

(4) Write notes on four (4) of the following:

- (a) Optical square; ✓
- (b) Vernier;
- (c) Clinometer; ✓
- (d) Prismatic compass;
- (e) Planimeter; ✓
- (f) Magnetic declination;
- (g) Contours. ✓

(5) A 1,000 ft. sided square ABCD (clockwise) is part of a geological exploration grid. AB is due North. Ground levels at A, B, C and D are 500 ft., 515 ft., 535 ft. and 547 ft. respectively. Boreholes have been put down at A, B and C, having the following depths to a particular strata:-

- A : 500 ft.
- B : 605 ft.
- C : 757 ft.

At what depth would a borehole at point D encounter the same strata if that strata is dipping uniformly? Calculate the bearing and value of the full dip of the strata.

(6) The co-ordinates of three stations A, B and C are -

	Latitude	Departure
A :	1573 ft.	1263 ft.
B :	587 ft.	923 ft.
C :	722 ft.	1639 ft.

Produce the lines AB, AC and BC and set out a circular curve tangential to all three of these lines. Calculate the distance from station A to the first tangent point along AB.

(7) (a) State the Prismoidal formula.

(b) A box cut is made to expose a coal seam for bulk sampling. The base of the cut is to be level at 60 ft. below the surface and measure 15 ft. wide x 120 ft. long. Side slopes are to be one vertical to ½ horizontal. Calculate the volume of the excavation; assume the original surface to be level.

(c) The excavated material is to be piled in a conical heap with 45° sides. If the weight of rock is 162 lb./cu. ft. in situ and 86 lb./cu. ft. when piled, what is the height of the pile going to be?

(8) (i) Trilateration and triangulation are two different methods of obtaining co-ordinates. Describe how they are different and how the various accuracies of first and second order work are achieved.

(ii) Discuss the four (4) major adjustments on a theodolite with respect to significance in field results.