AN MMC BASIS UNLESS OTHERWISE SPECIFIED
  - SURFACE A IS DATUM A AND HAS A FLATNESS TOLERANCE OF 0.04
  - THE  $\varnothing 70.2$  IS DATUM B
  - THE  $\varnothing 10$  HOLES ARE DATUM C
  - THE  $\varnothing 40.5$  IS TO HAVE A POSITIONAL TOLERANCE OF 0.02 REFERENCED TO DATUMS A AND B IN THAT ORDER

- THE M8 TAPPED HOLES ARE TO HAVE A POSITIONAL TOLERANCE OF 0.3 REFERENCED TO DATUMS A, B, AND C IN THAT ORDER
- THE  $\varnothing 10$  HOLES ARE TO HAVE A POSITIONAL TOLERANCE OF 0.1 REFERENCED TO DATUMS A AND B IN THAT ORDER



3. Complete the following table showing the maximum permissible tolerance zone for the three perpendicularity tolerances.

$\perp$	$\varnothing 0.03$	$(M) \varnothing 0.08$ Max	A
Feature Size, $\varnothing$	Diameter Tolerance Zone allowed		
36.00	0.03		
36.01	0.04		
36.02	0.05		
36.03	0.06		
36.04	0.07		
36.05	0.08		
36.06	0.08		
36.07	0.08		
36.08	0.08		

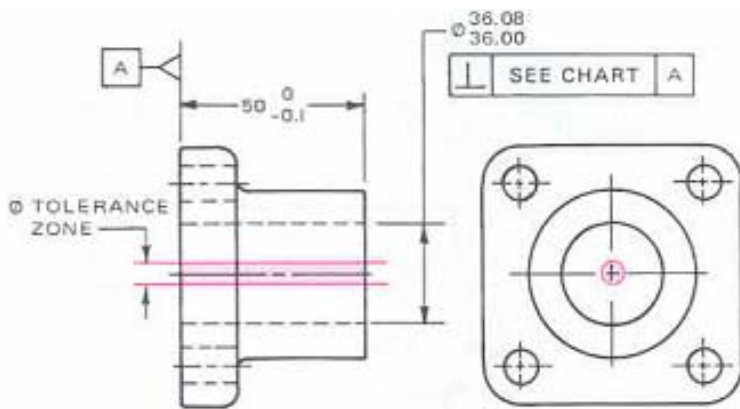


Fig. 16-8-A Pillow block.