INDICATIVE SYLLABUS: Assistant Mine Surveyor (E0) for NML

PART A (APTITUDE) (50 Questions)

This part will consist of 50 objective type questions on:

01. Verbal Ability/General English

02. Quantitative Aptitude

03. Reasoning Ability

PART B (SUBJECT) (70 questions)

This part will consist of 70 objective type questions on:

Linear measurement: Instruments for measuring distance ranging, chain surveying; errors in chaining and plotting; optical square.

EDM: Principles of measurements; types; correction and selection of instrument.

Angular measurement: Prismatic compass; bearing of lines; local attraction; magnetic declination.

Plan Table Surveying: methods contouring using plane table and micro-optic alidade.

Miners' dials and other compass instruments: dialling; loose and fast needle surveying.

Theodolite: Modern micro-optic theodolites; measurement of horizontal and vertical angles; theodolite traversing; traverse calculation; computation of coordinates; adjustment of traverse; temporary and permanent adjustment.

Total Stations: Surveying by Total stations, errors, adjustments and applications.

Levelling: Levelling instrument types of levelling; booking and reduction methods; temporary and permanent adjustment of levels; geometrical, trigonometric and physical levelling; characteristics and uses of contours; methods of contouring; traverse; co-ordinates and levelling problems.

Tachometry

Controlled surveys: Triangulation; trilateration; application of GPS and Total Station in mine surveying.

Use, care, testing, and adjustments of instruments.

Field astronomy: Astronomical terms; determination of true bearing by equal altitude method; Gyro theodolite;

principle and determination of Gyro north, astronomical triangle; conversion of time systems and precise determination of azimuth by astronomical methods.

National grid: Map projection Cassini Lambert's polyconic and universal transfers Mercator; transformation of
coordinates, vertical projections; mine models.

Geodesy: Geod, spheroid and ellipsoid, geocentric, geodetic and astronomical coordinates, orthometric and dynamic heights.

Photogrammetry: Introduction; scale of a vertical photograph; photographs versus maps; application of
photogrammetry and remote sensing in mining.

Theory of errors and adjustments: Causes and classification of errors; inclines of precision; laws of weight
propagation and adjustment of errors; adjustment of triangulation figures.

Traversing along steep topography with or without auxiliary telescope.

Area and volume calculation; different methods and their limitations: earth work and building estimation; laying out of rail and haul road curves; determination of azimuth latitude and longitude.

Borehole surveying and calculations, dip, strike, outcrop and fault problems.

Types of plans for opencast workings, their preparation, care, storage and preservation: legislation concerning mine plans and sections; duties and responsibilities of surveyors.

Geological map reading.
Application of computers in mine surveying and preparation of mine plan, 3D laser profiling of surfaces and bench / slopes.

Profiling of benches, highwall, dumps

Dump / Highwall stability monitoring using different instruments like Laser Scanner / Continuous Real Time Monitor