

2017

HRIDHA Series

MPPSC

Assistant Engineer (Civil)

Examination

Paper I & II

Salient Features:

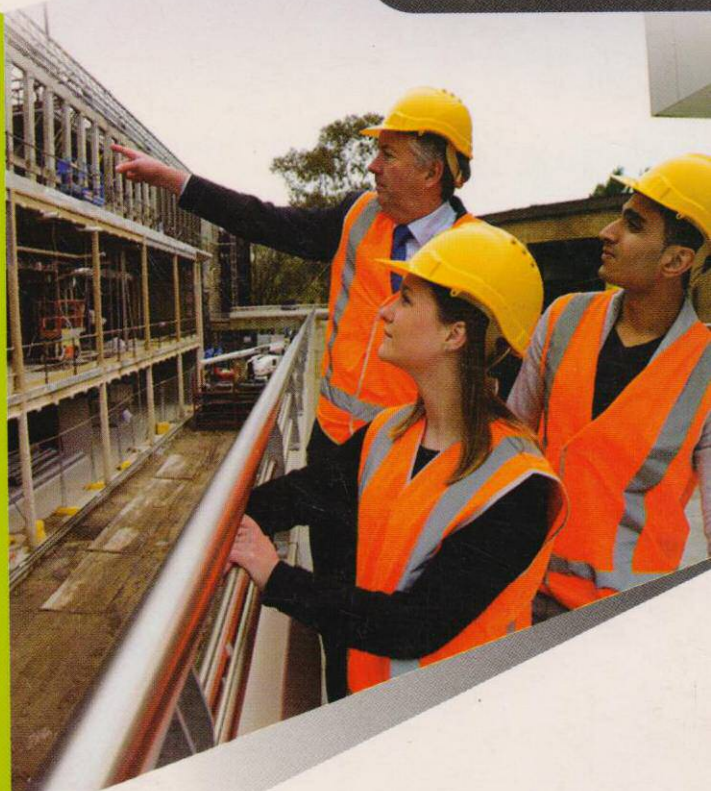
Based on MPPSC Exam Pattern.

Covering all Topic Briefly.

**Objective & Descriptive Type
Questions of Civil Engg. (AE).**

Special Interview Section.

**Model Test Papers with
Complete Answers.**



KHANNA PUBLISHERS

MPPSC
ASSISTANT ENGINEER (CIVIL)
SERVICES EXAMINATION

2017

Edited by
Hridha Khanna



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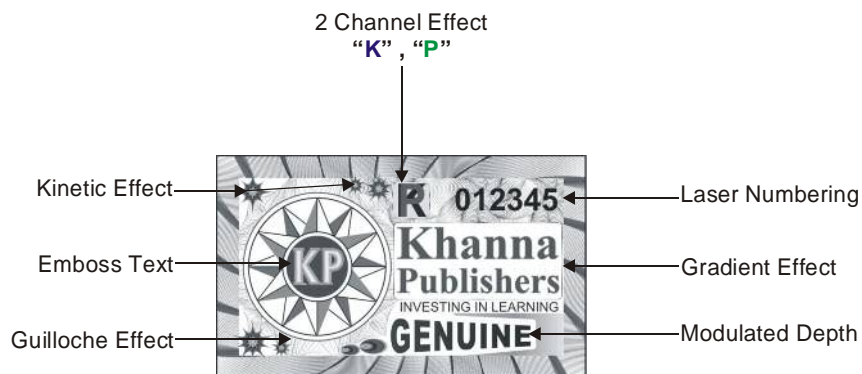
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Hologram & Description

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First Edition : 2017

Preface

The book has been designed as per the latest syllabus prescribed for MPPSC Assistant Engineer (CIVIL) Services and other States Assistant Engineer examinations. The book comprised into two parts (Prelims and Mains Examinations) alongwith Interview Preparation and Model Test Papers. This book will serve the purpose for the students who are preparing for Assistant Engineering Services Examinations.

The main objective of this book is to guide the students about the technique of questions asked in the examinations. Important questions of previous examinations have been included in each chapter. The latest updates have been included in general studies section. One separate chapter has been provided on **Madhya Pradesh alongwith Multiple Choice Questions**. Objective and Subjective questions arranged separately in Prelims and Mains section.

Salient Features

- Based on MPPSC Pattern of Examination
- Important questions have been included
- Separate chapter on Madhya Pradesh for GS
- Civil Engineering --Objective Type Questions
- Civil Engineering --Descriptive Type Questions
- Common Civil Engineering questions solved and unsolved provided in Interview section.
- Model Test Papers solved of each section given at the end of the book.

Every attempt has been made to make this book student friendly. Any suggestions made by the students to improve the usefulness of the book are welcomed.

—Publishers

Syllabus

Preliminary and Mains

Written Examination (MPPSC)2017

Exam Pattern : Exam Pattern for the MPPSC Assistant Engineer Pre written exam is as follows:

Plan of Exam:

- (i) Preliminary Written Exam (Screening Test) : **500 marks**
- (ii) Main Written Exam : **600 marks**
- (iii) Interview : **75 marks**

Preliminary Written Examination

Exam Pattern : Exam Pattern for the MPPSC Assistant Engineer Pre Written Exam is as Follows :

- ▶ The Written Exam will be Multiple Choice Questions (Objective Type).
- ▶ There will be two papers in written exam.
- ▶ The duration of each paper will be 02:00 hours (120 minutes).
- ▶ Minimum Qualifying marks will be 40% marks (for SC/ST/OBC 30% marks).

Papers	Subjects	Questions	Marks
Paper 1	General Aptitude		200
	Section-A: General Studies of India, preference to MP	50	100
	Section-B: Hindi Language	25	50
	Section-C: English Language	25	50
Paper 2	Engineering (Civil)	100	300
	Total Marks		500

PAPER-I

Section (A) General Introduction of Madhya Pradesh

1. **Geography** : General Introduction of Madhya Pradesh, area, topography and structure, physical and geographic areas and climate.
2. **Natural Resources of Madhya Pradesh:** Mineral Wealth, Forest Wealth and Wild Life. Agriculture and Live stock: Regional distribution of crops, planned development of Agriculture, Green Revolution, Development of Live stock. Water Resources: Development of Irrigation and Irrigation projects.
3. **Human Resources:** Population, Population Density, Urban and Rural population, Literacy and Labours.
4. **Energy Resources:** Questions will attempt to assess the general awareness of candidates about the conventional and non-conventional sources of energy and their uses in human life.
5. **Industries** : Attempt will be made to assess the general awareness of candidates about the types and size of industries and their impact on state economy.
6. **Environment:** Questions will be related to environment and its protection, pollution, natural climates and their impact on quality of human life.
7. **Planning and Evaluation:** Attempt will be to assess the general awareness of candidates about different aspect of five year plans till date, various programmes of urban and rural development, economic planning and its evaluation and status of Madhya Pradesh in the context of Country.
8. **Administrative Structure of Madhya Pradesh:** Questions will be related to general knowledge of candidates about administrative units – Division, District, Tehsil and Development-Blocks; their relationship and administrative structure.
9. **Rural and Urban Administrative Structure** : Questions will be pertaining to the general knowledge of candidate about organization and administrative structure of Pachayati Raj, Municipality and Municipal Corporation.
10. **Games and Sports:** Attempt will be made to assess the awareness of candidates related to organization, management and facilities for different games and sports. The questions will also be related to different State awards, and personalities and contribution of Government and non Government agencies.
11. **Culture, Literature, Music, Dance, Arts and History of Madhya Pradesh**
 1. **Culture** : The questions will be related to nature, types their salient features and impact on human life.
 2. **Literature** :
 - (i) Ancient: Kalidas, Bharthari, Bhavbhuti, Vanabhata.
 - (ii) Medieval: Keshav, Padmakar, Bhushan.
 - (iii) Modern: Pandit Makhanlal Chaturvedi, Subhadra Kumari Chauhan, Gajanan Madhav Muktibodh, Balkrishna Sharma “Navin”, Bhavani Prasad Mishra, Harishankar Parsai, Sharad Joshi, Mulla Ramoozi, Shiv Mangal Singh, Suman and Nanddulare Vajpai
 - (iv) Folk Literature/Dialects of Madhya Pradesh. Isuri, Singaji.

3. **Music & Dance Tradition**

(i) Music Tradition: Tansen, Ustad Allauddin Khan, Ustad Hafiz Ali Khan, Pandit Krishna Rao, Pandit Shankar, Rajabhaiya Poonchwale, Ustad Amir Khan, Kumar Gandharva, Maharaj Chakradhar Singh, Pandit Kartik Ram.

(ii) Dance tradition: Major styles of folk music, major folk dances.

4. **Arts:** The questions of general nature will be related to characteristics of Rock painting, folk painting, modern painting school and important painters. It will also have questions related to major folk and other theatres.

5. **Major Scheduled Tribes:** It will assess the general awareness of candidates related to names, characteristics, habitats, major fairs and festivals and cultural structure of major scheduled tribes. It will also have questions related to different programmes of State Government for the upliftment of Scheduled Tribes.

6. **Programmes of State Government in the field of Culture:** The questions will attempt to assess general knowledge of the candidate related to literacy academics and institutions. The questions will also be related to different Music and Fine Arts Schools and Cultural festivals. There will be questions awards given by the state for the significant contribution in the field of literature, music and fine arts.

7. **Archaeological Heritage:** The questions of general knowledge will be related to significance and characteristics of major historical, archaeological and tourist places.

8. **Historical perspective of Madhya Pradesh:** The questions will be related to creation of M.P. and important dynasties and rules of M.P. It will also have questions related to contribution of M.P. in freedom movement.

Section (B) हिंदी भाषा

1. व्याकरण संबंधी वस्तुनिष्ठ प्रश्न जिसमें संज्ञा, सर्वनाम, विशेषण, संधि, समास, कारक आधारित वस्तुनिष्ठ प्रश्न पूछे जाएंगे।
2. वाक्य संरचना, वाक्य के प्रकार, वाक्यगत अशुद्धि, शब्दगत अशुद्धि एवं तत्सम, तद्धव से संबंधित वस्तुनिष्ठ प्रश्न पूछे जाएंगे।
3. पारिभाषिक शब्द (प्रशासनिक शब्द), विलोम शब्द, पर्यायवाची शब्द, मुहावरे, कहावतें, प्रारूप लेखन, संक्षेपन आधारित प्रश्न होंगे।
4. अपठित गद्यांश से सम्बंधित 5 वस्तुनिष्ठ प्रश्न पूछे जाएंगे। प्रत्येक प्रश्न 2 अंक का होगा।

Section (C) English Language

The syllabus for the examination General English will be as follows:

The objective type questions paper will carry maximum 25 marks each question of one mark.

- Applied grammar containing topics like parts of speech, vocabulary, Active-Passive, Direct and Indirect speech, Transformation of sentence.
- Sentence completion questions (Fill in the blanks). These will be of the nature of multiple choice questions.
- Questions on reading comprehension (Based on an unseen passage each).

PAPER-II

Objective Type Questions from Civil Engineering Paper 1 and II given for Mains examinations.

MAINS EXAM

CIVIL ENGINEERING (CODE NO. 01)

PAPER – I

- 1. Structural Analysis:** Determinate and Indeterminate Structures, Degrees of Freedom. Static and Kinematic indeterminacy, Principle of Superposition, Virtual Work, Energy theorem, Deflection of Trusses, Redundant Frames.

Analysis of Determinate and Indeterminate Arches, their influence lines. Rolling loads, influence lines for Determinate Beams and Pin-jointed Frames. Mullar Breslau's Principle and influence lines for Indeterminate Beams and Frames. Slope Deflection, Moment Distribution and Kani's methods. Column Analogy, Energy Methods for analysis of indeterminate beams and frames. approximate methods for analysis of Rigid Frames. Matrix Methods of analysis, Stiffness and Flexibility Matrices of Beams. Frames & Trusses, Elements of Plastic analysis.

- 2. Structural Design:**

- (1) Steel Design: Factors of Safety and Load Factors. Rivetted and Welded connections of Members, Design of Tension, Compression and Flexural members, built-up beams and Plate Girder Slab and Gusseted Bases for Columns, Design of Roof Trusses. Purling and Coverings, Structural Steel tubes and their connections Industrial and Multi-Storyed Buildings Water tank and supporting tower's design. Plastic Design of Continuous Beams & Frames.
- (2) R.C. Design: Working Stress and Limit State methods for design of Rectangular, T and L Beams, Slabs and Columns. Isolated and Combined footings, Raft Foundations. Overhead, Resting on ground and Underground Water Tanks. Design of Bunkers and Silos. Methods and Systems of Prestressing, Anchorages. Losses in Prestress, Design of Prestressed Concrete Beams.

- 3. Construction Planning and Management:** Detailed estimates, specifications, analysis and rates of various works in civil engineering. Construction activity, work break down structures, scheduling through CPM and PERT analysis, cost optimization through network construction, Float times, Bar charts, Project control and super-vision, cost reduction measures, Cost analysis and resource allocation, Fundamentals of engineering economics, methods of appraisal, present work, annual costs, benefit cost analysis, Types of tenders and contract conditions.

- 4. Environmental Engineering: Water Demand:** Per capita Demand, Population Estimation methods Water Quality Criteria for various uses viz. Domestic & Non-Domestic, Irrigation effects & significance of important parameters and permissible concentration as per relevant standards. Transmission of Water- relative merits & demerits of various pipes viz C.I. G.I. Mild Steel. A.C. Pressure Pipes. Corrosion of Pipes-types & Methods of control System of distribution & layouts of distribution.

Unit Processes & Operations for Water Treatment viz, Objectives and Design criteria of Sedimentation, Coagulation, Flocculation, Chemical Sedimentation. Filtration (slow sand & rapid sand), Disinfection, Softening. Quantity & Characterization of Domestic Sewage-significance

of B.O.D., C.O.D., D.O., Solids. T.O.C., N.O.D. Effluent Standards, River Standards. Sewage System-Design of Sewer & Storm Sewer, Sewage Pumps. Design of Screens, Grit Chamber. Design of Primary Sedimentation tank. Design of Biological Treatment Units viz.

Trickling filters, Activated Sludge Treatment and Secondary Sedimentation tank. Waste Stabilization Ponds- Aerobic, Anaerobic & Facultative Ponds, design criteria and principles. Sludge Treatment-Digestion & Sludge Disposal. Septic Tanks-design criteria & working Self Purification of Streams-oxygen sag curve. Types of Pollution-Sources & effects of various pollution viz., Water, Air, Land & Noise, Relevant standards. Rural Sanitation, Solid Waste- collection & disposal.

PAPER – II

- 1. Water Resources Engineering:** Water Resources in the Globe, Available Fresh Water. Need for Optimum use of Available water, Schemes for Drinking, Irrigation, Hydro Power, Multipurpose Schemes. Irrigation: Necessity, Scope, Benefits & Effects. Methods & Systems of Irrigation, their efficiencies. Water Distribuion & Scheduling techniques. Crop Water Requirements, Evapotranspiration, Consumptive Use, Duty, Delta, Base Period their relation, Crop Rotation, Quality of Irrigation Water.

Hydrology – Hydrological Cycle, Precipitation – Types, Measurement, Raingauge Network, Analysis of Precipitation Data, Dependability Analysis, Unit Hydrograph, Summation & Synthetic Hydrographs, Design Flood by UH & Frequency Studies. Ground Water – Class & Availability of Soil Moisture. Aquifers- Confined & Unconfined. Open & Tube Wells, Radial Flow in Wells, Dupuit's Theory. Darcy's Law, Seepage Analysis using Flow Nets. Yield of Wells, determination. Storage Scheme – Reservoir Planning, Capacity, Yield, Life. Gravity & Earthen Dams.

Forces Acting, Modes of Failure, Stability Criteria, Design. Galleries. Shafts. Joints in Gravity Dams. Foundation Treatment. Spillways, Types, Design of Ogee & Siphon Spillways. Energy Dissipating Devices, Design of Stilling Basins. Diversion Schemes – Structures on Pervious Formations, Bligh's & Khosla's Theory, Hydraulic Jump, Design of Vertical Drop Weir & Barrage. Distribution System – Canals – Classification, Layout, Alignment, Capacity, Design of Canals. Silt Theories, Canal Regulation Structures.

Design of Head & Cross Regulators, Canal Falls, Cross Drainage Works, and Outlets, Escapes. Water Logging – Causes, Effects, Remedial Measures, Losses in Canals, Canal Lining, Types. Advantages, Conjunctive use of Surface & Ground Water. River Training – Objective & Methods, Concepts of Hydro Power Projects.

- 2. Transportation Engineering: Railways:** Permanent Way, Sleepers, Rail Fastenings, Ballast, Points and Crossings, different types of Turn Outs. Stations and Yards, Turn Tables, Signals and Interlocking, Level Crossing. Maintenance of Track, Super-elevation, Creep of Rails, Ruling Gradients, Track Resistance. Tractive Efforts, Curve Resistance. Highways & Airports – Principles of Highway Planning, Highway Alignments. Geometrical design, Cross-section. Camber, Super-elevation. Horizontal and Vertical curves.

Classification of Roads. Design and Construction of Flexible and Rigid pavements for Highway and Airfields. Evaluation of Pavement Failure and Strengthening, Drainage of Roads.

Traffic Engineering : Traffic Surveys, Highway Capacity, Intersections, Rotary Design Elements,

Signs, Signals and Markings. Selection of Airport Sites, Windrose Diagram & Runway Orientation. Runway and Taxiway Geometric and Lighting.

Bridge Engineering – Selection of Site, Design Data collection, Hydraulic Design, Scour Depth for Bridge Foundation, Economic Span. Type of Road and Railway Bridges, Design Loads and Forces, Impact Factor, Indian Loading Standards. Super Structure & Sub Structure, Abutments, Piers, Wing Walls, Return Approaches.

3. **Geotechnical Engineering:** Index Properties of Soil, Classification of Soils. Clay Minerals. Capillary Water, Permeability, Factors Affecting Permeability, Lab and field methods. Permeability of stratified soil deposits. Seepage Pressure, Quick Sand Condition, Flow Net, its properties & uses. Stress distribution in soils, Boussinesq's theory. Newmark's Chart.

Consolidation and Settlement: Terzaghi's theory, Consolidation test. Settlement computation. Time Settlement curve. Compaction tests & their significance, factors affecting compaction. Shear Strength Parameters, Shear Tests, Mohr Coulomb's failure theory, Skempton's Pore Pressure coefficients. Earth Pressure at rest, Active and Passive Pressures, Rankine's and Coulomb's theory.

Bearing capacity, Terzaghi's analysis, factors affecting Bearing Capacity, Plate Load Test. Stability of Slopes, Swedish Slip Circle method and Bishop's simplified method. Stability Number. Sub-surface exploration. Methods, sampling, SPT, DCPT and Static Cone Penetration Test, Electrical Resistivity and Seismic method. Essential features of Foundation, types, design criteria, Rafts. Pile Foundation, Types of Piles, Pile Capacity, Pile Load Test. Group Action. Static/Dynamic formulae. Elements of Machine Foundation, Natural frequency, Amplification and Resonance. Ground Improvement Techniques, Sand Drains, Soil Stabilization, Geotextiles.

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