



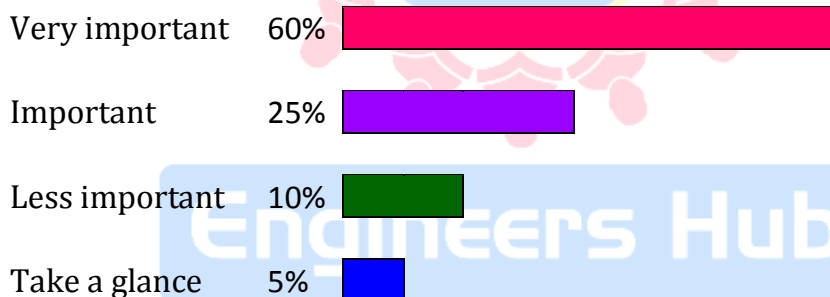
Engineers Hub

Where Quality Matters...

GATE-2018 MECHANICAL IMPORTANT TOPIC LIST

We just had cheerfully welcomed a new year with new resolutions. You might not have forgot your last year resolution of cracking **GATE-2018**. Now you are in a critical phase of preparation which is going to decide your rank. So, be cautious and know what exactly is required. *‘Tune your preparation to the frequency of paper setter’*. Here we are providing you the important topics of **DESIGN** and **IE & OR** subjects.

Topics, based on their chance to come in GATE, are categorized by color coding as follows-



ENGINEERING MECHANICS:

- *Lami's theorem; Forces in Truss Members*
- *Rectilinear Motion (Constant Acceleration)*
- *Time Derivatives of Displacement*
- *Moment of Inertia-Pure Rotational Motion*
- *Velocity, Acceleration in Polar Coordinate System;*
- *Coriolis Acceleration*
- *Rolling Without Slipping-Instantaneous Centre Of Rotation*

Venkat Sai

Technical Advisor - Engineers Hub

- **Kinetics:** *FBD-Application of Newton & Euler's Equations for Dynamic Equilibrium*
- **Friction:** *Horizontal & Inclined Plane-Limiting Friction conditions (Block on Block)*
- **Work-Energy-Impulse:** *Momentum Conservation-Collisions*
- *Energy Stored in Different Cases, Their Conversions (Conservation).*

THEORY OF MACHINES:

- *Mobility of Planar Mechanisms-Grubler's Criteria, Quick Return Ratio (Witworth & Slotted Lever Mechanisms)*
- *Velocity Analysis of Planar Mechanisms; Mechanical Advantage,*
- **Gears:** *Classification of Gears, Pitch (P_d , P_c , m)- Central Distance Relations; Force-Torque Transmitted, Interference in Involute Teeth*
- **Gear Trains:** *Compound & Epicyclic Gear Trains*
- **Flywheels:** *Coefficient of Fluctuation of Speed; Energy Stored in Fly Wheels*
- **Vibrations:** *Natural Frequency Calculations (Springs-Mass System) Equivalent Stiffness.*
- *Damping Factor Expression-Damped Frequency Relation,*
- *Steady State Amplitude-Magnification Factor in Forced Vibration*
- *Transmissibility, Critical Speed*
- *Cams, Balancing, Gyroscope.*

STRENGTH OF MATERIALS:

- **Bars:** *Axial Loading; Stress-Strain Relations; Thermal Stresses, Biaxial Loading-Mohr's Circle-Principle Stresses & Strains*
- **Beam:** *Shear Force-Bending Moment Diagrams, Transverse Loading-Stresses in Beams*

- **Shafts:** Torsional Stresses; Shafts in Series; Torsion Formula (St. Venant's)
- Thin Cylindrical Shells, Springs, Deflection of Beams, Columns

DESIGN OF MACHINE ELEMENTS:

- Static Failure Theories, S-N Diagram, Dynamic Failure Theories.
- **Bolted and Riveted Joints:** Tearing, Shearing and Crushing Failures; Eccentric Loading.
- **Brakes:** Band and block brakes
- **Clutches:** Pressure and wear Theories-Torque transmission capacity
- **Rolling contact bearings:** load-life relations
- **Sliding contact bearings:** Sommerfeld Number

OPERATIONS RESEARCH:

- Queuing theory
- PERT & CPM
- Inventory
- Linear programming
- Forecasting
- Sequencing
- Line Balancing
- Break Even Analysis

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For GATE, ESE & PSUs