

SCHEDULE – I

Clause No

I GENERAL STUDIES (COMPULSORY FOR ALL GRADE/POSTS/BRANCHES)

TOTAL MARKS – 100
Duration of examination – 1 hour

The break up of marks on various topics will be as follows:-

<u>Topic</u>	<u>Marks</u>
i) Comprehension of a given passage	20
ii) Usage (corrections)	10
iii) Vocabulary (synonyms & antonyms, idioms & phrases)	10
iv) General knowledge	20
(Questions will include knowledge of Indian and geography of such a nature which the candidates should be able to answer without any special study. Questions on Tripura, its historian topography will also be included.)	
v) Current Affairs	20
(The questions will include knowledge of Indian current events and of such matters of every day observation and experience in their scientific aspects as may be expected of an educated person who has not made a special study of any scientific subject.)	
Vi) Mental Ability.	20
Total	100

II. ENGINEERINGS SUBJECT PAPER – I & II(OPTIONAL FOR ALL GRADES /RANCHES)

TOTAL MARKS – 200(each paper)
Duration of examination – 3 hour

The break up of marks will be as follows:

<u>Topic</u>	<u>Marks</u>
i) 15 questions of 6 marks each having answers restricted to 40 words	90
ii) 40 multiple choice type questions of 2 marks each	80
iii) 05 numerical questions of 6 marks each	30
Total	200

SCHEDULE-II
SYLLABUS FOR GRADE IV/ ASSISTANT ENGINEER
CIVIL ENGINEERING
PAPER - I

TOTAL MARKS – 200
DURATION OF EXAMINATION – 3 HOURS

1. BUILDING MATERIALS

Timber : Different types and species of structural timber, density-moisture relationship, strength in different directions, defects, influence of defects on permissible stress, preservation, dry and wet rots, codal provisions for design, Plywood.

Bricks: Types, Indian Standard classification, absorption, saturation factor, strength in masonry, influence of mortar strength on masonry strength.

Cement: Compounds of, 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, elasticity, non-destructive testing, mix design methods.

2. SOLID MECHANICS

Elastic constants, stress, plane stress, Mohr's circle of stress, strains, plane strain, Mohr's circle of strain, combined stress; Elastic theories of failure; Simple bending, shear; Torsion of circular and rectangular sections and simple members.

3. DESIGN OF STEEL STRUCTURES

Principles of working stress method. Design of connections, simple members, Built-up sections and frames, Design of Industrial roofs. Principles of ultimate load design. Design of simple members and frames.

4. DESIGN OF CONCRETE AND MASONRY STRUCTURES

Limit state design for bending, shear, axial compression and combined forces. Codal provisions for slabs, beams, walls and footings. Working stress method of design of R.C. members.

Principles of prestressed concrete design, materials, methods of pre stressing, losses. Design of simple members and determinate structures. Introductions to prestressing of indeterminate structures.

Design of brick masonry as per I.S. Codes.

5. CONSTRUCTION PRACTICES, PLANNING AND MANAGEMENT

Concreting Equipment: Weight Batcher, Mixer, vibrator, batching plant, concrete pump. Cranes, hoists, lifting equipment.

Earthwork Equipment: Power shovel, hoe, dozer, dumper, trailers and tractor, rollers, sheep foot rollers, pumps.

Construction, Planning and Management: Bar chart, linked bar chart, work-break down structures, Activity-on - arrow diagrams. Critical path, probabilistic activity durations; Event-based networks.

PERT network: Time-cost study, crashing; Resource allocation.

**CIVIL ENGINEERING
PAPER - II**

TOTAL MARKS - 200
Duration of Examination – 3 Hours

1. (a) FLUID MECHANICS, OPEN CHANNEL FLOW, PIPE FLOW:

Fluid Properties, Pressure, Thrust, Buoyancy; Flow Kinematics; Integration of flow equations; Flow measurement; Relative motion; Moment of momentum; Viscosity, Boundary layer and Control, Drag, Lift; dimensional Analysis, Modeling; Cavitation; Flow oscillations; Momentum and Energy principles in Open channel flow, Flow controls, Hydraulic jump, Flow sections and properties; Normal flow, Gradually varied flow; Surges; Flow development and losses in pipe flows, Measurements; Siphons; Surges and Water hammer; Delivery of Power Pipe networks.

(b) HYDRAULIC MACHINES AND HYDROPOWER:

Centrifugal pumps, types, performance parameters, scaling, pumps in parallel; Reciprocating pumps, air vessels, performance parameters; Hydraulic ram; Hydraulic turbines, types, performance parameters, controls, choice; Power house, classification and layout, storage, pondage, control of supply.

2. (a) HYDROLOGY:

Hydrological cycle, precipitation and related data analyses, PMP, unit and synthetic hydrographs; Evaporation and transpiration; Floods and their management, PMF; Streams and their gauging; River morphology; Routing of floods; Capacity of Reservoirs.

(b) WATER RESOURCES ENGINEERING:

Multipurpose uses of Water: Soil-Plant-Water relationships, irrigation systems, water demand assessment; Storages and their yields, ground water yield and well hydraulics; Water logging, drainage design; Irrigation revenue; Design of rigid boundary canals, lining of canals; Sediment transport in canals; Non-Overflow and overflow sections of gravity dams and their design, Energy dissipaters and tail water rating; Design of head works, distribution works, falls, cross-drainage works, outlets; River training.

3. ENVIRONMENTAL ENGINEERING

(a) WATER SUPPLY ENGINEERING:

Sources of supply, yields, design of intakes and conductors; Estimation of demand; Water quality standards; Control of Water-borne diseases; Primary and secondary treatment, detailing and maintenance of treatment units; Conveyance and distribution systems of treated water, leakages and control; Rural water supply; Institutional and industrial water supply.

(b) WASTE WATER ENGINEERING:

Urban rain water disposal; Systems of sewage collection and disposal; Design of sewers and sewerage systems; pumping; Characteristics of sewage and its treatment, Disposal of products of sewage treatment, stream flow . Plumbing Systems, Rural and semi-urban sanitation.

(c) SOLID WASTE MANAGEMENT:

Sources, classification, collection and disposal; Design and Management of landfills

4 (a) SOIL MECHANICS:

Properties of soils, classification and interrelationship; Compaction behavior, methods of compaction and their choice; Permeability and seepage, flow nets, Inverted filters; Compressibility and consolidation; Shearing resistance, stresses and failure; soil testing in laboratory and in-situ; Stress path and applications; Earth pressure theories, stress distribution in soil; soil exploration, samplers, load tests, penetration tests.

(b) FOUNDATION ENGINEERING:

Types of foundations, Selection criteria, bearing capacity, settlement, laboratory and field tests; Types of piles and their design and layout, Foundations on expansive soils, swelling and its prevention, foundation on swelling soils.

5. (a) SURVEYING:

Classification of surveys, scales, accuracy; Measurement of distances - direct and indirect methods; optical and electronic devices; Measurement of directions, prismatic compass, local attraction; Theodolites - types; Measurement of elevations - Spirit and trigonometric leveling; Relief representation; Contours; Digital elevation modeling concept; Establishment of control by triangulations and traversing - measurements and adjustment of observations, computation of coordinates; Field astronomy, Concept of global positioning system; Map preparation by plane tabling and by photogrammetry; Remote sensing concepts, map substitutes.

(b) TRANSPORTATION ENGINEERING:

Planning of highway systems, alignment and geometric design, horizontal and vertical curves, grade separation; Materials and construction methods for different surfaces and maintenance: Principles of pavement design; Drainage.

Traffic surveys, Intersections, signaling; Mass transit systems, accessibility, networking.

*Sd/-
(T.K.Bhowmik)
Deputy Secretary
Public Works Department
Govt. of Tripura.*