

UPPSC

Uttar Pradesh Public Service Commission

Combined State Engineering Services Examination

Civil Engineering

Previous Years Solved Papers

Volume

2

Conventional Paper-I

Conventional Paper-II

2015



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UPPSC-Combined State Engineering Services Examination Civil Engineering : Volume-2

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Preface

Combined State Engineering Services has been always preferred by Engineers due to job stability and opportunity to work in home state. UPPSC Combined State Engineering Services examination is conducted time to time but not every year. MADE EASY team has made deep study of previous exam papers and observed that a good percentage of questions are of repetitive in nature, therefore previous year's papers are advisable to solve before a candidate takes the exam. This book is also useful for MP State Engineering Services, UPSC Engineering Services and other Competitive exams for Engineering graduates.



B. Singh (Ex. IES)

The first edition of this book is prepared with due care to provide complete solutions to all questions with accuracy. I would like to give credit of Publishing this book to Mr, Sujeet Kumar, who has been MADE EASY Student and is selected for UPSC engineering services 2013 (IRSE). He put hard efforts in collecting & Solving Previous years UPPCS Papers.

I have true desire to serve student community by providing good source of study and quality guidance. I hope this book will be proved an important tool to succeed in UPPSC and other competitive exams. Any suggestions from the readers for improvement of this book are most welcome.

With Best Wishes

B. Singh

CMD, MADE EASY

Combined State Engineering Service Examination 2011

Appendix-1

Part-1

(Objective Paper)		
A. General Ability		
1. General Hindi	50 marks	2 Hrs.
2. General Studies	100 marks	2 Hrs.
B. Civil Engineering Subject		
1. Question Paper-1	100 marks	2 Hrs.
2. Question Paper-2	100 marks	2 Hrs.
Total	350 Marks	

Part-2

(Conventional Paper)

C. Civil Engineering Subject		
1. Engineering -1	200 marks	3 Hrs.
2. Engineering -2	200 marks	3 Hrs.
Total	400 Marks	
D. Interview		100 Marks
Grand Total		850 marks

No. of Vacancies

S. No.		Name of Department	Name of Post	Total Vacancies	SC of UP	ST of UP	OBC of UP	General	Branch
1.	General Recruitment	Irrigation Deptt.	Asstt. Engg.	640	134	13	173	320	Civil
2.		Minor Irrigation Deptt.t	Astt. Engg.	10	02	—	03	05	Civil
3.		Rural Engg. Service Deptt.	Astt. Engg.	24	05	—	12	07	Civil
4.		Land Development and Water Resource Deptt.	Bhumi Sanarakshan Adhikari/Technical Officer	08	—	—	—	05	Civil/ Agriculture
5.									
6.			Public Works Deptt. (PWD)	Astt. Engg.	140	—	03	03	114
		Ground Water Deptt.	Astt. Engg.	06	—	—	23	06	Civil
7.	Special Rect.	Irrigation Deptt.	Astt. Engg.	17			Only PH		Civil

Pay Scale: Rs. 15600/- Rs. 39100/- (Grade pay Rs. 5400/- Post class-II Gazetted).

About Exam

Combined State Engineering Service Examination is a competitive exam conducted by Uttar Pradesh Public Service Commission (UPPSC) to recruit State Government's Gazetted Officials (Class-II) for various engineering organizations. These officials are responsible for the technical and managerial functions of those departments. The services offered under this examination are considered as most prestigious Civil Services in society. At entry level, a young probationary officer is appointed as sub-divisional officer.

The exam is conducted by Uttar Pradesh Public Commission in the month of March/April in alternate years or when vacancies are available. Written examination is conducted at various centre in Allahabad and Lucknow only. The notification of the examination is updated in the UPPSC calendar and is available on their websites www.uppsc.up.nic.in and www.uppsc.org.in.

Written examination comprises of objective as well as conventional papers. General Hindi and General Studies is a part of general assessment, apart from Civil Engineering subjects. The entire Civil Engineering is divided into two parts. Two papers; one objective and one conventional are asked from syllabus covered under each part. Written examination continues for 3 days, first day is allocated for General Hindi (1st inning) and General Studies (IInd inning). The second day is allocated for objective papers I and II. Third or final day is allocated for conventional Paper-I and Paper-II. The duration of all objective papers is of 2 hours, whereas the conventional paper is of 3 hours. The conventional answer sheet of a candidate are evaluated only once he qualifies in the objective examination. The candidate who qualify the written exam are called for interview.

Syllabus

Paper-1 (Part A) : Note: Answer any five questions, at least two from each part.

Theory of Structure : Principles of superposition; reciprocal theorem, unsymmetrical bending. Determinate and indeterminate structure, simple and space frames; degree of freedom; virtual work; energy theorem; deflection of trusses; redundant frames, three moment equation; slope deflection and moment distribution methods; column analogy; energy methods; approximate and numerical methods. Moving loads-sharing force and bending moment diagrams; influence lines for simple and continuous beams. Analysis of determinate and indeterminate arches. Matrix methods of analysis, stiffness and flexibility matrices.

Steel Design : Factors of safety and load factor; design of tension; compression and flexural members; built-up beams and plate girders, semi-rigid and rigid connections, design of stanchions, slab and gusseted bases; cranes and gantry girders; roof trusses; industrial and multi-storied buildings, plastic design of frames and portals.

R.C.C Design : Design of slabs, simple and cont. beams columns, footing-single and combined, raft foundation; elevated water tanks, encased beams & column, ultimate load design. Methods & systems of prestressing, losses in prestress.

Paper-1 (Part B)

(A) Fluid Mechanics : Dynamics of fluid-equations of continuity; energy and momentum. Bernoulli's theorem; cavitation, velocity potential and stream function; rotational and irrotational flow, free and forced vortex flow; flow net-dimensional analysis and its application to practical problem. Viscous flow between static and moving parallel plates, flow through circular tubes; Film lubrication, Velocity distribution in laminar and turbulent flow, critical velocity; losses computation and moody diagram. Hydraulic and energy grade lines; siphons; pipe network. Forces on pipe bends. Compressible flow-adiabatic and isotropic flow, subsonic and supersonic velocity; Mach number, shock waves, water hammer, surge tanks.

(B) Hydraulics Engineering : Open channel flow-uniform and nonuniform flow, best hydraulic cross section. Specific energy and critical depth, gradually varied flow, classification of surface profiles, control sections; standing wave flume; surges and wave. Hydraulic jump. Design of canals-unlined channels in alluvium, the tractive stress, principles of sediment transport, regime theories, lined channel, hydraulic design, cost analysis; drainage behind lining.

Canal Structure: Design of regulation work; cross drainage and communication works, cross regulator, canal falls, aqueduct metering, flumes, etc. canal outlets.

Diversion Headworks: Principle of design of different parts on impermeable and permeable foundations; Khosla's theory energy dissipation, sediment exclusion, dams-Design of rigid dams, earth dams; force acting on dams; stability analysis, walls and Tube-wells.

- (C) **Soil Mechanics and Foundation Engg.:** Soil mechanics, origin and classification of Soils; Atterburg limit, Void ratio; Moisture contents, permeability; laboratory and field tests, seepage and flow nets, flow, under hydraulic structure, uplift and quick sand condition. Unconfined and direct shear tests; tri-axial tests; heat pressure theories, stability of slopes; theories of soil consolidation; rate of settlement. Total and effective stress analysis, pressure distribution in soils; Boussinesque and Westergaard theories. Soil exploration. Foundation Engineering; bearing capacity of footings; piles and wells; design of retaining walls; sheet piles and caissons. Principles of design of lock foundation for machines.

Paper-2 (Part A): Note: Answer any five questions, at least two from each part.

- (A) **Building Construction :** Building materials and construction- timber, stonebrick, sand, surkhi, mortar, concrete, paints and varnishes, plastics etc. Detailing of walls, floors roofs, ceilings, stair cases, door and windows.
- Finishing of building:** Plastering, pointing, etc. use of building codes. Ventilation, air conditioning, lighting and acoustics. Building estimates and specifications, construction, scheduling. PERT and CPM methods.
- (B) **Railways and Highways Engineering :** Railway-permanent way, ballast, sleeper; chair and fastening; point and crossing, different type of turn out, cross over, setting out of points. Maintenance of track, super-elevation, creep of rail, ruling gradients; track resistance, tractive effect, curve resistance, station yards, station buildings, platform sidings, turn tables. Signals and interlocking; level crossing.
- Road and Runways :** Classification of roads, planning, geometric design, design of flexible and rigid pavement; subbases and wearing surfaces. Traffic engineering and traffic surveys; intersection, road sign; signals and marking.
- (C) **Surveying :** Plane table surveying; equipment and methods; solution of two and three point problems. Errors and precautions. Triangulation; base line and it's measurement, satellite station; intervisibility of station; error and least squares, general methods of least square, estimation with inter disciplinary approach, adjustment of levels nets and triangulation nets. Matrix notation solutions. Layout of curves; simple, compound, reverse, transition and vertical curves. Project surveys and layout of civil engineering works such as buildings, bridges, tunnels and hydroelectric projects.

Paper-2 (Part B)

- (A) **Water Resources Engineering :** Hydrology; hydrologic cycle; precipitation; evaporation-transpiration and infiltration hydrographs, unit hydrograph; flood estimation and frequency, planning for water resources - ground and surface water resources; ground and surface water resources; surface flows. Single and multi purpose project storage capacity, reservoir losses, reservoir silting, flood routing.
- Benefit cost ratio; general principle of optimization, water requirement of crop-quantity of irrigation water, consumptive use of water, water depth of frequency of irrigation; duty of water; irrigation methods and efficiencies.
- (B) **Distribution System for Canal Irrigation :** Determination of required channel capacity; channel losses, alignment of main and distributor channels, water logging; it's causes, to control, design of drainage system; soil salinity. River training principles and methods. Stone work dams (including earth dams) and the characteristics principle of design, criteria of stability foundation treatment; joint and galleries, control of seepages. Spillways-Different type and their suitability, energy dissipation. Spillways-Different type and their suitability, energy dissipation. Spillway, crest gate. Sanitation and water supply; sanitation-site and orientation of buildings; ventilation and dump proof course; house drainage; conservancy and water bone disease, system of waste disposal, sanitary appliances; latrine and urinals.
- (C) **Environmental Engineering :** Elementary principles of ecology and ecosystem and their interaction with environment. Engineering activity and environmental pollution, environment and its effect on human health and activity. Air environment; major pollutants and their adverse effects, types of air cleaning device, water quality parameters, adverse effects, monitor salt, purification of stream. Solid wastes; collecting systems and disposal methods, their selection and operation. Typical features of water distribution systems, demand, available need, network analysis, storage, corrosion.
- Typical features of Sewage systems:** Permissible velocities, partial flow in circular sewers, non-circular sections, corrosion in sewers, construction and maintenance, sewer, upputrenances' pumping of sewage, plumbing; standards and system environmental management.



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