Syllabus for Mine Surveying

Part Test 1

- Linear measurement: Instruments for measuring distance and ranging, units of measurement in surveying.
- EDM: Principles of measurement; types, correction and selection of instrument.
- Angular measurement: Prismatic compass; bearing of lines; local attraction; magnetic declination.
- Dials; loose and fast needle surveying; plane table surveying and micro-optic alidade.

Part Test 2

- 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; tacheometry.
- Levelling: Levelling instruments; types of levelling; characteristics and uses of contours; methods of contouring; booking and reduction methods; shaft depth measurement; temporary and permanent adjustment of levels; problem solving.
- Controlled survey: Triangulation; trilateration; application of GPS and Total Station in mine surveying.

Part Test 3

- 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.
- Correlation: Methods of correlation surface and underground including Gyro-Laser combination.
- Development surveys: Surveys of flat, moderately and steeply inclined and vertical workings; control of direction and gradient in drifts and roadways; traversing along steep working with or without auxiliary telescopes; 3D laser profiling of surfaces and bench walls.

Part Test 4

- Theory of errors and adjustments: Causes and classification of errors; indices of precision; laws of weight; propagation and adjustment of errors; adjustment of triangulation figures.
- National grid: Map projection – Cassini, Lambert’s polyconic and universal transfers mercator; transformation of coordinates.
- 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.

**Part Test 5**

- Area and volume calculation: Different methods and their limitations; earthwork and building estimation; laying out of rail curves and haul road curves, surface and underground.
- Dip and strike problems; outcrop problems; borehole surveying and calculations.
- Types of plans and their preparation, care, storage and preservation; legislation concerning mine plans and sections; duties and responsibilities of surveyors.
- Application of computers in mine surveying and preparation of plans.