

- (b) Construct and cut out two triangles which have the two sides and the included angle equal. By measurement and calculation, and also by superimposing, prove equality in all respects—viz., area, other side, and other angles.
- (c) Any two sides of a triangle are together greater than the third side.
- (d) (i) If one side of a triangle is produced, the exterior angle is greater than either of the interior opposite angles.
(ii) The exterior angle is equal to the sum of the two interior opposite angles.
(iii) The sum of the three angles of any triangle is equal to two right angles.
(iv) Any two angles of a triangle are together less than two right angles.
(v) A triangle cannot have more than one right angle.
- (e) Construction of pentagon, hexagon, and octagon, and measurement of the interior angles of each. The geometrical figures that lend themselves to the formation of a pavement.
- (f) The diagonals of a parallelogram bisect each other.
- (g) The straight line joining the middle points of two sides of a triangle is parallel to the base and equal to half the base.
- (h) If in a triangle a straight line is drawn parallel to the base through the middle point of one side it bisects the other side, hence lead to the method of dividing a given straight line into any given number of equal parts.
- (i) The area of a parallelogram is—
(i) Equal to the area of a rectangle on the same base and between the same parallels.
(ii) Double the area of a triangle on the same base and between the same parallels.

ADDITIONAL MATHEMATICS (OPTIONAL).

1. *Algebra*.—The following course constitutes about half the programme outlined in the Department's syllabus for the Intermediate and P.S.E. Examinations:—

- (a) Fundamental operations.
- (b) Easy fractions.
- (c) Factors of expressions that are the product of two binomial factors. Factors of such expressions as $a^3 + b^3$.
- (d) Common multiples and divisors to correspond.
- (e) Simple equations involving one or two unknown quantities.
- (f) Easy problems.

2. *Geometry*.—The following has been selected from the programme in Geometry as prescribed for the Intermediate and Public Service Examinations. No theoretical proofs required in Part I but only in Part II. The truth of the theorems in Part I should be established by intuition and experiment, and the teaching of formal geometry should be based on the acceptance of these theorems.

Part I—

- (a) If a straight line stands on another straight line, the sum of the adjacent angles so formed is equal to two right angles, and the converse.
- (b) When a straight line cuts two other straight lines, if a pair of corresponding angles are equal, the two straight lines are parallel; and the converse.
- (c) When a straight line cuts two other straight lines, if (i) a pair of alternate angles are equal, or (ii) a pair of interior angles on the same side of the cutting lines are supplementary, then the two straight lines are parallel; and the converse.
- (d) Straight lines which are parallel to the same straight line are parallel to one another.
- (e) If two triangles have two sides of the one equal to two sides of the other, each to each, and also the angles included by those sides equal, the triangles are congruent.
- (f) If two triangles have three sides of the one equal to three sides of the other, each to each, the triangles are congruent.

Part II, section I—

- (a) The sum of the angles of a triangle is equal to two right angles.
- (b) If two sides of a triangle are equal, the angles opposite those sides are equal; and the converse.
- (c) If two sides of a triangle are unequal, the greater side has the greater angle opposite to it; and the converse.