

Schedule A.—Computations.

(1.) Elementary theory in plane and analytical trigonometry: The trig. ratios and definitions, supplements and complements of an angle, relationships between the trig. ratios, two angles and their ratios. Trigonometrical equations, right-angled triangles, oblique-angled triangles, and solutions of the cases. (50 marks.)

(2.) Elementary practice: A traverse line; co-ordinates; what they are. Theory of closure. A closed polygon. Rule for elimination of error in co-ordinates.

Areas of triangles and area of trapezoids, with examples of methods of obtaining. Areas by calculation from co-ordinates. Logarithms (common) of natural numbers, theory of. Logarithms of trig. functions. (50 marks.)

(3.) Practical examples: Opposite sides of roads. Intersection of section lines and road; crossing of roads. Bearing and distance from co-ordinates of two points, with diagram of the triangle involved; calculation and closure of a traverse. Area of enclosed polygon by calculation. Area of irregular portion from offsets by calculation. (50 marks.)

(4.) Instruments: Planimeter, polar and rolling (diagram of the figure mechanically traced by each; mathematical formula for area of each figure); function of the measuring-roller; relationship of roller and arms of instruments; unit of measurement engraved on roller, and relationship to length of tracer-arm.

Line of slipping (without rolling), datum circle and constant, pole within figure; position of figure measured in relation to datum circle.

Pantograph: Relation of tracer, pencil, and fulcrum. Geometrical figures on which instrument is based; how to find scales not marked on instrument. The suspended pantograph.

Eidograph: Relation of tracer, pencil, and fulcrum. Geometrical figures on which instrument is based. Rule for setting instrument readings. (75 marks.)

(5.) Measurements in the field: Reduction for slope, sag, and temperature; check chainage, standard traverse, limit of error; relationship of limit of error to area-limit. Methods of keeping a field-book. (50 marks.)

Computations, Advanced.

(6.) Observations of trig. angles, methods followed by observers in the field, desirable conditions in field, repetition under different circumstances, micrometer and level readings and corrections, number of readings. The deduced angles. Criteria for rejection of observations, least square adjustments. Base measurements. Elasticity and expansion of tapes. Catenary curve of suspended tape. Temperature corrections. (75 marks.)

(7.) Triangulation: Adjustment of a triangle and of a polygon, practical example of; adjustment of quadrilateral and practical example. Breaking down by ray trace; practical example. Circuit and true meridian. Convergence. Comparison of meridian on boundaries of circuits. Spherical excess. (50 marks.)

(8.) Latitudes, longitudes, and azimuth: Spheroidal earth, compression, ellipticity; definitions; computation of a latitude from tables of geodetic factors, computation from earth's axis, &c.; geodetic and astronomical latitude. Azimuth of a line at each end; computation of the great-circle length and bearing between two distant places. Computation of longitude and convergence. Computation of geographical co-ordinates for projection on a polyconic projection. Conic, polyconic, and rectangular projection compared. Classes into which projections fall; equal areas; representation of straight lines, of great circles, and shortest distances. (50 marks.)

Elementary Practical Astronomy.

(9.) Time; sidereal, solar, mean, civil, astronomical: Relation between longitude and time. Relation between sidereal time, right ascension, and hour angle. Relation between sidereal and mean time. Standard time. Civil and astronomical dates. Equation of time, acceleration and retardation.

Latitude, zenith, nadir, horizon, rational and apparent horizons, vertical circle, almucantars, poles, equator, hour circles, parallels of declination, meridian, prime vertical, ecliptic, equinoxes. Relation between zenith, altitude of pole, and latitude. Relation between latitude declination, and altitude of a star. The astronomical triangle.