



MEER SIR
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*We Deliver Results,
Not Promises.*

**FACULTY OF ENGINEERING AND TECHNOLOGY
JAMIA MILLIA ISLAMIA
NEW DELHI – 110025**

B.E. MECHANICAL (EVENING)

ENTRANCE TEST SYLLABUS

Entrance Test Overview

Particular	Details
Paper Structure	One paper
Broad Areas	Engineering Mechanics, Design, Production Engineering and Thermal Engineering
Standard of Questions	Equivalent to the level expected in a three-year Diploma (Mechanical) Examination of Polytechnics

1. Engineering Mechanics

- Coplanar and non-coplanar force systems.
- Triangle, parallelogram and polygon laws of forces.
- Moments and couples.
- Centre of gravity and centroid.
- Moment of inertia.
- Motion and displacement; velocity and acceleration; equations of motion.
- Newton's Laws of Motion.
- Momentum and conservation of momentum.
- Work, power and energy; types of energy; conservation of energy.
- Curvilinear motion.
- Angular velocity and angular acceleration.
- Centripetal and centrifugal force.
- Simple machines: lever, wheel and axle, pulley, jack and winch crab.
- Mechanical advantage, velocity ratio and efficiency of a machine.
- Laws of friction.

2. Design

- Types of stress and strain.
- Strain energy due to direct stresses.
- Stress due to gradual, sudden and falling loads.
- Theory of simple bending.
- Stress in beams of rectangular, circular, I and T sections under different types of loads, including concentrated load and uniformly distributed load (UDL).
- Deflection in simply supported beams and cantilevers under UDL and concentrated loads.



- Types of columns and their modes of failure.
- Buckling and crushing loads.
- Factors affecting the strength of a column.
- Riveted and welded joints for pressure vessels and structural members.
- Bolts and nuts.
- Power transmitted by shafts under torsion.
- Design of flanged coupling.
- Design of leaf springs and close-coiled helical springs.
- Cotter and knuckle joints.

3. Production Engineering

- Types of welding, metal-forming and moulding processes and their applications (introductory level).
- Introduction to machine tools and metal cutting.
- Common features of machine tools.
- Geometry of single-point cutting tools, drills and milling cutters.
- Types of chips.
- Tool wear and tool life.
- Use and types of cutting fluids.
- Working principle and mechanism of a shaper.
- Specifications of a shaper.
- Types, angles and materials of shaper tools.

Industrial Management Topics within Production Engineering

- Sources of capital.
- Joint stock, private, partnership and private limited companies.
- Line, staff and functional organisations.
- Trade unions and labour laws.
- Inventories and wages.
- Production Planning and Control (PPC).
- Productivity and its measurement.
- Break-even point.
- Depreciation and its methods.
- Elements of cost.
- Quality control.

4. Thermal Engineering

- Thermodynamic systems and their properties.
- Laws of thermodynamics.
- Enthalpy.



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- Thermodynamic processes: constant-volume, constant-pressure, isothermal, adiabatic and polytropic processes.
- Conditions and properties of steam: wet saturated, dry saturated and superheated steam.
- Boilers for low- and high-pressure generation of steam; fire-tube and water-tube types.
- Principle, construction and working of impulse and reaction turbines.
- Classification of I.C. engines; S.I. and C.I. engines.
- Working principle of two-stroke and four-stroke cycle engines.
- Power cycles: ideal air, fuel-air, Otto, Diesel and dual-combustion cycles; thermal efficiencies and comparisons.
- Principle of refrigeration.
- Refrigeration cycle; common refrigerants and their properties.
- Psychrometric processes and properties.
- Properties of fluids: specific weight, specific mass, specific volume and capillarity.
- Pascal's Law.
- Pressure on vertically inclined surfaces and centre of pressure.
- Types of fluid flow.
- Rate of discharge and equation of continuity.
- Bernoulli's theorem.
- Fluid flow through a pipe, an orifice and a venturimeter.
- Pitot tube.
- Loss of pressure head due to friction, sudden enlargement, contraction, obstruction and bends.

Meer Sir Academy – Preparation Framework

Area	Preparation Focus
Engineering Mechanics	Force systems, motion, work-energy, friction and simple machines; practise numerical applications.
Design	Strength of materials, beams, columns, joints, shafts, couplings and springs.
Production Engineering	Manufacturing processes, machine tools, cutting tools, shaper and industrial management.
Thermal Engineering	Thermodynamics, steam, boilers, turbines, I.C. engines, refrigeration, psychrometrics and fluid mechanics.

MEER SIR ACADEMY

JMI B.E. Mechanical (Evening) Entrance Preparation 2026–27

Engineering Mechanics | Design | Production Engineering | Thermal Engineering