Contents

CBT - 2nd Stage

Syllabus issued by
Government of India, Ministry of Railways,
Railway Recruitment Boards

Vide Detailed Centralized Employment Notice

CEN No. 03 / 2024

For Recruitment of Junior Engineer (JE), Depot Material Superintendent (DMS) and Chemical & Metallurgical Assistant (CMA), Chemical Supervisor (Research) and Metallurgical Supervisor (Research)

1st Stage CBT (Common for all notified posts of this CEN)

Duration : 90 minutes (120 Minutes for eligible PwBD candidates accompanied with Scribe)
No. of Questions : 100

a. Mathematics :

Number systems, BODMAS, Decimals, Fractions, LCM and HCF, Ratio and Proportion, Percentages, Mensuration, Time and Work, Time and Distance, Simple and Compound Interest, Profit and Loss, Algebra, Geometry, Trigonometry, Elementary Statistics, Square Root, Age Calculations, Calendar & Clock, Pipes & Cistern.

b. General Intelligence and Reasoning :

Analogies, Alphabetical and Number Series, Coding and Decoding, Mathematical operations, Relationships, Syllogism, Jumbling, Venn Diagram, Data Interpretation and Sufficiency, Conclusions and Decision Making, Similarities and Differences, Analytical reasoning, Classification, Directions, Statement – Arguments and Assumptions etc.

c. General Awareness :

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.

d. General Science :

Physics, Chemistry and Life Sciences (up to 10th Standard CBSE syllabus).

The section wise Number of questions and marks are as below :

Subjects	No. of Questions	Marks for each Section
	Stage-I	Stage-I
Mathematics	30	30
General Intelligence &	25	25
General Awareness	15	15
General Science	30	30
Total	100	100
Time in Minutes	90	

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Computer Based Test (CBT – II stage)

RRB JE CBT 2 Exam

Total duration of RRB Junior Engineer CBT Stage 2 is 120 minutes and total number of questions is 150.

Subjects	No. of Questions	Marks
General Awareness	15	15
Physics & Chemistry	15	15
Basics of Computer and its Applications	10	10
Basic of Environment and Pollution Control	10	10
Technical Ability	100	100
Total	**150**	**150**

→ Selection of candidates for the 2nd stage CBT exam will be based on the normalized marks obtained by them in 1st stage of CBT exam.

→ Virtual calculator will be made available on the Computer Monitor during 2nd stage of CBT exam.
→ **Negative Marking :** 1/3rd of question mark will be deducted for each wrong answer from total.
→ Same Minimum percentage of marks for eligibility in various categories as in 1st stage of CBT.
→ There can be variation in the actual question papers. Total number of candidates to be shortlisted for 2nd Stage shall be 15 times the community wise total vacancy of Posts notified against the RRB as per their merit in 1st Stage CBT.

RRB JE 2nd Stage CBT 2024 Syllabus
Here questions will be of objective type with multiple choices (MCQ) and are likely to include questions pertaining to each syllabus sections.

RRRB JE CBT 2nd Stage General Awareness
Current Affairs Knowledge, Culture and history of India including freedom struggle, Indian Polity and Constitution, Indian Geography, Indian Economy, Environment issues concerning India and the world, Sports, General Scientific and technological developments

RRRB JE CBT 2nd Stage Physics and Chemistry
Questions shall be based of upto 10th standard CBSE syllabus.

RRRB JE CBT 2nd Stage Basic of Computers and Applications
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.

RRRB JE CBT 2nd Stage Basic of Environment and Pollution Control
Basic of Environment, Adverse effect environmental pollution and control strategies; Air, water and Noise pollution, their effect and control; Waste Management, Global warming; Acid rain; Ozone depletion.

RRRB JE CBT 2nd Stage Technical Ability

Exam paper has been framed into 7 group based on the technical ability.

1. Civil & Allied Engineering-JE
2. Electrical & Allied Engineering-JE
3. Electronic & Allied Engineering-JE
4. Mechanical & Allied Engineering-JE
5. Computer Science and Information Technology – JE
6. Printing Technology – JE
7. Chemical & Metallurgical Assistant (CMA)

RRB JE Syllabus for Mechanical and Allied Engineering

Chapter Name	Topics
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 (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.
Material Science	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.
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 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, plainer, broaching, 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, 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, CO2, atomic – hydrogen, ultrasonic welding), brief description of MIG & TIG welding.

Grinding and 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 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, 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.
Industrial Management	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.
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, performance of internal combustion engines. Air compressors their cycles refrigeration cycles, principle of a refrigeration plant.