

piece of metal weighs 850 grains in vacuum, 760 grains in water, and 772 grains in a mixture of alcohol and water. Find the specific gravity of the mixture.

8. A barometer tube of uniform bore is 34 inches in length. A small quantity of air is left by inadvertence above the mercury, so that the barometer registers 30 inches when the true atmospheric pressure is 30.05. What will be the true barometric reading when this barometer registers 28 inches?

9. Light proceeds from a point at the bottom of a lake. Make a careful drawing of the pencil of rays after emergence from the water, and find the geometrical focus of the pencil.

10. What is the critical angle of a transparent medium? Describe what a fish would see on looking towards the surface of the water in directions differently inclined to the horizon, and illustrate your description by a diagram.

11. A small object is placed in front of a concave spherical mirror of 6 inches radius at a distance of 4 inches from the surface of the mirror. Where will its image be situated? will it be erect or inverted? and what will its dimensions be compared with those of the object? Where must the object be that the image may be of the same size?

12. What is the focal length of a lens, and how would you determine it experimentally? In the case of a convex lens, if the object be as near as possible to the image, where must the lens be?

13. Shew how to convert temperatures expressed in the centigrade scale into degrees Fahrenheit, and *vice versa*. The number expressing the temperature of a body in degrees Fahrenheit is double that expressing it in degrees centigrade: find the temperature.

14. What is meant by the latent heat of steam? Describe some method by which it may be determined, mentioning the chief precautions which must be taken in carrying it out.

15. Distinguish between evaporation and ebullition, and define the boiling-point. How is the pressure of aqueous vapour in a saturated space affected by the presence of air or other gases?

16. Define the absolute conductivity of a substance. A metal plate $\frac{1}{2}$ in. in thickness and two feet square has the whole of one face in contact with water which is kept boiling, while the other face is in contact with melting ice; and it is found that 300 pounds of ice are melted in one hour. Find the absolute conductivity of the metal, stating clearly the units you employ.

ENGLISH LANGUAGE.

Examiners—Prof. Henry Morley and C. Knight Watson, Esq., M.A.

[N.B.—Not more than *ten* questions are to be answered, inclusive of the exercise in dictation.]

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

(Candidates will bear in mind that it is not allowable to make a fair copy of this exercise in dictation.)

2. Distinguish between the classical and the Teutonic elements in English. Point out the several ways in which words of Latin origin have been introduced into the language.

3. Define the terms vowel, diphthong, consonant. What letters are called mutes, and how are they subdivided? Tell the substance of Grimm's law.

4. Describe the several ways of indicating gender in English nouns, including explanation of the words *woman*, *lady*, *vixen*, *scamstress*, *mistress*, *bridegroom*, *widower*, *drake*.

5. What arguments might be used for and against the recognition of the article as a distinct part of speech? Tell what you know of the history of *an* and *the*.

6. Trace as fully as you can the history of the inflections of *thou*, and of *he*, *she*, *it*, in singular and plural.

7. Account for the separate forms *two* and *twain*, and for the words *ten*, *eleven*, *twelve*,