

## SECTION - A

### 1. General Intelligence and Reasoning

The test will include questions on analogies, similarities and differences, space visualization, problem solving, analysis, judgment, decision making, visual memory, discriminating observation, relationship concepts, verbal and figure classification, arithmetical number series, non-verbal series etc. The test will also include questions designed to test the candidates' abilities to deal with abstract ideas and symbols and their relationship, arithmetical computation and other analytical functions.

### 2. English Language

Understanding of the English Language, its vocabulary, grammar, sentence structure, synonyms, antonyms and its correct usage. etc.

### 3. Numerical Aptitude

Number Systems, Computation of Whole Numbers, Decimals and Fractions and relationship between Numbers, Fundamental Arithmetical operations, Percentages, Ratio and proportion, Averages, Interest, Profit and Loss, Discount, use of Table and Graphs, Mensuration, Time and Distance, Ratio and Time, Time and Work etc.

### 4. General Awareness and Knowledge

- a. General State and National Polity including Indian Constitution
- b. Current Affairs and current events of such matters of everyday observation and experience in their scientific aspects
- c. India and its Neighbouring Countries especially pertaining to Sports, History, Culture, Geography, Economic scene
- d. Environment around and its application to society

## SECTION - B

- 1) Basic Laws of Science such as Boyle's law, Charles' law and Gay-Lussac law, Characteristic Gas Equation, Zeroth, First and Second laws of thermodynamics,
- 2) Internal Combustion Engines, types and applications, Engine fuels like Petrol, Diesel and alternative fuels like LPG, CNG, Hydrogen, bio-diesel etc.. Automobile and various components/systems of an automobile like chassis, clutch, brakes, gearbox, steering, wheels and tyres, Troubleshooting of various systems/ components, Maintenance and Repair practices of various components of automobile, General service guideline for 4-wheelers, 6-wheelers and heavy vehicles.
- 3) Heavy Earth moving machinery and Mining machinery such as Cranes, Excavators, Loaders, Dumpers, Bulldozers, Motor graders, Mining Trucks, Roof Bolters, Shovels, Surface miners, Draglines etc.. Construction and working of Earth moving and mining

machineries, Preventive maintenance and Repair practices of Mining machineries. Various cutting tools used in Mining machinery, Safety features and standard practices for operating Mining machinery.

- 4) Basic concepts of measuring instruments, Various Linear and angular Measuring instruments like Vernier calliper, micrometer, dial Vernier, slip gauges, Sine bar etc..Various pressure measuring instruments, Least Count of various instruments, their types and application.
- 5) Various manufacturing processes and their applications like machining, casting, Metal forming, various machine tools like Lathe, shaper, milling, drilling, boring etc...and cutting tools used in those machine tools.
- 6) Concepts of Fluid Mechanics, properties of fluids, working of various fluid machinery like compressors and pumps, Construction and working of different types of compressors and pumps, selection criteria and application of various types of pumps.

### SECTION - C

1. General principle of operation of motor and generator systems with constructional features,
2. construction and principle of transformers, auto transformers, general specifications of cables, construction and types of cables, main features, construction and types of earthing, importance of grounding and earthing, types of wiring system, wiring tool, wiring circuits, domestic and industrial panel wiring, different protective devices such as fuse, MCB, MCCB and ELCB, construction and working of general purpose relays with their applications, electrical safety rules and safety measures of electrical appliances, safety requirements for mines.

### SECTION - D

#### 1. Building materials

**Rocks**– classification, types, uses, **Stones** – classification, types, uses, **Bricks** –. Manufacturing classification, types, uses, **Lime**–classification, types, uses, **Cement** – Manufacturing, classification, types, uses, **Clay Products** – earthenware, stoneware, porcelain, terracotta, glazing, types, **Mortar** –. Preparation classification, types, uses **Concrete** –. Preparation classification, types, uses, **Admixtures** - for cement mortar & cement concrete, classification, types, uses.

#### 2. Protective materials

**Paints**, classification, types, uses, **varnishes** –.classification, types, uses, **Metal** – classification, types, uses, **Plastics** –. Classification ,types, uses.

#### 3. Building Construction

**Masonry : Stone masonry** Terms used -. Classification –Tools –**Brick masonry** – Technical terms –bonds, types junctions, **Hollow block construction** —types, admixtures added advantages.

#### 4. **Foundation**

**Soil** - Meaning of bearing capacity, **Foundation** - objectives, Requirement, types- **shallow** - spread, isolated or column footing, stepped, combined, continuous, raft or mat foundation. **Deep foundations**- piles foundation - general requirements - types-Cofferdam and caisson

#### 5. **Permanent & temporary structures**

life of structures, sub structure, super structure, load bearing structure, cavity wall, framed structure

#### 6. **Treatments for building structure**

**DPC**-Sources and effects of dampness, method. **Damp proofing materials** – properties, functions, types, **Anti-termite treatment** objectives &uses, method.

**Weathering course**- purpose, materials required-**Fire-proofing**. Effect, rules

#### 7. **Arches** - Technical terms-.types ,centering

#### 8. **Lintel**- types-wooden, brick, stone, steel & RCC.

9. **Doors** –Parts, Location, standard sizes, types, **Windows**-types, **Ventilators**-purpose-types, **Floors** – Ground floor & upper floor-Types. **Flooring**- materials used, types, **Stairs**- Terms. Requirements. headroom, .Types-(Turning. Materials)- Planning, **Lift**, **Escalator**, **Roofs** & Roof coverings –Purposes -Elements-. Types:- Flat & pitched, **Truss**-king post, queen post, mansard, bel-fast, steel, composite.

#### 10. **Building rules & bye laws**

Objectives & importance, Function & responsibility, lay out plan & key plan- composition of submission , drawing. provision for safety. requirement of green belt and land

#### 11. **Estimating and Costing**

Introduction, Purpose and common techniques, Construction drawing Measurement techniques, Estimate-necessity, importance, types-approximate and detailed estimate-main and sub estimates, revised, supplementary, maintenance / repair estimate, Taking off quantities- method, Rate analysis and Specifications, Labour and materials, Schedule of rate,

#### 12. **Wiring Electrical**

Elementary electrical engg, General ideas of supply system, Wireman’s tools kit, Wiring materials, Electrical fittings, System of wirings, Wiring installation for domestic lightings.

### 13. **Surveying**

Introduction, principles, Objectives. and uses, common terms used and definitions, classification, accuracy, types Main divisions (plane & geodetic),Chaining, bearing & meridian.

\*\*\*\*\*