



**INLAND WATERWAYS AUTHORITY OF INDIA**  
(A Statutory Body under Ministry of Ports, Shipping &  
Waterways, Govt. of India)  
Head Office A-13, Sector -1, Noida, U.P. -201301.

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**Syllabus of Computer Based Test (C.B.T) for Junior  
Hydrographic Surveyor of IWAI:**

**Section (A) / Technical Questions: 100 MCQ carrying  
100 marks**

**Water Engineering**

Sourcing of water- surface and groundwater, types of intakes and wells; sedimentation, etc.; water supply engineering- population and forecasting of water demands, reservoirs, networks, its components, Velocity, discharge, etc.

**Surveying**

Basic principles and Importance of surveying to engineering projects. Type of maps, scales and uses, plotting accuracy, map sheet numbering, coordinate and map projection. Surveying equipment, levels, compass, theodolites, tachometer, EDM, total Stations and other instruments like GPS, Echosounder etc. Measurement of angles, directions, distances and water depths. Determination of elevation, spirit levelling, trigonometrical levelling, and tachometric surveying, contouring. Plane table surveys and mapping. Methods of control establishment, traversing, triangulation, adjustment of survey measurements, computation of coordinates.

**Geotech**

Physical properties of soils: Classification; Compaction: clay mineral, compaction tests, Compressibility, vertical sand drains; Shear strength of soils: Principle of

effective stress, Mohr-Coulomb failure criterion, direct shear test, unconfined compression test, Soil exploration; Earth pressure and retaining walls (Rankine and Coulomb's earth pressure theories); Shallow foundations: bearing capacity and settlement, Stresses below foundations; Sheet piling and bracing of foundation excavation; Pile foundations: load carrying capacity of individual and group of piles, settlement; Well foundations: methods of construction, tilt and shift, bearing capacity and settlement, lateral stability of well foundation; Stability analysis of slopes: infinite slopes, method of slices and Bishop's simplified method.

### **Transportation**

Road and Highway Planning in India; Alignment fixing and surveys; Geometric design - factors affecting, cross-sectional elements, sight distances, horizontal alignment design, vertical alignment design; Access control; Traffic flow characteristics and their relationships, traffic volume studies, speed studies, delay and travel time studies, parking studies and accident studies and analysis; Capacity of roads - urban roads and rural highways.

### **Hydraulics**

**Hydraulics:** Forces on immersed bodies; Flow measurement in channels and pipes; Dimensional analysis and hydraulic similitude; Kinematics of flow, velocity triangles; Channel Hydraulics - Energy depth relationships, specific energy, critical flow, slope profile, hydraulic jump, uniform flow and gradually varied flow.

**Hydrology:** Hydrologic cycle, watershed, infiltration, unit hydrographs, hydrograph analysis, flood estimation and routing, reservoir capacity, reservoir and channel routing, surface run-off models, ground water hydrology - steady state well hydraulics and aquifers.

**Irrigation & Hydraulic structures:** Duty, delta, estimation of evapo-transpiration; Design of lined and unlined canals, head works, Design of weirs/barrage on permeable foundation; Types of irrigation systems, irrigation methods; Canal regulatory works, cross-drainage structures, outlets and escapes, gravity and embankment dams, spillways. River Training works: Permanent and Semi-permanent; Bank Protection.



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**Section (B) / Non-Technical Part (25 MCQ carrying 25 marks)**

The topics for 25 marks will be on the following:

1. Quantitative aptitude (simple maths)
  2. MS Office (Word, Excel and Powerpoint)
  3. Analytical and Logical reasoning
  4. Simple English
  5. General Knowledge
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**Syllabus for the post of Junior Hydrographic Surveyor**

Junior Hydrographic Surveyor examination will consist of one stage:

**STAGE I: (TIER-I + TIER-II)**

- |    |                                            |   |         |
|----|--------------------------------------------|---|---------|
| 1. | Computer Based Test (CBT) (Objective Type) | - | Tier-I  |
| 2. | Computer Based Test (CBT) (Objective Type) | - | Tier-II |

**TIER-I****1. Computer Based Test: Tier-I (Objective Type):****Section (A) / Technical Questions: 100 MCQ carrying 100 marks**

(Test will consist of 100 Multiple Choice Question (MCQs) as per attached syllabus, one (01) mark for each question, 120 minutes' duration. The questions will be set in English:

| Part | Subject (Not in sequence)                                | No. of Questions/<br>Maximum Marks |
|------|----------------------------------------------------------|------------------------------------|
| I    | Water Engineering                                        | 15/ 15                             |
| II   | Surveying                                                | 30/ 30                             |
| III  | Geotech                                                  | 15/ 15                             |
| IV   | Transportation                                           | 10/ 10                             |
| V    | Hydraulics, Hydrology, Irrigation & Hydraulic structures | 30/ 30                             |

**TIER-II**

Paper will consist of objective type – Multiple Choice Questions (MCQs) only. The questions will be set both in English & Hindi except the English Language Test. Each question will be of 01 mark. For each wrong answer 0.25 marks will be deducted.

**2. Computer Based Test: Tier-II (Objective Type):****Section (B) / Non-Technical Part (25 MCQ carrying 25 marks)**

(Test will consist of 25 Multiple Choice Question (MCQs), one (01) mark for each question, 30 minutes' duration:

| Part | Subject (Not in sequence)              | No. of Questions/<br>Maximum Marks |
|------|----------------------------------------|------------------------------------|
| I    | Quantitative aptitude (simple maths)   | 25/25                              |
| II   | MS Office (Word, Excel and Powerpoint) |                                    |
| III  | Analytical and Logical reasoning       |                                    |
| IV   | Simple English                         |                                    |
| V    | General Knowledge                      |                                    |