Roll No .....

MMPD - 102

M.E./M. Tech., I Semester

Examination, December 2015

Advance Machine Design

Time : Three Hours

Maximum Marks : 70

Note: i) Use of machine design data book is permitted.
ii) Solve any five questions.
iii) All questions carry equal marks.

1. Design a mechanism when the motion of the input and output link is governed by $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ where x and y vary between 0-4 with an interval of 0.75 units. Make suitable assumptions.

2. A pinion with 200mm pitch circle diameter running at 2000r.p.m. transmits 12.5 kW of power to gear whose pitch circle diameter is 600mm for straight tooth, the pressure angle being 20°. Determine:
   a) Torque on the driving shaft
   b) Torque on the driven shaft
   c) Transverse bending force on the shafts
   d) The tangential force

3. A cam drives an offset flat face follower with S.H.M. for a rise of 100mm. The follower moves out and returns in one revolution without any dwell. The base circle diameter is 25mm and offset is 10mm. Calculate the theoretical length of the follower face.

4. Determine the lengths of the links of a 4-bar linkage to generate $y = \log_{10} x$ in the interval $1 < x < 10$. Assume length of the smallest link = 50mm. Use three accuracy points with Chebyshev's spacing.

5. Design the kinematic arrangement of a Gear-Train having gears of less than 100 teeth to give a train value of 0.716243 within an accuracy of 1 in 100000.

6. Obtain the pitch curve for the mating gears which is to mesh with an elliptical gear. Also discuss the procedure for determining the pitch curves of non-circular spur gears with constant centre distance.

7. What shall be the addendum of each gear in terms of circular pitch? When two equal straight tooth involute spur gears having 30 teeth each and standard pressure angle of 20°. Assume Arc of contact = 2× circular pitch.

8. Write short notes on any two of the following:
   a) Disc cam and its applications
   b) Conjugate tooth action and its properties
   c) Polydyne cam
   d) Different types of kinematic synthesis

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