

**UNIT I**

**Chapter 1 : Fundamentals and Type of Mechanisms**

**1-1 to 1-20**

**Syllabus :**

**1.1 Kinematics of Machines :** Introduction to Statics, Kinematics, Kinetics, Dynamics, Kinematic links, joints, pairs, chain and its types, constrained motion and its types, Inversion, Mechanism, machine and structure.

**1.2 Inversions of Kinematic Chains and their materials :** Four bar chain - Locomotive coupler, Beam engine and Pantograph. Single Slider Crank chain - Pendulum pump, Rotary I.C. Engines mechanism, Oscillating cylinder engine, Whitworth quick return mechanism, Quick return mechanism of shaper. Double Slider Crank Chain - Scotch Yoke Mechanism, Elliptical trammel, Oldham's Coupling.

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**UNIT II**

**Chapter 2 : Velocity and Acceleration in Mechanisms**

**2-1 to 2-41**

**Syllabus :**

2.1 Concept of relative velocity and relative acceleration of a point on a link, angular acceleration, inter-relation between linear and angular velocity and acceleration.

2.2 Analytical method and Klein's construction to determine velocity and acceleration of different links in single slider crank mechanism.

2.3 Drawing of velocity and acceleration diagrams for simple mechanisms. Determination of velocity and acceleration of point on link by relative velocity method (Excluding Coriolis component of acceleration)

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**UNIT III**

**Chapter 3 : Cams and Followers 3-1 to 3-35**

**Syllabus :**

- 3.1 Introduction to Cams and Followers, Cam and follower terminology, Classification of Cams and Followers. Applications of cams and followers.
- 3.2 Types of follower motions and their displacement diagrams- Uniform velocity, Simple harmonic motion, uniform acceleration and Retardation.
- 3.3 Drawing of profile of radial cam based on given motion of reciprocating knife-edge and roller follower with and without offset.

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**UNIT IV**

**Chapter 4 : Power Transmission 4-1 to 4-46**

**Syllabus :**

- 4.1 **Belt Drives** : Introduction to Flat belt, V-belt and its applications, material used for flat and V-belt. Introduction of timing belt and pulley. Angle of lap, length of belt, Slip and creep. Determination of velocity ratio of tight side and slack side tension, centrifugal tension and initial tension, condition for maximum power transmission. Merits, demerits and selection of belts for given applications.
- 4.2 **Chain Drives** : Introduction to chain drives, Types of chains and sprockets, Methods of lubrication. Merits, demerits and selection of Chains for given application.
- 4.3 **Gear Drives** : Introduction to gear drives, Classification of gears, Law of gearing, gear terminology. Types of gear trains, Train value and velocity ratio for simple, compound, reverted and epicyclic gear trains using spur and helical gears. Merits, demerits and selection of gear derives for given applications.

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**UNIT VI**

**Chapter 6 : Flywheel , Governors and Balancing**

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**6.2** Coefficient of fluctuation of energy, coefficient of fluctuation of speed and its significance.

**6.3 Governors** : Introduction, Types, functions and applications, Terminology of Governors. Comparison of Flywheel and Governor.

**6.4 Balancing** : Need and types of balancing, Balancing of single rotating mass. Analytical and Graphical method for balancing of several masses revolving in same plane.

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