

24258

B. Tech. 5th Semester (ME) Examination,
December-2015

MECHANICAL MACHINE DESIGN-I

Paper-ME-303-F

Time allowed : 4 hours] [Maximum marks : 100

Note : (i) Question No. 1 is compulsory. Attempt at least one question from each section.

(ii) Design Data books PSG C T C Mahadevan are only permitted.

1. Write short notes on following :

- (i) Self Locking Brakes
- (ii) Material properties of material.
- (iii) Manufacturing consideration in Design.

Section-A

2. (i) Discuss the feasibility Study in detail and its various types. 10
- (ii) Discuss various properties of materials. 10
3. Calculate the tolerances fundamental deviation and limits of sizes for the shaft designated as 40 H8 / F7.

24258-P-3-Q-9 (15)

[P.T.O.]

Section-D

(3)

8. A single plate clutch, effective on both sides is required to transmit 25 kW at 3000 r.p.m. Determine the outer and inner diameter of frictional surface if the co-efficient of friction is 0.255, ratio of diameters is 1.25 and the max. pressure in not to exceed 0.1 N/mm^2 . Also determine the axial thrust to be provided by springs. Assume the theory of uniform wear.
9. Design a cone clutch considering uniform pressure and uniform wear theory.

Section-B

(2)

4. A double riveted lap joint with Zig-Zag riveting is to be designed for 13 mm thick plates. Assume, $t = 80 \text{ MPa}$, $\tau = 60 \text{ MPa}$ and $\sigma_c = 120 \text{ MPa}$, state how the joint will fail and find the efficiency of the joint.
5. Design a knuckle joint to transmit 150 kN. The design stresses may be taken as 75 MPa in tension, 60 MPa in shear, and 150 MPa in compression.

6. Design a damp coupling to transmit 30 kW at 100 r.p.m. The allowable shear stress for the shaft and key is 40 MPa and the no. of bolts connecting the two halves are six. The permissible tensile stress for the bolt is 70 MPa. The co-efficient of friction b/w muff and the shaft surface may be taken as 0.3.
7. Design and draw a cast iron flange coupling for a mild steel shaft transmitting 90 kW at 250 r.p.m. The allowable shear stress in the shaft is 40 MPa and the angle of twist is not to exceed 1° in a length of 20 diameters. The allowable shear stress in the coupling bolts is 30 MPa.