ASSIGNMENT: 1

1. What do you mean by interference and undercutting of gear? How it can be avoided?

2. What is contact ratio? How it can be increased?

3. Discuss causes & remedies of gear tooth failure.

4. A spur gear pair made of plain carbon steel 55C8 (σut = 720 N/mm2 and E = 210 GPa) is required to transmit 7.5 kw power from an electric motor running at 1440 rpm to a machine running at 370 rpm. The tooth system is 20o full depth involute and no. of teeth on pinion are as minimum as possible. The service factor and load concentration factor are 1.25 and 1.2 respectively. The factor of safety required is 1.25 to 1.5. The face width is twelve times the module. The gears are to be machined to meet the specifications of grade 7. Design the gear pair by using the velocity factor $Kv = 3/(3+v)$ and buckingham's equation for dynamic load. Suggest the case hardness for gear pair. Use the following relations.

5. A pair of spur gear with 20o full depth involutes teeth needs to be designed. Input shaft rotates at 800 rpm and receives 6 kW power. Speed reductions of output shaft by 5 times. Pinion and gear are made of steel with σut= 450 N/ mm2 service factor is 1.3. The gears are machined to accuracy of grade 10. Assume a pitch line velocity of 3.6 m/s and FOS is 2. Estimate the module of the gear teeth. Determine static and dynamic load from Spott's equation. Specify the surface hardness of gear teeth assuming that strength in bending is the same as strength in wear.