

**UNIT I****Chapter 1 : Mechanics and Force System 1-1 to 1-10****Syllabus :**

Significance and relevance : Mechanics, applied mechanics, statics, dynamics.

Space, time, mass, particle, body, rigid body.

Scalar and vector quantity, Units of measurement (SI Units) - Fundamental units and derived units.

Force : unit, representation as a vector and by Bow's notation, characteristics and effects of a force, Principle of transmissibility of force, Force system and its classification.

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UNIT II**Chapter 2 : Simple Lifting Machine 2-1 to 2-31****Syllabus :**

Simple lifting machine, load, effort, mechanical advantage, applications and advantage, applications and advantages

Velocity ratio, efficiency of machines, law of machine.

Ideal machine, friction in machine, maximum Mechanical advantage and efficiency, reversible and non-reversible machines, condition for reversibility.

Velocity ratios of Simple axle and wheel, Differential axle and wheel, Worm and worm wheel, Single purchase and double purchase crab winch, Simple screw jack, Weston's differential pulley block, geared pulley block.

Graphs of load verses Effort, Load verses ideal Effort, load verses Effort lost in friction, Load verses MA, Load verses Efficiency.

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UNIT III

Chapter 3 : Resolution and Composition 3-1 to 3-49

Syllabus :

Resolution of a force : Orthogonal and Non Orthogonal components of a force, moment of a force, Varignon's Theorem.

Composition of forces : Resultant, analytical method of determination of resultant for concurrent non concurrent and parallel co-planar force systems , Law of triangle, parallelogram and polygon of forces.

Graphic statics, graphical representation of force, Space diagram, force diagram, polar diagram and funicular polygon

Graphical method of determination of resultant for concurrent and parallel co-planar force systems.

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**UNIT IV****Chapter 4 : Equilibrium 4-1 to 4-40****Syllabus :**

Equilibrium and Equilibrant, Free body and Free body diagram, Analytical and graphical conditions of equilibrium.

Equilibrium of force systems analytically

Lami's Theorem,

Types of beam, supports (simple, hinged, roller and fixed) and loads acting on beam (vertical and inclined point load, UD load, couple), span of beam

Beam reaction for cantilever, simply supported beam with or without overhang – subjected to combination of Point load and UD load or Vertical Point load and couple.

Beam reaction graphically for simply supported beam subjected to vertical loads only.

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UNIT V**Chapter 5 : Friction 5-1 to 5-19****Syllabus :**

Friction and its relevance in engineering, types and laws of friction, limiting equilibrium, limiting friction, co-efficient of friction, angle of friction, angle of repose, relation between co-efficient of friction and angle of friction.

Equilibrium of bodies on level surface subjected to force parallel and inclined to plane.

Equilibrium of bodies on inclined plane subjected to force parallel to the plane only.

FBD of ladder in friction

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UNIT VI

Chapter 6 : Centroid and Centre of Gravity 6-1 to 6-60

Syllabus :

Centroid of geometrical plane figures (Square, rectangle, triangle, circle, semi-circle, quarter circle)

Centroid of composite figures composed of not more than three geometrical figures

Centre of Gravity of simple solids (Cube, cuboid, cone, cylinder, sphere, hemisphere)

Centre of Gravity of composite solids composed of not more than two simple solids.

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