



**ACE**  
Engineering Academy  
(Leading institute for ESE/GATE/PSUs)



# RRB (JE)-2019

**Online Test Series**

**STAGE - II**

**MECHANICAL AND ALLIED ENGINEERING**

**No. of Tests : 20**

 Subject Wise Tests	<b>16</b>
 Full Length Mock Tests	<b>4</b>

## TEST SERIES HIGHLIGHTS

- ★ Rank will be given for each test.
- ★ Test wise and overall statistics.
- ★ Comparison with toppers.
- ★ Question wise and test wise time analysis & comparison with toppers on time management.

## Subject-wise Tests

*Tests will be activated at 6:00 pm on scheduled day*

Test No	Subject Name		No. of Questions	Max Marks	Duration	Date of Activation
Test-01	Non-Tech	General Awareness	37	37	30 Min	06-05-2019
Test-02	Tech	Engineering Mechanics	37	37	30 Min	08-05-2019
Test-03	Tech	Heat transfer	37	37	30 Min	10-05-2019
Test-04	Non-Tech	Physics and Chemistry	37	37	30 Min	11-05-2019
Test-05	Tech	Strength of Materials	37	37	30 Min	13-05-2019
Test-06	Tech	Material Science + Metrology	37	37	30 Min	15-05-2019
Test-07	Non-Tech	Basics of Computers and Applications	37	37	30 Min	16-05-2019
Test-08	Tech	Machining	37	37	30 Min	18-05-2019
Test-09	Tech	Welding	37	37	30 Min	20-05-2019
Test-10	Non-Tech	Basics of Environment and Pollution Control	37	37	30 Min	21-05-2019
Test-11	Tech	Fluid Mechanics & Hydraulic Machinery	37	37	30 Min	23-05-2019
Test-12	Tech	Grinding & Finishing Process	37	37	30 Min	25-05-2019
Test-13	Non-Tech	General Awareness + Basics of Environment and Pollution Control	37	37	30 Min	26-05-2019
Test-14	Tech	Industrial Management	37	37	30 Min	28-05-2019
Test-15	Tech	Thermal Engineering	37	37	30 Min	30-05-2019
Test-16	Non-Tech	Physics and Chemistry + Basics of Computers and Applications	37	37	30 Min	31-05-2019

## Full Length Mock Tests

Test No		No. of Questions	Max Marks	Duration	Date of Activation
Test-17	Full Length Mock Test - 1	150	150	2 Hours	19-06-2019
Test-18	Full Length Mock Test - 2	150	150	2 Hours	30-06-2019
Test-19	Full Length Mock Test - 3	150	150	2 Hours	23-07-2019
Test-20	Full Length Mock Test - 4	150	150	2 Hours	30-07-2019

**Note:** The Syllabus considered as per Notifications of RRB. ACE Engineering Academy does not take any responsibility for deviations in syllabus in the final RRB exam. As per Notification of RRB each question carries '1' mark and negative marking of 1/3rd (i.e. 0.33 Marks) for each wrong answer.

## **Syllabus for RRB (JE) STAGE-II** **(Mechanical and Allied Engineering)**

Subjects	STAGE-II	
	No. of Questions	Marks for each Section
General Awareness	15	15
Physics and Chemistry	15	15
Basics of Computers and Applications	10	10
Basics of Environment and Pollution Control	10	10
Technical Abilities	100	100
<b>Total</b>	<b>150</b>	<b>150</b>
<b>Time in Minutes</b>	<b>120</b>	

The section wise distribution given in the above table is only indicative and there may be some variations in the actual question papers.

### **Technical Abilities:**

The educational qualifications mentioned against each post shown in Annexure-A, have been grouped into different exam groups as below. Questions on the Technical abilities will be framed in the syllabus defined for various Exam Groups given at Annexure-VII-A, B, C, D, E, F & G.

<b>Subject Name</b>	<b>Syllabus</b>
<b>General Awareness</b>	Knowledge of Current affairs, Indian geography, culture and history of India including freedom struggle, Indian Polity and constitution, Indian Economy, Environmental issues concerning India and the World, Sports, General scientific and technological developments etc.
<b>Physics and Chemistry</b>	Up to 10th standard CBSE syllabus.
<b>Basics of Computers and Applications</b>	Architecture of Computers; input and Output devices; Storage devices, Networking, Operating System like Windows, Unix, Linux; MS Office; Various data representation; Internet and Email; Websites & Web Browsers; Computer Virus.
<b>Basics of Environment and Pollution Control</b>	Basics of Environment; Adverse effect of environmental pollution and control strategies; Air, water and Noise pollution, their effect and control; Waste Management, Global warming; Acid rain; Ozone depletion.

## Technical Abilities

Subject Name	Syllabus
<b>Engineering Mechanics</b>	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 (f) Built up sections (simple cases only), Newton's laws of motion (without derivation), motion of projectile, D'Alembert's principle, definition law of conservation of energy, law of conservation of momentum.
<b>Material Science</b>	Mechanical properties of engineering materials – tensile strength, compressive strength, ductility, malleability, hardness, toughness, brittleness, impact strength, fatigue, creep resistance. Classification of steels, mild steel and alloy steels. Importance of heat treatment. Heat treatment processes – annealing, normalizing, hardening, tempering, carburizing, nitriding and cyaniding.
<b>Strength of Materials</b>	Stress, strain, stress strain diagram, factor of safety, thermal stresses, strain energy, proof resilience and modulus of resilience. Shear force and bending moment diagram – cant lever beam, simply supported beam, continuous beam, fixed beam. Torsion in shafts and springs, thin cylinder shells.
<b>Machining</b>	Working principle of lathe. Types of lathes – Engine lathe – construction details and specifications. Nomenclature of single point 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, planer, broaching, milling and manufacture of gears, heat treatment process applied to gears.
<b>Welding</b>	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, types and applications of solders and fluxes, various flame cutting processes, advantages and limitations of flame cutting, defects in welding, testing and inspection modern welding methods, (submerged, CO <sub>2</sub> , atomic – hydrogen, ultrasonic welding), brief description of MIG & TIG welding.

Subject Name	Syllabus
<b>Grinding &amp; Finishing Process</b>	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 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.
<b>Metrology</b>	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.
<b>Fluid Mechanics &amp; Hydraulic Machinery</b>	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, pitottube, 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.
<b>Industrial Management</b>	Job analysis, motivation, different theories, satisfaction, performance reward systems, production, planning and control, relation with other departments, routing, scheduling, dispatching, PERT and CPM, simple problems. Materials in industry, inventory control model, ABC Analysis, Safety stock, re-order, level, economic ordering quantity, break even analysis, stores layout, stores equipment, stores records, purchasing procedures, purchase records, Bin card, Cardex, Material handling, Manual lifting, hoist, cranes, conveyors, trucks, fork trucks.
<b>Heat Transfer</b>	Modes of heat transfer, thermal conductivity, convective heat transfer coefficient, Stefan Boltzman law by radiation and overall heat transfer coefficient.
<b>Thermal Engineering</b>	Laws of thermo dynamics, conversion of heat into work vice versa , laws of perfect gases, thermo dynamic processes – isochoric, isobaric, isothermal hyperbolic, isentropic, polytropic and throttling, 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, performance of internal combustion engines. Air compressors their cycles refrigeration cycles, principle of a refrigeration plant.