

Observed altitudes of a heavenly body; corrections required to obtain true altitude. The simpler methods of obtaining latitude and time applicable to theodolites of 5 in. to 8 in. size.

Azimuth, true bearing, referring-mark. Methods of observing for azimuth with above instruments. Sun and star azimuths. Solar attachment. Use of nautical almanac, star catalogues, and star maps.

Practical examples in all the foregoing. (50 marks.)

Suggested Text-books.

Elementary Trigonometry ...	Hamblin Smith. Locke.
Planimeters ...	Surveying, by Johnson and Smith.
Pantograph ...	"
" ...	Drawing Instruments, Stanley.
Suspended Pantograph ...	Coradi Instructions.
Limits of Error and Length Relation ...	<i>The Surveyor</i> for September, 1905. Cadet's Manual.
Precise Surveying and Geodesy	Merriman.
Hints to Travellers ...	Royal Geographical Society.
Practical Astronomy ...	Hosmer.
Departmental Manuals.	
Text-book of Topographical Surveying ...	Close.

Schedule B.—Draughtsmanship.

(1.) The candidate shall lodge, not less than seven days before the examination,—

- (a.) A working-plot of rural sections, drawn to a scale of 10 chains to an inch, not less than 2 square miles in area.
- (b.) A town plan illustrating standard and Land Transfer work, on a scale of not less than 2 chains to an inch.
- (c.) A plan of a railway and road (or water-race), according to regulations, representing a plan of land to be taken under the Public Works Act.
- (d.) A map in black and white for reduction to half-scale by photo-lithography, the work on which shall cover not less than 15 in. square, half the area being covered with plain sectional detail and half with topographical drawing in any style suitable for the above method of reproduction.

(150 marks.)

The above plans shall each be certified to by some responsible officer of the Department as being the applicant's own work.

Materials.

(2.) The drawing-paper—its composition, best components, adulterations, characteristics of the best quality. Composition of second-class papers, bleaching, chemical bleaching, fibre of paper, sizing, effect of damp, mildew, effect of erasure, methods of erasure, chemical erasure, methods and precautions, restoring surface of erasures. Storing of paper.

The surfaces of paper, characteristics of each, purposes for which most suitable or not suitable. Mounted paper, advantages and drawbacks of. Mounting paper, the best mountant; sourness of paste; preservatives, their effect on colours, &c.; effects of bad or adulterated paste.

Stretching paper on drawing-board, method of; advantages of; result of over-damping paper in doing so.

The colours, vegetable, animal, mineral, and chemical, respective permanence. Permanent, fugitive, and intermediate classes of colours; meaning of "fugitive"; causes of lack of permanence or fading of colours; action of light; impure atmosphere; chemical interaction. Bleaching out colour with chemicals; which colours are insusceptible; effect of doing so on paper substance. Liquid colours, waterproof colours; circumstances under which they may be used; drawbacks to use of. Waterproofing ordinary colours with bichromate of potash, how this acts. Best paper surfaces for colouring; overcoming greasiness of surface; oxgall, soap; drawbacks of latter. Transfer-paper, making of.

India ink, characteristics of the best; grain, fracture, colour; difference of fresh and stale ink.