RRB JE SYLLABUS

Engineering Mechanics:

Resolution of forces, Equilibrium and Equilibrant, parallelogram law of forces, triangle law of forces, polygon law of forces and Lami's theorem, couple and moment of a couple, condition for equilibrium of rigid body subjected to number of coplanar non-concurrent forces, definition of static friction, dynamic friction, derivation of limiting angle of friction and angle of repose, resolution of forces considering friction when a body moves on horizontal plane and inclined plane.calculation of moment of inertia and radius of gyration of: (a) I-Section (b) channel section (c) T-Section (d) L-Section (Equal & unequal lengths) (e) Z-Section (1) Built up sections (simple cases only). Newton's laws of motion (without derivation), motion of projectile, Alembert's principle, definition law of conservation of energy, law of conservation of momentum.

Strength of Materials:

Stress, strain, stress strain diagram factor of safety, thermal stresses, strain energy, proof resilience and modules of resilience. Shear force and bending moment diagram-cant leaver beam, simply supported beam, continuous beam, fixed beam. Torsion in shafts and springs, thin cylinder shells.

Machining

Working principle of lathe. Types of lathes Engine lathe construction details and specifications. Nomenclature of single paint cutting tool, geometry, tool signature, functions of tool angles General and special operations - (Turning. facing, taper turning thread cutting, knurling, forming, drilling, boring, reaming, key way cutting), cutting fluids, coolants and lubricants Introduction to shaper, slotter, plainer, milling and manufacture of gears, heat treatment process applied to gears.

Welding

Welding-Introduction, classification of welding processes, advantages and limitations of welding, principles of arc welding. arc welding equipment, choice of electrodes for different metals, principle of gas (oxy-acetylene) welding equipment of gas welding, welding procedures (arc & gas), soldering and brazing techniques, defects in welding, (submerged, CO2, atomic-hydrogen, ultrasonic welding), brief description of MIG & TIG welding.

Grinding & Finishing Process:

Principles of metal removal by grinding abrasives, natural and artificial, bonds and binding processes, vitrified, silicate, shellac rubber, grinding machines, classification: cylindrical, surface, tool & cutter grinding machine, construction details relative merits principles of centreless grinding advantages & limitations of centre less grinding work holding details, relative merits, principles of centreless grinding, advantages & limitations of centreless grinding work, holding devices, wheel maintenance, balancing of wheels, coolants used, finishing by grinding, honing, lapping, super finishing. electroplating, basic principles-plating metals, applications, hot dipping, galvanizing tin coating, parkerising, anodizing. metal spraying, wire process, powder process and applications, organic coatings, oil base paint, lacquer base enamels. bituminous paints, rubber base coating

Metrology

Linear measurement Slip gauges and dial indicators, angle measurements, bevel protractor, sine bar, angle slip gauges, comparators (a) mechanical (b) electrical (c) optical (d) pneumatic Measurement of surface roughness; methods of measurements by comparison, tracer instruments and by interferometry, collimators, measuring microscope, interferometer Inspection of machine parts using the concepts of shadow projection and profile projection.

Fluid Mechanics & Hydraulic Machinery

Properties of fluid, density, specific weight, specific gravity, viscosity, surface tension, compressibility capillarity, Pascal's law, measurement of pressures, concept of buoyancy. Concept of Reynold's number, pressure, potential and kinetic energy of liquids, total energy, laws of conservation, mass, energy and momentum velocity of liquids and discharge, Bernoulli's equation and assumptions, venturimeters, pitot- tube, current meters. Working principle & constructional details of centrifugal pump, efficiencies-manometric efficiency, volumetric efficiency. mechanical efficiency and overall efficiency, cavitation and its effect, working principle of jet & submersible pumps with line diagrams.

Thermal Engineering

Laws of thermo dynamics, conversion of heat into work vice versa, laws of perfect gases, thermo dynamic processes - isochoric isobaric, isothermal hyperbolic, isentropic, polytrophic and throttling, modes of heat transfer, thermal conductivity, convective heat transfer coefficient, Stefan Boltzman law by radiation and overall heat transfer coefficient Air standards cycles - Carnot cycle, Otto cycle, Diesel cycle, construction and working of internal combustion engines comparison of diesel engine and petrol engine Systems of internal combustion engine, the performance of internal combustion engines. Refrigeration Cycles