PARUL UNIVERSITY
FACULTY OF ENGINEERING & TECHNOLOGY
M.Tech. Winter 2018-19 Examination

Semester: 1   Date: 13/12/2018
Subject Code: 203217135   Time: 10:30 am to 01:00 pm
Subject Name: Analysis and Synthesis of Mechanisms   Total Marks: 60

Instructions:
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 A) Derive freudenstein's equation for four bar mechanism.   **(05)**
　　　B) Explain types of errors.   **(05)**
　　　C) Explain Hartman Construction.   **(05)**

Q.2 **Answer the following questions**. (Attempt any three) (Each five mark)   **(15)**
　　　A) Explain Graphical method for determining three precision points.

　　　B) What do you understand by coupler curves? Describe the method of obtaining the co-ordinates of
　　　　　a coupler point in a slider crank mechanism.

　　　C) What is Chebychev spacing? What is its significance?

　　　D) Define: Function Generation, Path Generation and motion generation.

Q.3 A) Determine the proportions of four bar mechanism, by using three precision points, to generate y=   **(07)**
　　　　$x^{1.5}$, where x varies between 1 and 4. Assume θs= 30° ; Δθ = 90° ;ϕs = 90° ; and Δϕ= 90° . Take
　　　　length of the fixed link AD as 25 mm.

　　　B) Derive Euler savary equation.   **(08)**

OR

　　　B) *A* quick return mechanism of the crank and slotted lever type shaping machine is shown in Fig.   **(08)**
　　　　The dimensions of the various links are as follows: O_1O_2= 800 mm; O_1B = 300 mm; O_2D = 1300
　　　　mm; DR = 400 mm. The crank O_1B makes an angle of 45° with the vertical and rotates at 40 r.p.m.
　　　　in the counter clockwise direction. Find: (1) velocity of the ram R, (2) angular velocity of link O_2D.
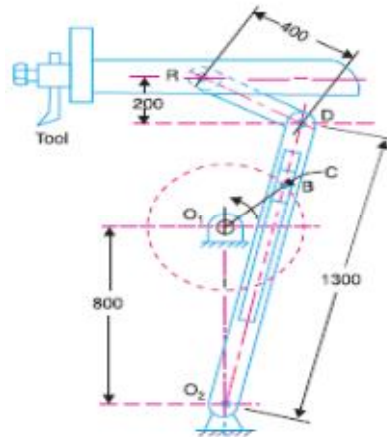
Q.4 A) Steps to solve three position synthesis by relative pole mehods.   **(07)**

OR

　　　A) What is Kinematic Pair? Give Classification   **(07)**
　　　B) Synthesis a four bar mechanism for the following position of input and output link.   **(08)**

$$\theta_1 = 36.02775^0, \phi_1 = 65.0274^0$$

$$\theta_2 = 75^0, \phi_2 = 101.7636^0$$

$$\theta_3 = 113.97^0, \phi_3 = 143.2664^0$$

　　　Draw the mechanism; take fixed link as 1 unit.