Code: 9D15102

M.Tech I Semester Supplementary Examinations August 2016
ADVANCED MECHANISMS
(Machine Design)
(For students admitted in 2012, 2013, 2014 & 2015 only)

Time: 3 hours   Max. Marks: 60

Answer any FIVE questions
All questions carry equal marks
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1 (a) Derive the Kutzbach mobility equation for spatial mechanism.
   (b) Prove that the rocker of a Groshoff linkage can never cross the line of frame.

2   What do you mean by inflection circle and explain the Hartmann's method of determining the inflection circle.

3   Determine the polode curvatures for the coupler link of a four bar mechanism with the following dimensions:
          Flex link (AD) = 100 mm.
          Input link (AB) = 30mm.
          Coupler (BC) = 40 mm.
          Output link (CD) = 60 mm.
          Angle DAB = 60^0.

4   Explain the synthesis of a crank-rocker mechanism for a given degree of quick return action i.e. for the prescribed value of crank angle and rocker angle.

5 (a) Write notes on Horne's and Nelson's Motion Atlas' related to path generation.
   (b) Explain the relative rotocenter method (two positions) for the synthesis of four bar function generator.

6   Synthesize a four-bar linkage to meet the following specifications of position, velocity and acceleration:

	Input link	Output link
Position (θ) degree	60	90
Velocity (ω) rad/sec	5	2
Acceleration rad/sec^2	2	7

Assume minimum length of the link = 100 mm.

7 (a) Explain the D-H parameters of a spherical arm.
   (b) Sketch and explain PUMA industrial robot manipulator.

8 (a) Explain the Jacobian of the two-link revolute joined arm.
   (b) Obtain the singularity of a two-link planar arm.

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