

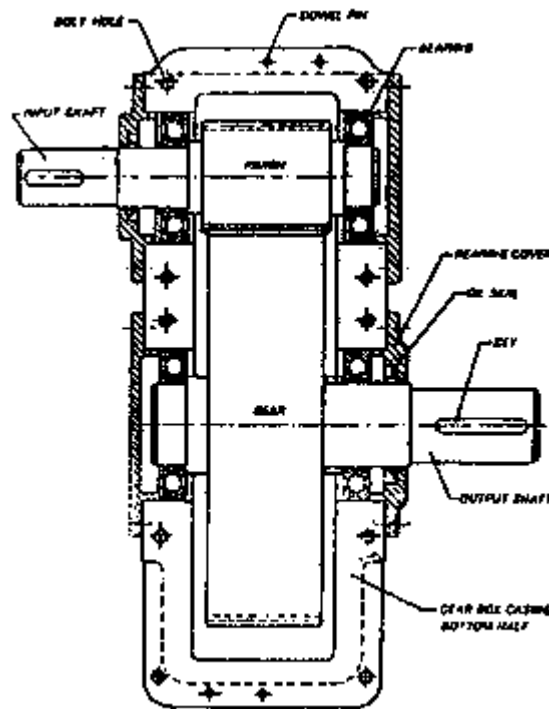
### Mid-Term Exam, Part (2)

It is required to design a single stage spur gear speed reducer as shown in Figure. Gears are made of 20<sup>0</sup> full-depth involute teeth. The input shaft rotates at 1200 RPM, and receives 250 hp from a turbo-charged six-cylinder diesel engine through a flexible coupling. The speed of the output shaft should be fixed at 400 RPM in order to drive a high capacity water pump.

#### **Requirements:**

- 1- Make a complete design of a pair of spur gears for this purpose.  
(Only the check on bending fatigue is required) **60%**
- 2- Design the pinion shaft. **15%**
- 3- Select proper deep Groove ball bearings for the input shaft.  
(Both bearings are identical). **25%**

Single Stage Speed Reducer



Assume any missing data

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