

## SYLLABUS FOR GENERAL KNOWLEDGE

Covering General Knowledge topics relating to Current Events, General Science, Indian History, Indian Geography, Social Science, General Mental Ability, matters of every day observation and practical knowledge as may be expected of a person who has passed the prescribed qualifying examination.

### **TECHNICAL SYLLABUS**

#### **i) Roads and Bridges :**

##### **Roads:**

1. General- Importance of highway development, Highway economics and Highway financing and Highway system.
2. Surveys – Highway planning surveys, location surveys and soil surveys, Presentation of data in terms of charts and tables (urban and rural areas), Highway plans and specifications.
3. Highway Design – Geometric design – Rights of way, Highway capacity, design speeds, cross section, sight distances, grade line, alignments, channelisation, inter sections and inter changes, grade separators, rotary inter sections etc.,
4. Highway Construction - Urban and Rural areas, economic principles: drainage of road way and road side and subsoil drainage and hydrology, hydraulical design principles, drainage structures.
5. Highway Construction – Site Clearance, different types of road rollers, earth moving equipment and construction equipment, Modern highway practices of construction, Specifications for highway materials and construction.
6. Highway Construction – Surface maintenance, shoulder and approach maintenance, snow and ice control, bridge and culvert maintenance etc., Traffic service and maintenance cost.

##### **Bridges:**

1. ATE for design, Hydrologic investigations of the watershed area, Flood estimation for bridge water ways by Empirical formulas, Rational method, Probability method and Unit graph method.

2. Practical rules of design and economic Span Types of Bridges such as Deck and through bridges, Bowstring, suspension and Moveable-span bridges.
3. Design of floor system and different types of bearing specifications for Railway and Highway bridges.

**ii) Construction Technology and Management:**

1. Quantitative methods in construction.
2. Construction, planning and control.
3. Advances in construction materials.
4. Construction in disaster prone areas.
5. Rehabilitation of structures.
6. Construction economics and finance.
7. Construction management and computer application.
8. Mechanisation in construction.
9. State laws governing construction.

**iii) Highway Engineering:**

1. General – Importance of highway development, Highway financing and Highway system.
2. Surveys- Highway planning surveys, location surveys and soil surveys, Presentation of data in terms of charts and tables (urban and rural areas) Highway plans and specifications.
3. Highway design- Geometric design – Rights of way, Highway capacity, design speeds, cross section, sight distances, grade line, alignment, channelisation, inter-section, etc.,
4. Highway Drainage – Urban and Rural areas, economic principles drainage of roadway and road side and sub soil drainage and hydrology, hydraulical design principles, drainage structure.
5. Highway Construction – Site clearance, different types of road rollers, earth moving equipment and construction equipment, Modern highway practices of construction, Specifications for highway materials and construction.
6. Highways Maintenance- Surface maintenance, shoulder and approach maintenance, snow and ice control, bridge and culvert maintenance, etc., Traffic service and maintenance cost.

**iv) Advance Structure:**

1. Compound stresses and strains – Mohr's Circle and its application. Compound strains, Principal strains, graphical solutions.

2. Effects of temperature on Mechanical properties of materials.
3. Theories of elastic failure.
4. Strain Energy Methods – Deflection of simple trusses, strain energy methods applied to simple beams and trusses.
5. Castigliano's Theorem I and its application to simple cases.
6. Analysis of continuous beams, propped cantilevers, fixed beams, Slope-deflection equations and moment distribution.
7. Three hinged arches, Lines of resistance through hinged arches under dead and live loads, Influence lines for horizontal thrust and bending moment. Reaction locus.
8. Rolling loads-curves of maximum bending moments and maximum shear forces, the enveloping parabola and determination of equivalent uniformly distributed load under different system of loading.
9. Influence lines of reaction, shear force, bending moment and deflection, Reversal of stress under live load, Williot-Mohr's diagram.
10. Determination of stresses in the members of the frames due to rolling loads – Influence lines.

**v) Public Health Engineering :**

**(a) Sanitary Engineering:**

1. Drainage and Sewerage – Objects of Scheme – surface drainage, underground sewerage systems and the general arrangement of the several works, principles of design, Data to be collected, allowances for inclusions of the foul part of the rainfall, size velocity and gradients of sewers, Selection of suitable system and evolution of a scheme, design of the several necessary works of a sewer lines.
2. House Drainage – Water closets, taps, soil and other pipes, sinks, inventories, urinals and baths.
3. The sewer line – Laying, joining and testing of sewer, Construction of manholes, flushing tanks, Over flows junctions, catch-basin inverted syphons and public conveniences, maintenance of sewer lines.
4. Pumping sewage – Treatment of sewage before disposal objects. Characteristics of sewage, Modern methods of treatment including diffused air and other process, Collection and disposal of solid refuse, Screening and pulverising – various methods of composting – utilization and disposal.
5. Elements of Public Health Engineering – Latrines, Drainage refuse collection and disposal, plumbing, food and milk sanitation, restaurants, market places, slaughter houses, cemeteries, parks, hospitals, playgrounds and cinema halls.

6. Elements of town Planning –Housing, Zoning, Lighting and Ventilation factors, Dust control, Developing environment beautifying town, malaria control, fly and rodent control, rural sanitation, fairs and festivals and disinfection.

**(b) Water Supply:**

7. Value and Importance of water Supply – Domestic, Commercial and Public requirement – allowance for prospective population – variation in demand.
8. Quantity of Water – estimating the quantity of water for a town or city, considering various modifying influences affecting consumption per capita, Estimating the quantity of water available from a source (surface water from rainfall and catchments and underground water by pumping and other methods), Sources of Water – impounded, perennial streams, artesian wells, shallow wells, deep well and infiltration galleries.
9. Quality of Water – Pollution, contamination and infection waterborne diseases, sanitary survey, conservation of catchments and basin, Water analysis, physical bacterial, chemical and microscopic, Protection of water supplies – control of algae, river pollutions and its control, Purity of water, PH value.
10. Construction of water works – General principles of economics, construction and arrangement of the several types of water intake works for different sources.
11. Purification of water – Study of impurities (suspended, dissolved and colloidal) plain sedimentation, sedimentation with coagulation, types of coagulants and their uses, slow and rapid filtration, pressure and other filters modern methods of sterilization and ariation –purification of water for industrial use, different methods.
12. Pumping and Distribution system – System of supply, construction of pipe lines and conduits, pumping machinery service reservoirs, balancing reservoirs, stand pipes and water towers, Distribution system (grid iron, dea-end and ring system), Appurtenances such as valves, hydrant, rate controllers and meters, expansion joints, manholes, Principles to be followed in the design of distribution system, maintenance and repairs, detection of leakages, prevention of waste.