



DEPARTMENT OF MECHANICAL ENGINEERING
NATIONAL INSTITUTE OF TECHNOLOGY SRINAGAR
Hazratbal, Kashmir (J&K)-190006

THEORY OF MACHINES (MEC 403)

Assignment No. 1 (Due Date of Submission: 1st May 2020)

Note:

- Students are advised to submit the assignment online by scanning the handwritten assignment on or before the date of submission at mohsinkhan@nitsri.ac.in
- Please ensure that the Roll No along with name should be written in the front page of Assignment

- Q.1** Explain different kinds of kinematic pairs giving an example for each one of them.
- Q.2** Explain the term kinematic link. Give the classification of kinematic link.
- Q.3** State and prove the ‘Aronhold Kennedy’s Theorem’ of three instantaneous centres.
- Q.4** A link AB is moving in a vertical plane. At a particular instant, when the link is inclined at 30° to the horizontal, the point A is moving horizontally at 4m/s, while B is moving vertically upwards. Find the velocity of B.
- Q.5** What do you understand by the instantaneous centre of rotation in kinematic of machines? Answer briefly.
- Q.6** In a four-bar mechanism ABCD, points A and C are fixed points 30 cm apart and AB,CD are bars 60 cm and 70 cm long respectively, which are connected by a rod BD which is 50 cm long. If AB rotates with a uniform speed of 60 rpm, determine:
- (i) The velocity of D when AB is perpendicular to AC and also when it makes 10° on either side of the perpendicular.
 - (ii) The instantaneous centre of the bar BD and its angular velocities in the three positions.
- Q.7** Sketch and describe the working of two different types of quick return mechanism. Give examples of their applications. Derive an expression for the ratio of times taken in forward and return stroke for one of these mechanisms.
- Q.8** What is a clutch? Explain the Different Types of Clutches.
- Q.9** What is a Self Energizing Brake? When a Brake becomes Self-Locking.
- Q.10** Determine the Maximum, Minimum and Average Pressure in a Plate Clutch when the Axial Force is 4KN. The inside radius of the contact surface is 50mm, and the outer radius is 100mm. Assuming Uniform Wear.