8. SELECTION PROCEDURE

The selection procedure will be as under:-

(a) **FIRST PHASE OF THE EXAMINATION**

The Written Examination will be conducted at the selection Centres. There will be two papers of the following parts :-

(i) **First Paper**
(Objective Type with multiple choice) Time – 01 Hour 30 Minutes.

aa) General Intelligence & Reasoning - 25 Questions - 25 Marks
ab) General awareness - 25 Questions - 25 Marks
ac) General Engineering (Civil) - 50 Questions - 50 Marks
Total - 100 Questions carrying- 100 Marks

Standard and Syllabus for Paper-I :- The Written examination of Paper-I shall be conducted from the following subject:-

(aa) General Intelligence & Reasoning: The Syllabus for General Intelligence would include questions of both verbal and non-verbal type. The test may include questions on analogies, similarities, differences, space visualization, problem solving, analysis, judgement, decision making, visual memory, discrimination, observation, relationship concepts, arithmetical reasoning, verbal and figure classification, arithmetical number series etc. The test will also include questions designed to test the candidate's abilities to deal with abstract ideas and symbols and their relationships, arithmetical computations and other analytical functions.

(ab) General Awareness:- Questions will be aimed at testing the candidate's general awareness of the environment around him/her and its application to society. Questions will also be designed to test knowledge of current events and of such matters of everyday observations and experience in their scientific aspect as may be expected of any educated person. The test will also include questions relating to India and its neighbouring countries especially pertaining to History, Culture, Geography, Economic Scene, General Polity and Scientific Research, etc. These questions will be such that they do not require a special study of any discipline.

(ac) General Engineering (Civil) :- Building Materials, Estimating, Costing and valuation, Surveying, Soil Mec Engineering, Transportation Engineering, Environmental Engineering.

Note :- ***During the written examination of Paper-I (OMR based answer sheet), candidates have to fill and shade (in OMR answer Sheet) their Name, Roll number, Date of birth, question booklet series code i.e. A B C D because these information are essential for evaluation of the Answer Sheet and publishing of result of qualified candidates. Circle as printed against each should be shaded correctly, otherwise candidate may be declared fail for which candidate himself will be responsible for such mistakes.***

(ii) Second Paper (Conventional Type) Time – 02 Hours

aa) General Engineering (Civil) - 10 Questions - 100 Marks
(12 Questions will be given out of which 10 questions will be attempted)

ab) Standard and Syllabus for Paper-II :- The Written examination of Paper-II shall be conducted from the following subject:-

Building Materials : Physical and Chemical properties, classification, standard tests, uses and manufacture/quarrying of materials e.g. building stones, silicate based materials, cement (Portland), asbestos products, timber and wood based products, laminates, bituminous materials, paints, varnishes.

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Estimating, Costing and Valuation: Estimate, glossary of technical terms, analysis of rates, methods and unit of measurement, Items of work – earthwork, Brick work (Modular & Traditional bricks), RCC work, Shuttering, Timber work, Painting, Flooring, Plastering. Boundary wall, Brick building, Water Tank, Septic tank, Bar bending schedule, Centre line method, Mid-section formula, Trapezodial formula, Simpson's rule. Cost estimate of Septic tank, flexible pavements, Tube well, isolates and combined footings, Steel Truss, Piles and pile-caps. Valuation – Value and cost, scrap value, salvage value, assessed value, sinking fund, depreciation and obsolescence, methods of valuation.

Surveying : Principles of surveying, measurement of distance, chain surveying, working of prismatic compass, compass traversing, bearings, local attraction, plane table surveying, theodolite traversing, adjustment of theodolite, Levelling, Definition of terms used in levelling, contouring, curvature and refraction corrections, temporary and permanent adjustments of dumpy level, methods of contouring, uses of contour map, tachometric survey, curve setting, earth work calculation, advanced surveying equipment.

Soil Mechanics : Origin of soil, phase diagram, Definitions-void ratio, porosity, degree of saturation, water content, specific gravity of soil grains, unit weights, density index and interrelationship of different parameters, Grain size distribution curves and their uses. Index properties of soils, Atterberg's limits, ISI soil classification and plasticity chart. Permeability of soil, coefficient of permeability, determination of coefficient of permeability, Unconfined and confined aquifers, effective stress, quick sand, consolidation of soils, Principles of consolidation, degree of consolidation, pre-consolidation pressure, normally consolidated soil, e-log p curve, computation of ultimate settlement. Shear strength of soils, direct shear test, Vane shear test, Triaxial test. Soil compaction, Laboratory compaction test, Maximum dry density and optimum moisture content, earth pressure theories, active and passive earth pressures, Bearing capacity of soils, plate load test, standard penetration test.

Hydraulics : Fluid properties, hydrostatics, measurements of flow, Bernoulli's theorem and its application, flow through pipes, flow in open channels, weirs, flumes, spillways, pumps and turbines.

Irrigation Engineering: Definition, necessity, benefits, 2II effects of irrigation, types and methods of irrigation, Hydrology – Measurement of rainfall, run off coefficient, rain gauge, losses from precipitation – evaporation, infiltration, etc. Water requirement of crops, duty, delta and base period, Kharif and Rabi Crops, Command area, Time factor, Crop ratio, Overlap allowance, Irrigation efficiencies. Different type of canals, types of canal irrigation, loss of water in canals. Canal lining – types and advantages. Shallow and deep to wells, yield from a well. Weir and barrage, Failure of weirs and permeable foundation, Slit and Scour, Kennedy's theory of critical velocity. Lacey's theory of uniform flow. Definition of flood, causes and effects, methods of flood control, water logging, preventive measure. Land reclamation, Characteristics of affecting fertility of soils, purposes, methods, description of land and reclamation processes. Major irrigation projects in India.

Transportation Engineering : Highway Engineering – cross sectional elements, geometric design, types of pavements, pavement materials – aggregates and bitumen, different tests, Design of flexible and rigid pavements – Water Bound Macadam (WBM) and Wet Mix Macadam (WMM), Gravel Road, Bituminous construction, Rigid pavement joint, pavement maintenance, Highway drainage, Railway Engineering- Components of permanent way –

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sleepers, ballast, fixtures and fastening, track geometry, points and crossings, track junction, stations and yards. Traffic Engineering – Different traffic survey, speed-flow-density and their interrelationships, intersections and interchanges, traffic signals, traffic operation, traffic signs and markings, road safety.

Environmental Engineering : Quality of water, source of water supply, purification of water, distribution of water, need of sanitation, sewerage systems, circular sewer, oval sewer, sewer appurtenances, sewage treatments. Surface water drainage. Solid waste management – types, effects, engineered management system. Air pollution – pollutants, causes, effects, control. Noise pollution – cause, health effects, control.

(iii) The minimum qualifying marks of Written Examination in each paper :-

For General/OBC Category Candidate - 50%
For SC/ST Category Candidate - 45%

However, number of candidates qualified in written examination will be restricted maximum ten times of number of vacancies or qualified candidates whichever is less for appearing in 2nd phase examination.

NOTE 1:- *There will be no re-evaluation of answer sheets.*

NOTE 2 *:- Candidates are not permitted to use Mobile Phone, Calculator or any other electronic/Civil device for answering any paper (Test Booklets). Candidates must not therefore, bring Mobile Phone, Calculator or any other electronic Civil device inside the Examination premises. Possession of these items, whether in use or not, will be considered as "use of unfair means" in the Examination and appropriate action will be taken by the department against such candidates, as per extant policy of the department.*

NOTE 3:- *The written examination will be conducted on OMR based answer sheet. If the candidate did not shade/wrongly shaded/did not fill/wrongly filled his/her mandatory data ovals i.e. Roll number, question booklet series code and category etc in the OMR Answer, the OMR answer sheet will be rejected at the initial stage and the OMR answer sheet will not be further evaluated for which candidates himself will be responsible for such rejection. A sample of OMR Answer sheet is enclosed with this advertisement as* ***Annexure-'F'*** *for information and practice of candidates.*

(b) **SECOND PHASE OF THE EXAMINATION**

Successful candidates in the Written Examination will appear before the selection board of Second Phase Examination i.e. Documentation, Physical Standards Test & Physical Efficiency Test at respective Examination Centre on a date, which will be communicated to them through call letter as well as BSF Website (**www.bsf.nic.in**). They will be put through subsequent stages. Candidates have to qualify all the stages of the Second phase of examination one by one. Any candidate not qualifying in any of the events of the examination, he will be eliminated from the process.

(i) **Documentation**

Original testimonials/certificates of the candidates will be checked to confirm the eligibility of the candidates. If candidate does not produce original documents, he/she will be disqualified. If he/she is found not eligible on the basis of documents, he/she will be disqualified.

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