1	Design a spur gear pair from the following given data. Power to be transmitted = 20 kW, Pinion speed = 1440 rpm, Speed reduction =2.5, No. of teeth on pinion = 21, Service factor = 1.5, b= 10m, Pitch line velocity =5 m/sec (For initial calculation of module), Maximum permissible error in gear tooth profile = 0.025 mm, k = A factor depending upon the form of teeth = 0.111, Velocity factor = 3/ (3 + V), where V is the pitch line velocity in m/s. Take endurance surface hardness = 600 MPa Lewis form factor = 0.154 – 0.912/No. of teeth for 20_0 pressure angle involute tooth system. Assume Suitable Materials.
2	A pair of mating carefully cut spur gears has 20^0 full depth of 3 mm module. The number of teeth on pinion and gears are 38 and 115, respectively. The face width is 42 mm. If the pinion and gear are made of steel with $f_{b\ Static}$ = 233 MPa and surface hardness of 300 BHN. Calculate the safe power that can be transmitted when the pinion is run at 1440 rpm.
3	Design a spur gear pair to transmit 16 kW power from an electric motor shaft running at 1440 rpm to a machine shaft from the following specifications. Tooth system = 20_0 pressure angle full depth involute Number of teeth on pinion = 23 Speed reduction ratio = 3:1 Service factor = 1.3 Material of pinion and gear = FG 200 Design bending stress of material = 60 MPa Surface hardness of pinion and gear = 200 BHN Endurance strength of the material = 84 MPa Dynamic load factor = 178 N/mm Modulus of elasticity = 1.1 x 10_5 MPa Assume pitch line velocity as 7.5 m/sec for module calculation.
4	A pair of gears is to be designed to transmit 30kW power from a pinion running at 960rpm to a gear running at 320rpm. Design the gears so that they can last for 108 cycles. Assume 20^o full depth involutes spur gear for the system. Motor shaft diameter is 30mm
5	A spur gear having 22 teeth to be made of plain carbon steel 40C8 (Sut=580N/mm^2) is to be mesh with a gear having 88 teeth to be made of grey cast iron FG260(Sut=260N/mm^2).The pinion shaft is connected to 12KW,1440 rpm electric motor. The starting torque of the motor is approximately twice the rated torque. The tooth system is 20° full depth involute. The face width is 10 times module for which the load distribution factor is 1.4. The gears are to be machined to met the specifications of grade 7 for which deformation factor is 240 N/mm.