



ARIHANT

ENGINEERING ACADEMY

O.P.S.C-AEE

(ODISHA PUBLIC SERVICE COMMISSION)

ONLINE TEST SERIES

CIVIL ENGINEERING - SCHEDULE

No. of Test:- 18	
Subject Wise Mock Test	12
Mixed Subject Mock Test	6

- All tests will be activating as per the date and valid up to the exam.

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Syllabus

Civil Engineering

Paper – I

1. **SOLID MECHANICS:-** Elastic constants, plane stress, plane strain, Mohr's circle, combined stress; Elastic theories of failure; Simple bending, Shear; Torsion of circular and rectangular sections and simple members. Bending Moment and Shear Force in statically determinate beams.
2. **STRUCTURAL ANALYSIS:-** Analysis of determinate structures - different methods including graphical methods. Analysis of indeterminate skeletal frames - moment distribution, slope deflection, stiffness and force methods, energy methods, Muller-Breslau principle and application. Plastic analysis of indeterminate beams and simple frames - shape factors. Basic concepts of matrix method of structural analysis.
3. **DESIGN OF CONCRETE STRUCTURES:** Limit state design for bending, shear, axial compression and combined forces. Codal provisions for slabs, beams, walls and footings. Principles of prestressed concrete design, materials, methods of prestressing, losses. Design of simple members.
4. **DESIGN OF STEEL STRUCTURES (Based on Limit State Method):-** Analysis and design of tension and compression members. Column bases, connections – Simple and eccentric beam – column connections. Plate girders and trusses.
5. **BUILDING MATERIALS and BUILDING CONSTRUCTION:-**
 - a. **Building Materials:-** **Cement:** Components, different types, setting times, strength. **Cement Mortar:** Ingredients, proportions, water demand, mortars for plastering and masonry
Concrete: Importance of W/C Ratio, Strength, ingredients including admixtures, workability, testing for strength, non-destructive testing, mix design methods.
Bricks: Types, Indian Standard classification, absorption, saturation factor, strength in masonry.
 - b. **Building Construction:-** Types of Foundations, Brick masonry, Stone masonry, Floorings, Causes and prevention of cracks in buildings, Damp proofing, Special maintenance of buildings.
6. **ESTIMATION, CONSTRUCTION PLANNING AND MANAGEMENT:-** Preliminary estimate, Detailed estimate, Specifications and cost analysis. Bar chart, Linked bar chart, Work-breakdown structures Activity- on – arrow diagrams, critical path, probabilistic activity durations, Event- based networks, PERT networks: Time- cost study, Resource allocation.

Paper – II

1. **WATER RESOURCES AND HYDRAULIC ENGINEERING:-**
 - a. **Irrigation Engineering:-** Consumptive use of water, irrigation systems, water demand assessment; Storages and their yields, ground water and well hydraulics; Water logging, drainage design; Design of rigid boundary canals, Lacey's and

Tractive force concepts in canal design, lining of canals; Sediment transport in canals; Forces acting on gravity dams and their design, Design of head works, distribution works, falls, Cross – drainage works, outlets; River training.

- b. Hydrology:-** Hydrological cycle, precipitation and related data analyses, Probable maximum precipitation, unit hydrograph and synthetic unit hydrographs; Evaporation and transpiration; Floods and their management, Design Flood, Streams and their gauging; Routing of floods; Capacity of Reservoirs.
 - c. Fluid Mechanics:-** Fluid Properties, Pressure, Thrust, Buoyancy; Flow Kinematics; Integration of flow equations; Flow measurement; Relative motion; Moment of momentum; Viscosity, Boundary layer and Control, Dimensional Analysis, Flow development, losses in pipe flows, Pipe networks, Flow measuring equipment and structures.
 - d. Open Channel Flow:-** Momentum and Energy principles in Open channel flow, Types of flow, Flow sections and properties; Normal flow, Gradually varied flow, Hydraulic jump
- 2. ENVIRONMENTAL ENGINEERING**
- a. Water Supply Engineering:-** Sources of supply, design of intakes, Estimation of demand; Water quality standards; Primary and secondary treatment, detailing and maintenance of treatment units; Conveyance of treatment units; distribution systems of treated water, leakages and control; Institutional and industrial water supply.
 - b. Waste Water Engineering:-** Urban rain water disposal; Quantity and characteristics of waste water, Collection of waste water, Primary, Secondary and tertiary treatment of waste water, Sludge disposal, effluent discharge standards, Institutional and industrial sewage management
 - c. Solid Waste Management:-** Characteristics, Generation, Collection and Transportation, Engineered systems of solid waste management (reuse, recycle, recovery, treatment and disposal). Design and Management of landfills.
 - d. Air and Noise Pollution:-** *Air pollution*: sources and impacts, air pollution controls, standards and limits. *Noise pollution*- impacts of noise, permissible limits, measurements and control of noise pollution.
- 3. GEOTECHNICAL ENGINEERING**
- a. Soil Mechanics:-** Fundamental definitions and interrelationships; Properties and Classification of soils, Permeability and seepage, Effective stress principles, Shear strength, Consolidation, Compaction, stress distribution in soils.
 - b. Foundation Engineering:-** Types of foundations, Foundation design requirements, Shallow foundations - bearing capacity, settlement analysis in sands and clays, Deep foundations- pile types, dynamic and static formulae, load carrying capacity of piles in sands and clays, group action, negative skinfriction , Earth pressure theories, effect of water table, layered soils, Stability of slopes, Sub-surface investigations- scope, drilling bore holes, sampling, penetration tests, plate load tests, geophysical tests.
- 4. TRANSPORTATION ENGINEERING:-**
- a. Highway Engineering:-** Geometric design of highways, Testing and specifications of paving materials, design of flexible and rigid pavements

- b. Traffic Engineering:-** Traffic characteristics, theory of traffic flow, intersection design, traffic signs and signal design, highway capacity.
- c. SURVEYING:-** Principles and classification of surveys, mapping concepts, Coordinate systems, Measurement of distance and directions, Levelling, Theodolite traversing, Contours, Plane table surveying, Errors and adjustments, Curves, Total station, Concept of Global Positioning System; Photogrammetry and Remote Sensing concepts.

Distribution of Marks for Civil Engineering

Paper – I

Number of multiple choice questions:

1. Solid Mechanics – 20
2. Structural Analysis – 20
3. Design of concrete structure – 15
4. Design of steel structure – 10
5. Building Material and Building Construction – 15
6. Estimation, Construction Planning and Management – 10

Total number of questions – 90. Duration of Examination – 3 hours. Each question carries two marks.

Paper – II

Number of multiple choice questions:

1. Water Resources and Hydraulic Engineering – 25
2. Environmental Engineering – 15
3. Geotechnical Engineering – 25
4. Transportation Engineering – 15
5. Surveying – 10

Total number of questions – 90. Duration of Examination – 3 hours Each question carries two marks.

OPSC - AEE Online Test Series

Test Packages

S. No	Test series Title	Stream	Total Test	Price
1	OPSC – AEE Prelims Online Test Series	CE	18	1000/-

Test Details

S. No	Test Name	Test Type	Subject/ Syllabus	Tests	Questions	Marks	Duration	Total Tests	Total Questions
1	OPSC – AEE	Subject Wise Test	Full Syllabus	12	100	100	100 Minutes	18	1800
2		Mixed Subjects Test	Full Syllabus	6	100	100	100 Minutes		

Test Schedule**OPSC - AEE****OPSC – AEE 2021 – 22 Prelims Online Test Series Schedule****Civil Engineering**

Test No./Name	Start Date	End Date	Subjects/ Topic Covered	No. of Questions	Total Marks	Total Time	Minus Marks
Subject Wise Test – 01(P1) Solid Mechanics	02.12.2021	Till OPSC – AEE 2022 Prelims Exam	Solid Mechanics	100	100	100	¼ marks
Subject Wise Test – 02(P1) Structural Analysis	05.12.2021	Till OPSC – AEE 2022 Prelims Exam	Structural Analysis	100	100	100	¼ marks
Subject Wise Test – 03(P1) Design of Concrete Structures	09.12.2021	Till OPSC – AEE 2022 Prelims Exam	Design of Concrete Structures	100	100	100	¼ marks
Subject Wise Test – 04(P1) Design of Steel Structures	12.12.2021	Till OPSC – AEE 2022 Prelims Exam	Design of Steel Structures	100	100	100	¼ marks
Subject Wise Test – 05(P1) Building Materials & Building Construction	16.12.2021	Till OPSC – AEE 2022 Prelims Exam	Building Materials & Building Construction	100	100	100	¼ marks
Subject Wise Test – 06(P1) Estimation, Construction Planning and Management	19.12.2021	Till OPSC – AEE 2022 Prelims Exam	Estimation, Construction Planning & Management	100	100	100	¼ marks
Subject Wise Test – 07 (P2) Irrigation & Hydrology	23.12.2021	Till OPSC – AEE 2022 Prelims Exam	Irrigation Hydrology	100	100	100	¼ marks
Subject Wise		Till OPSC –					

Test – 08 (P2) FM & Open Channel Flow	26.12.2021	AEE 2022 Prelims Exam	FM & Open Channel Flow	100	100	100	¼ marks
Subject Wise Test – 09 (P2) Environmental Engineering	30.12.2021	Till OPSC – AEE 2022 Prelims Exam	Environmental Engineering	100	100	100	¼ marks
Subject Wise Test – 10 (P2) Geotechnical Engineering	02.01.2022	Till OPSC – AEE 2022 Prelims Exam	Geotechnical Engineering	100	100	100	¼ marks
Subject Wise Test – 11 (P2) Transportation Engineering	06.01.2022	Till OPSC – AEE 2022 Prelims Exam	Transportation Engineering	100	100	100	¼ marks
Subject Wise Test – 12 (P2) Surveying	09.01.2022	Till OPSC – AEE 2022 Prelims Exam	Surveying	100	100	100	¼ marks
Mixed Test – 01 (P1)	13.01.2022	Till OPSC – AEE 2022 Prelims Exam	SOM + RCC	100	100	100	¼ marks
Mixed Test – 02 (P2)	16.01.2022	Till OPSC – AEE 2022 Prelims Exam	Environment + Transportation	100	100	100	¼ marks
Mixed Test – 03 (P1)	20.01.2022	Till OPSC – AEE 2022 Prelims Exam	SA + STEEL	100	100	100	¼ marks
Mixed Test – 04 (P2)	23.01.2022	Till OPSC – AEE 2022 Prelims Exam	Soil Mechanics + Foundation + Irrigation	100	100	100	¼ marks
Mixed Test – 05 (P1)	27.01.2022	Till OPSC – AEE 2022 Prelims Exam	BMBC + Estimation	100	100	100	¼ marks
Mixed Test – 06 (P2)	30.01.2022	Till OPSC – AEE 2022 Prelims Exam	Hydrology + FM + OCF	100	100	100	¼ marks