

1- Figure 6-1 shows a double-reduction helical gearset. Pinion 2 is the driver, and it receives a torque of 135 N.m from its shaft in the direction shown. Pinion 2 has a normal module of 3 mm, 14 teeth, and a normal pressure angle of 20° and is cut left-handed with a helix angle of 30° . The mating gear 3 on shaft b has 36 teeth. Gear 4, which is the driver for the second pair of gears in the train, has a normal module of 5 mm, 15 teeth, and a normal pressure angle of 20° and is cut left-handed with a helix angle of 15° . Mating gear 5 has 45 teeth.

Find the magnitude and direction of the force exerted by the bearings C and D on shaft b if bearing C can take only radial load while bearing D is mounted to take both radial and thrust load.

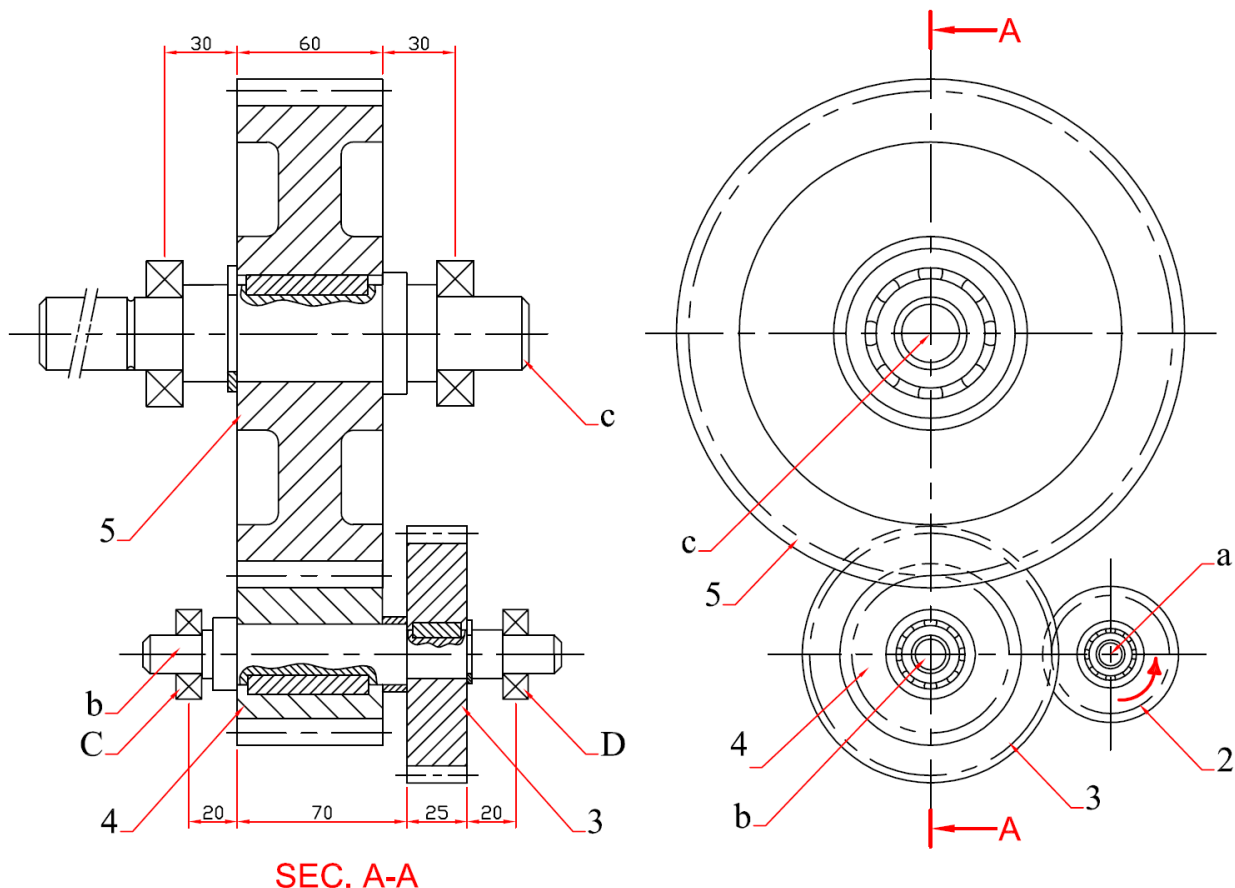


Figure 6-1

2- If the pinion described in problem 1 is running at 375 rpm, the gears are made of grade 1 steel, through-hardened at 200 Brinell, made to No. 6 quality standards, uncrowned, and are to be accurately and rigidly mounted. Assume a pinion life of 10^8 cycles, a reliability of 90% and a rim thickness of 20 mm (in gear 5).

Determine the AGMA bending and contact stresses acting on the gears and the corresponding factors of safety.