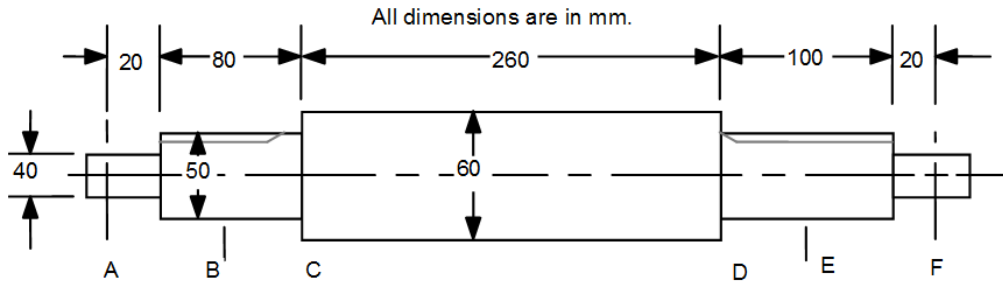
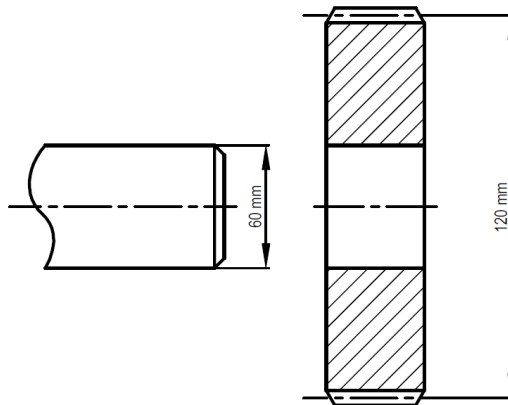


## TUTORIAL-Tolerances and Fits

**Problem 1:** The shaft shown in figure below has radial bearings bearing at A and F. The tolerance on the bore diameter of the bearings is  $\{0 ; 0.012 \text{ mm}\}$ . If the fit is of transition type, and the tolerance on fit ( $T_F$ ) is equal to 0.028 mm, determine tolerance range of the shaft and give its ISO designation.



**Problem 2:** A gear made from steel is to be assembled on a steel shaft with an interference fit. Nominal diameter of the shaft is 60mm and the pitch diameter of the gear is 120mm. The shaft and the gear hole are machined with IT5 and IT6 qualities respectively. If the fit is based on basic shaft system (BSS), determine the nearest standard fit if the minimum interference is 0.013 mm.



**Problem 3:** A shaft of 30 mm is machined to IT5 quality. A gear produced from cast iron is to be press-fitted over the shaft as shown in the figure below. The outside diameter of the hub of the gear is 50 mm. The minimum torque to be transmitted by the gear shaft assembly is 25 Nm. The maximum tangential stress in the gear hub is required to be 82 Mpa. Modulus of elasticities and poisson's ratios for cast iron and for steel are  $E_h=100\text{GPa}$  and  $E_s=207\text{GPa}$ ;  $\nu_h=0.211$   $\nu_s=0.3$  respectively. Determine the nearest standard fit using Basic Shaft System (BSS) if coefficient of friction,  $f=0.1$  and Length of the fit is 20mm.

