Code: 9A03605

R09

B.Tech III Year II Semester (R09) Supplementary Examinations May/June 2017
DESIGN OF MACHINE ELEMENTS – II
(Mechanical Engineering)

Time: 3 hours   Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks
Use of design data books is permitted in the examination hall
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1 (a) Name the commonly used bearing materials with their properties and limitations for sliding contact bearings.
   (b) How the sliding contact bearings are classified?

2 (a) What is the main function of cylinder and piston in I.C engine?
   (b) How would you reduce the distortion of the liners?

3 (a) Write assumptions in design of centre crank shaft.
   (b) Design a centre crank for a single acting 175 mm x 175 mm stroke air compressor working at 360 rpm. The maximum pressure on the cylinder is 0.7 N/mm^2. Select suitable material and factor of safety.

4   Determine the load carrying capacity of a hoop of rectangular cross-section. The thickness of the hoop is 6.5 mm; the radius of the inner fibers is 100 mm, while that of the outer fibers is 200 mm the line of action of the force passes at a distance of 65 mm from the inner fibers. The allowable stress is 80 MN/m^2.

5   A V-belt drive is used to connect two shafts 1 m apart for transmitting 75 kW at 1200 r.p.m of a driver pulley. Take effective diameter of driver pulley = 300 mm, effective diameter of drive pulley = 900 mm, coefficient of friction = 0.25, density of the belt material = 1100 kg/m^3, the angle of groove = 40^0, area of the belt section is 400 mm^2 and permissible stress is 2.46 Mpa. Calculate the number of belts required and the length of belt.

6   A non metallic pinion is to transmit 10 kW at 940 r.p.m the teeth are 20^0 full depth involute form. The static strength for the non-metallic pinion may be taken as 40MPa. Determine proper module for the pinion and the face width.

7   A spring is subjected to a variable load varying from 500 N to 900 N. Determine the diameter of wire and mean diameter of the coils. Take factor of safety as 1.5. Assume the other needed date for the solution.

8   ASME threads are used in a lead screw of a lathe. Acme threads have 50 mm outside diameter and 8 mm pitch. The axial pressure required from lead screw is 2250 N. The collar subjected to thrust in the carriage has 110 mm outside diameter and 55 mm inside diameter and the lead screw rotates at 45 r.p.m. Determine: (i) The power required to drive the lead screw. (ii) The efficiency of the lead screw. Take μ for screw as 0.15 and that for collar as 0.12.

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