Total No. of Questions : 10]

SEAT No. :

P4564

[Total No. of Pages : 3

[4760]-126

M.E. (Mechanical) (Design Engineering)

ANALYSIS AND SYNTHESIS OF MECHANISMS

(2008 Course) (Semester - II) (502210)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answer any three questions from each section.***
2) ***Answers to the two sections should be written in separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Use of electronic pocket calculator is allowed.***
5) ***Assume suitable data, if necessary.***
6) ***Figures to the right indicate full marks.***

SECTION - I

Q1) a) Distinguish between simple & complex mechanism. Explain function generation and path generation. **[8]**

b) Explain clearly with sketches the 'Method of Normal acceleration', stating the principles on which it is based, and by taking an example of a complex mechanism. What are the limitations to the applicability of the method. **[8]**

Q2) a) Explain type, number and dimensional synthesis. Explain Kutzbach criterian for spacial mechanisms. **[8]**

b) Explain the matrix method of analysis of 4-Bar planer mechanism. **[8]**

Q3) Determine the cubic of stationary of curvature for plane motion equivalent to the rolling of a circle along a fixed straight line & compare the result with rolling of a straight line along a circle. **[16]**

Q4) a) Explain the term 'fixed and moving centrodes' and osculating circles. **[8]**

b) Explain with neat sketch the Hartmann construction and show that it satisfies the Euler Savary equation. **[8]**

P.T.O.

Q5) Write a note on (Any Three): **[18]**

a) Inertia forces in linkages.

b) Ball's Point.

c) Auxilary Point method for velocity acceleration analysis.

d) Application in dwell mechanisms.

e) Elastic linkage model.

SECTION - II

Q6) Determine the length of the link of a four bar linkage to generate $Y = \log_{10} X$ in the interval $1 \leq X \leq 10$. The length of the smallest link is 5 cm. Use three accuracy points with Chebyshev spacing. Draw the final sketch of linkages. (For input lever select 54° starting angle and 60° total swing angle, for the Output lever select 135° starting angle with total swing angle of 90° travel.)**[16]**

Q7) a) Explain Freudenstein's method of synthesis of mechanisms. Derive the expressions for displacement, velocity and acceleration of a four bar mechanism. **[8]**

b) What do you mean by 'center point and circle point circles'. Explain Bermester points. **[8]**

Q8) a) State and prove Robert-Chebychev theorem. Comment on its use. **[8]**

b) Find the Denavit-Hartenberg' parameter for Hook joint. **[8]**

Q9) What is Dyad? Derive its standard form. Explain the procedure of synthesizing a four bar for path generation with prescribed timing, with three accuracy points. Can such a synthesized mechanisms have an order defect? **[16]**

Q10) Write a note on (ANY THREE): **[18]**

a) Eulerian angles.

b) Branch and order defect.

c) Cognates.

d) Symmetry of coupler curves.

e) Structural error.

EEE