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RRB-JE

RAILWAY RECRUITMENT BOARD

JUNIOR ENGINEER

COMPUTER BASED TEST (CBT) - II

CIVIL & ALLIED ENGINEERING

Previous years Questions with Detailed Solutions,
Subjectwise & Chapterwise (2014, 2015 & 2019)

General Awareness | Physics & Chemistry | Basics of Computers & Applications
Basics of Environment & Pollution Control | Civil Engineering

SALIENT FEATURES:

- Explanations in detail with a focus on strategy
- Competency-based text approach
- Contains 2500+ Solved Questions
- Useful for SSC-JE & Other Competitive Examinations

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Foreword

Dear Students,

For the purpose of hiring Junior Engineers for the Indian Railways, the Railway Recruitment Board (RRB) Junior Engineer Examination is a combined two-stage exam that is followed by document verification (IR). A high number of applicants show up for this exam every two years, vying for a small number of open positions. Due to its low selection ratio and technical character, RRB-JE is therefore one of the most sought-after tests in India.



RRB-JE aspirants experience tremendous preparation pressure a few weeks before the real examination as they are not sure about the type of questions expected in the exam. It is very difficult to guess the possible questions in the competitive exam but there are ways to overcome this difficult situation. One such excellent option is solving the previous years' question papers as a part of the preparation strategy. Solving previous years' questions always gives a positive mindset before going to the real examination. This option may look simple and easy yet many aspirants do not include the practice of previous years' questions in their preparation.

The RRB-JE pattern consists of two stages: CBT-I and CBT-II, which are followed by document verification; the candidate must pass each level in order to advance to the next. General Intelligence and Reasoning, Quantitative Aptitude, General Science, and General Awareness are all included in the preliminary stage. The CBT-I is applicable here to all branches. The CBT-II second stage is an objective test for the corresponding engineering field.

We at ACE Engineering Academy came up with a series of books on previous questions and solutions for various competitive exams such as GATE, ESE, PSUs, and Other Government Recruitment Examinations. The latest offering is in this series is **Railway Recruitment Board - Junior Engineer (RRB - JE) CBT - II Civil Engineering Examination** Questions and Solutions book. The unique feature in this book is that the available previous years' examination questions are categorized as subject-wise, chapter-wise so that the aspirant can integrate these questions along in their regular preparation.

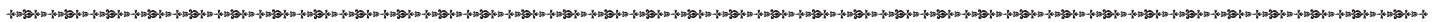
We at ACE are sure that this book will be of tremendous help to the aspirants of RRB - JE CBT -II examination. Any suggestions or inputs which will add value are welcomed.

Thanks to all Professors who extended their services in the preparation of this booklet. It is believed that this volume is also a valuable aid to the students appearing for competitive exams like SSC-JE, Central & State Public Service Commissions & Various Competitive Examinations.

Wishing you Success in all your Endeavors

Y.V. Gopala Krishna Murthy,
M Tech. MIE,
Chairman & Managing Director,
ACE Engineering Academy,
ACE Engineering Publications.
Frost Interactive Service Pvt. Ltd. (ACE ONLINE).

RRB - JE Examination Pattern & Syllabus



RECRUITMENT PROCESS:

- Only single online application {common to all the notified posts in opted RRB - Junior Engineer (JE), Junior Engineer (Information Technology) [JE(IT)], Depot Material Superintendant (DMS) and Chemical & Metallurgical Assistant (CMA)} has to be submitted by the candidate through the link provided on the official website of RRBs.
- The entire recruitment process shall involve, 1st stage Computer Based Test (CBT), 2nd stage CBT, and Document Verification/Medical Examination as applicable. Selection is made strictly as per merit, on the basis of CBTs.
- The date, time and venue for all the activities viz CBTs and DV or any other additional activity as applicable shall be fixed by the RRB and shall be intimated to the eligible candidates in due course. Request for postponement of any of the above activity or for change of venue, date and shift will not be entertained under any circumstances.

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

- The 1st stage CBT is of screening nature and the standard of questions for the CBT will be generally in conformity with the educational standards and/or minimum technical qualifications prescribed for the posts.
- The normalized score of 1st stage exam shall be used only for short listing of candidates for 2nd stage exam as per their merit.
- Candidates who are shortlisted for 2nd stage CBT availing the reservation benefits of a community, PwBD and ExSM shall continue to be considered only against that community for all subsequent stages of recruitment process.

The Questions will be of objective type with multiple choices and are likely to include questions pertaining to:

- (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, Jum-bling, 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	Duration
	Stage-I	Stage-I	90 Min
Mathematics	30	30	
General Intelligence & Reasoning	25	25	
General Awareness	15	15	
General Science	30	30	
Total	100	100	

- The section wise distribution given in the above table is only indicative and there may be some variations in the actual question papers.
- Minimum percentage of marks for eligibility in various categories: UR -40%, OBC-30%, SC-30%, ST -25%. These percentage of marks for eligibility may be relaxed by 2% for PwBD candidates in case of shortage of PwBD candidates against vacancies reserved for them.

2nd Stage CBT:

Duration : 120 minutes (160 Minutes for eligible PwBD candidates accompanied with Scribe)

No. of Questions : 150

- Short listing of Candidates for the 2nd Stage CBT exam shall be based on the normalized marks obtained by them in the 1st Stage CBT Exam.
- 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.
- However, Railways reserve the right to increase/decrease this limit in total or for any specific category(s) as required to ensure availability of adequate candidates for all the notified posts.

Syllabus: The Questions will be of objective type with multiple choices and are likely to include questions pertaining to General Awareness, Physics and Chemistry, Basics of Computers and Applications, Basics of Environment and Pollution Control and Technical abilities for the post. The syllabus for General Awareness, Physics and Chemistry, Basics of Computers and Applications, Basics of Environment and Pollution Control is common for all notified posts under this CEN as detailed below:-

(a) 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.

(b) Physics and Chemistry: Up to 10th standard CBSE syllabus.

(c) Basics 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.

(d) Basics of Environment and Pollution Control: 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.

(e) 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.

The section wise Number of Questions and Marks are as below :

Subjects	No. of Questions	Marks for each Section	Duration
	Stage-II	Stage-II	120 Min
General Awareness	15	15	
Physics & Chemistry	15	15	
Basics of Computers and Applications	10	10	
Basics of Environment and Pollution Control	10	10	
Technical Abilities	100	100	
Total	150	150	

- The section wise distribution given in the above table is only indicative and there may be some variations in the actual question papers.
- Minimum percentage of marks for eligibility in various categories: UR -40%, OBC-30%, SC-30%, ST -25% This percentage of marks for eligibility may be relaxed by 2% for PwBD candidates, in case of shortage of PwBD candidates against vacancies reserved for them.
- Virtual calculator will be made available on the Computer Monitor during 2nd Stage CBT.

Discipline Mapping Tables:-

Three years Diploma in Engineering or Bachelor's Degree in Engineering/Technology	Exam Group
Mechanical Engineering	Mechanical and Allied Engineering
Production Engineering	
Automobile Engineering	
Manufacturing Engineering	
Mechatronics Engineering	
Industrial Engineering	
Machining Engineering	
Tools and Machining Engineering	
Tools and Die Making Engineering	
Combination of any sub stream of basic streams of above disciplines	
Electrical Engineering	Electrical and Allied Engineering
Combination of any sub stream of basic streams of Electrical Engineering	

Three years Diploma in Engineering or Bachelor's Degree in Engineering/Technology	Exam Group
Electronics Engineering	Electronics and Allied Engineering
Instrumentation and Control Engineering	
Communication Engineering	
Computer Science and Engineering	
Computer Engineering	
Computer Science	
Information Technology	
Combination of sub streams of basic streams of above disciplines	
Civil Engineering	Civil and Allied Engineering
Combination of sub streams of basic streams of Civil Engineering	
B.Sc., in Civil Engineering of 3years duration	
Printing Technology/Engineering	Printing Technology

S. No.	Education Qualifications	Exam Group
1.	B.Sc., Chemistry and Physics	CMA
2.	BE/B.Tech., (Computer Science)	Computer Science and Information Technology
	BE/B.Tech., (Information Technology)	
	PGDCA	
	B.Sc. Computer Science	
	BCA	
	DOEACC "B" Level Course of 3 years duration or equivalent	

All the candidates with the above qualification shall be tested in the Exam Group mapped as per the above chart. However, candidates with educational qualification of BE/B.Tech (Computer Science) or BE/B.Tech (Information Technology), applying for both the posts of JE(S&T Department) and JE (IT), have to opt for either Electronics and Allied Engineering Exam Group or Computer Science and Information Technology Exam Group. The educational qualification for the post of DMS (Depot Material intendent) is Three Years Diploma in Engineering i.e a candidate with Three Years Diploma in any of Engineering disciplines, can apply for these posts as applicable. Candidates with educational qualifications not figuring in the above chart and eligible for DMS posts have to choose any one of the above listed Exam Groups other than CMA Exam Group, during the registration for online applications of this CEN.

A candidate possessing more than one minimum educational qualification, mapped to different Exam Groups, can choose any one Exam Group. These candidates would be eligible for all the posts for which they possess minimum educational qualifications.

Syllabus for Civil & Allied Engineering

1. **Engineering Mechanics**- Force (resolution of force, moment of force, force system, composition of forces), Equilibrium, Friction, Centroid and Center of gravity, Simple machines.
2. **Building Construction**- Building components (substructure, superstructure), type of structure (load bearing, framed and composite structures).
3. **Building materials**- Masonry materials (stones, bricks, and mortars), Timber and miscellaneous materials (glass, plastic, fiber, aluminum steel, galvanized iron, bitumen, PVC, CPVC, and PPF).
4. **Construction of substructure**- job layout, earthwork, foundation (types, dewatering, coffer dams, bearing capacity).
5. **Construction of superstructure**- stone masonry, brick masonry, Hollow concrete block masonry, composite masonry, cavity wall, doors and windows, vertical communication (stairs, lifts, escalators), scaffolding and shoring.
6. **Building finishes**- Floors (finishes, process of laying), walls (plastering, pointing, painting) and roofs (roofing materials including RCC).
7. **Building maintenance**- Cracks (causes, type, repairs- grouting, guniting, epoxy etc.), settlement (causes and remedial measures), and re-baring techniques.
8. **Building drawing**- Conventions (type of lines, symbols), planning of building (principles of planning for residential and public buildings, rules and byelaws), drawings (plan, elevation, section, site plan, location plan, foundation plan, working drawing), perspective drawing.
9. **Concrete Technology**- Properties of various types/grades of cement, properties of coarse and fine aggregates, properties of concrete (water cement ratio, properties of fresh and hardened concrete), Concrete mix design, testing of concrete, quality control of concrete (batching, formwork, transportation, placing, compaction, curing, waterproofing), extreme weather concreting and chemical admixtures, properties of special concrete (ready mix, RCC, pre-stressed, fiber reinforced, precast, high performance).
10. **Surveying**- Types of survey, chain and cross staff survey (principle, ranging, triangulation, chaining, errors, finding area), compass survey (principle, bearing of line, prismatic compass, traversing, local attraction, calculation of bearings, angles and local attraction) leveling (dumpy level, recording in level book, temporary adjustment, methods of reduction of levels, classification of leveling, tilting level, auto level, sources of errors, precautions and difficulties in leveling), contouring (contour interval, characteristics, method of locating, interpolation, establishing grade contours, uses of contour maps), area and volume measurements, plane table survey (principles, setting, method), theodolite survey (components, adjustments, measurements, traversing), Tacheometric survey, curves (types, setting out), advanced survey equipment, aerial survey and remote sensing.
11. **Computer Aided Design**- CAD Software (AutoCAD, Auto Civil, 3D Max etc.), CAD commands, generation of plan, elevation, section, site plan, area statement, 3D view.
12. **Geo Technical Engineering**- Application of Geo Technical Engineering in design of foundation, pavement, earth retaining structures, earthen dams etc., physical properties of soil, permeability of soil and seepage analysis, shear strength of soil, bearing capacity of soil, compaction and stabilization of soil, site investigation and sub soil exploration.

- 13. Hydraulics-** properties of fluid, hydrostatic pressure, measurement of liquid pressure in pipes, fundamentals of fluid flow, flow of liquid through pipes, flow through open channel, flow measuring devices, hydraulic machines.
- 14. Irrigation Engineering-** Hydrology, investigation and reservoir planning, percolation tanks, diversion head works.
- 15. Mechanics of Structures-** Stress and strain, shear force and bending moment, moment of inertia, stresses in beams, analysis of trusses, strain energy.
- 16. Theory of structures-** Direct and bending stresses, slope and deflection, fixed beam, continuous beam, moment distribution method, columns.
- 17. Design of Concrete Structures-** Working Stress method, Limit State method, analysis and design of singly reinforced and doubly reinforced sections, shear, bond and development length, analysis and design of T Beam, slab, axially loaded column and footings.
- 18. Design of Steel Structures-** Types of sections, grades of steel, strength characteristics, IS Code, Connections, Design of tension and compression members, steel roof truss, beams, column bases.
- 19. Transportation Engineering-** Railway Engineering (alignment and gauges, permanent way, railway track geometrics, branching of tracks, stations and yards, track maintenance), Bridge engineering (site selection, investigation, component parts of bridge, permanent and temporary bridges, inspection and maintenance), Tunnel engineering (classification, shape and sizes, tunnel investigation and surveying, method of tunneling in various strata, precautions, equipment, explosives, lining and ventilation).
- 20. Highway Engineering-** Road Engineering, investigation for road project, geometric design of highways, construction of road pavements and materials, traffic engineering, hill roads, drainage of roads, maintenance and repair of roads.
- 21. Environmental Engineering-** Environmental pollution and control, public water supply, domestic sewage, solid waste management, environmental sanitation, and plumbing.
- 22. Advanced Construction Techniques and Equipment-** Fibers and plastics, artificial timber, advanced concreting methods (under water concreting, ready mix concrete, tremix concreting, special concretes), formwork, pre-fabricated construction, soil reinforcing techniques, hoisting and conveying equipment, earth moving machinery (exaction and compaction equipment), concrete mixers, stone crushers, pile driving equipment, working of hot mix bitumen plant, bitumen paver, floor polishing machines.
- 23. Estimating and Costing-** Types of estimates (approximate, detailed), mode of measurements and rate analysis.
- 24. Contracts and Accounts-** Types of engineering contracts, Tender and tender documents, payment, specifications.

Previous RRB - JE Questions with Solutions

Subjectwise & Chapterwise

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