1st Class Test -5th Sem

Design of Machine Elements- I

Time: 90 Mins

MM: 30

Attempt any 03 questions.

Q-1 Design a Gib & Cotter joint to carry a maximum load of 35 KN. Assuming that the gib, cotter and rod are of same material and have the following allowable stresses: tensile= 20 MPa, Shear= 15 MPa, Crushing= 50 MPa 10

Q-2 Design a cast iron flange coupling to transmit 15 KW at 900 rpm. The service factor may be assumed as 1.35. The following permissible stresses may be used:

Shear stress for shaft, bolt and key material= 40 MPa

Crushing stress for bolt and key= 80 MPa

Shear stress for cast iron= 8 MPa 10

Q-3 A helical spring is made from a wire of 6 mm dia and has outside dia of 75 mm. If the permissible shear stress is 350 MPa and modulus of rigidity is 84 KN/ram^2, find the axial load which the spring can carry and the deflection per active turn. 10

Q-4 An engine developing 45 KW at 1000 rpm is fitted with a cone clutch. The cone has a face angle of 12.5^0 and a maximum mean diameter of 500 mm. The c.o.f is 0.2. The normal pressure on clutch face is not to exceed 0.1 N/mm^2. Determine: 1 the face width required, and 2 the axial spring force necessary to enlarge the clutch. 10

Q-5 Design a transmission shaft considering torsion, bending and axial loading. 10