1- The gear train shown below (figure 7-1) consists of two stages. The first stage is a helical gear set while the second stage is a bevel gear set. The pressure angle (φ for spur bevel gears and φ_n for helical gears) is 20°.
Determine and show the magnitude and directions of the forces acting on the gears at the mesh points. The helical pinion 2 transmits 3 kW of power and rotates in the direction shown at 1500 rpm. Determine the reactions at bearings E an F.

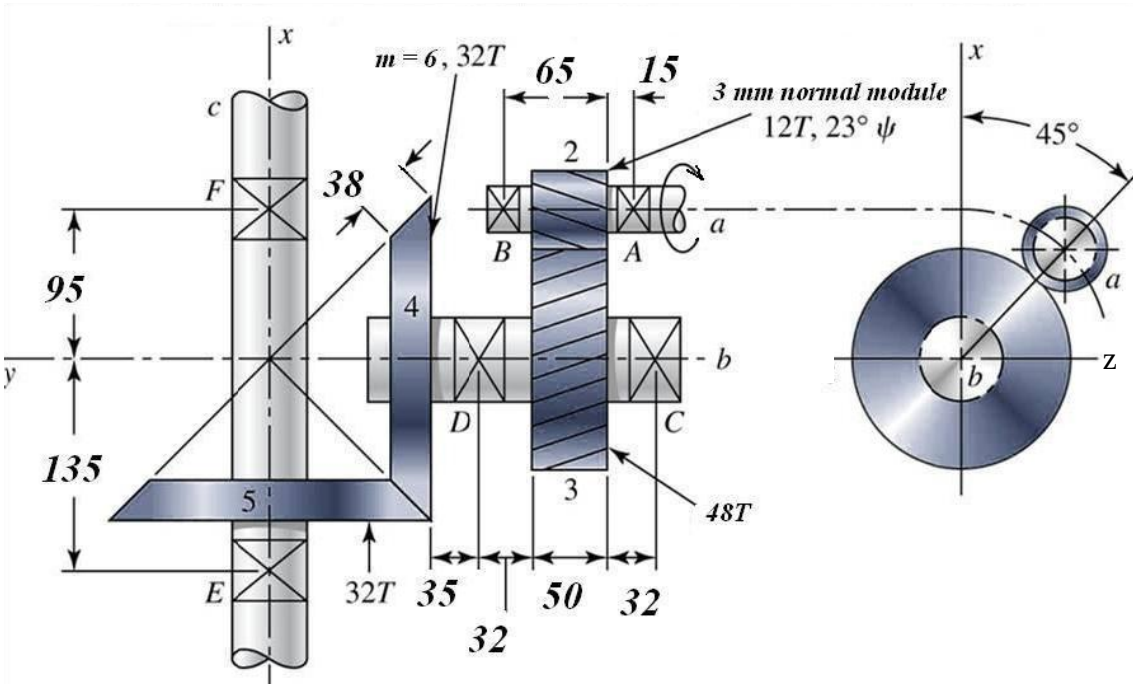

Figure 7-1

2- An uncrowned straight-bevel pinion has 22 teeth, a module of 4 mm, and a quality number 5. The pinion and the gear are made of grade 1 through-hardened steel, both having core and case hardnesses of 180 HB. The pinion speed is 1800 rpm and drives the 24-tooth bevel gear with a shaft angle of 90°. The face width is 25 mm, and the pressure angle is 20°. Both gears are outboard mounting.
Find the power rating of this gear set based on AGMA bending and pitting resistances if the expected service life is 10^9 revolutions of the pinion at a reliability of 0.999