then $\sqrt{s-p}\pm\sqrt{s-q}\pm\sqrt{s-r}=0$.

Put $p=l+m$, $q=m+n$, $r=n+l$, $\therefore s=l+m+n$

$\therefore (l+m)^2+(m+n)^2+(n+l)^2 = 6(lm+mn=nl)$,

or $l^2+m^2+n^2=2(lm+mn+nl)$,

$\therefore (l+m-n)^2=4lm$,

$\therefore l+m-n=\pm 2\sqrt{lm}$ and $(\sqrt{l}\pm\sqrt{m})^2=n$,

$\therefore \sqrt{l}\pm\sqrt{m}\pm\sqrt{n}=0$,

and $l=s-q$, $m=s-r$, $n=s-p$.

QUESTIONS IN PHYSICS.

By W. J. LOUDON, B.A., Univ. Coll.

13. The letters *A B C* are written in ink on a sheet of paper and an impression is taken from the paper on a sheet of blotting-paper. If this blotting-paper be held before a plane mirror the original letters are seen in their proper order. Explain this fact.

14. Three points on a spherical mirror when joined by three straight lines form an equilateral plane triangle. If a side of this triangle be *A*, and the greatest perpendicular distance from the plane of the triangle to the surface be *B*, then the radius of the surface is $\frac{A^2}{6B}+\frac{B}{2}$.

15. Show that $1+2\left(\frac{7}{24}\right)+\frac{2.5}{1.2}\left(\frac{7}{24}\right)^2 + \frac{2.5.8}{1.2.3}\left(\frac{7}{24}\right)^3+\ldots\ldots$ ad. inf. $=4$.

16. If $Al+Bm+Cn=0$, $lx+my+nz=0$, $Ax+By+Cz=0$, $a^2Ax+b^2By+c^2Cz=0$, $A^2+B^2+C^2=1$, $a^2A^2+b^2B^2+c^2C^2=R^2$,

then $\frac{l^2}{R^2-a^2}+\frac{m^2}{R^2-b^2}+\frac{n^2}{R^2-c^2}=0$.

By GEORGE ROSS, B.A., Math. Master, C. I., Galt.

17. *B* is the vertical angle and *C* the right angle of a right angled triangle *ABC*. Produce *AB* to *D*, making *AD* equal to *AC*, and draw *DF* at right angles to *AD*, to meet the bisector of the angle *BAC* in *F*. Then is *DF* equal to *BC*.

18. Assuming the centre of the circle prove (without use of Book III.) that the opposite angles of a quadrilateral inscribed in a circle are equal to two right angles, and hence prove that the angles in the same segment of a circle are equal.

19. Deduce the converse of the first part of 18.

20. If *A* and *B* are two fixed points on a fixed circle whose centre is *C*, and *QCR* any diameter, the circles described around *ACQ* and *BCR* will intersect on the circle which cuts the fixed circle at right angles at *A* and *B*.

21. If the sides *BC*, *CA*, *AB* of the triangle *ABC* be divided in *D*, *E*, *F*, so that the ratios *BD* to *DC*, *CE* to *EA*, and *AF* to *FB* are each equal to the ratio of two to one, the triangle formed by the intersections of *AD*, *BE*, *CF*, shall be one-seventh of the triangle *ABC*.

UNIVERSITY OF LONDON.

MATRICULATION EXAMINATION, Jan. 1885.

English Language.

Examiners—Henry Craik, Esq., M.A., LL.D., Prof. John W. Hales, M.A.

Not more than *ten* questions are to be attempted. They must include the exercise in Dictation, and the questions two and thirteen.

1. Write out and punctuate the passage read by the examiner.

2. Name the main sources which have contributed to form modern English, and state the period at which the influence of each has been chiefly felt.

3. In what directions, and through what channels has the Latin language left its impress on English?

4. Show what suffixes have been used to mark the plural in English, and how the number of those in ordinary use has been reduced.

5. Explain the origin of the suffixes in the following words:—*Shadow*, *hillock*, *holy*, *busy*, *farthing*, *darling*, *worship*, *favour*, *burgess*, *ceremony*, *enemy*, *homage*, *terrace*.

6. What is the etymology of the following