

Teachers' Examinations.

EDUCATION DEPARTMENT, ONTARIO,
JULY EXAMINATIONS, 1885.

FIRST-CLASS TEACHERS—GRADE C.

HYDROSTATICS AND HEAT.

Examiner—J. C. Glashan.

1. Distinguish between amount of pressure and intensity of pressure of a liquid on a submerged surface.

If the intensity of pressure on a surface be variable over the surface, how is the intensity of pressure at any given point measured?

A cube with edge one foot long is immersed in water so that one corner of the cube is just at the surface of the water and the diagonal of the cube from that corner, is vertical. Find the total pressure on the cube and the intensity of pressure at each corner.

2. Distinguish between mass and density, and between density and specific gravity.

How may one determine the specific gravity of an irregular solid insoluble in water, if the density of the solid be (i) greater; (ii) less, than that of water?

A cylindrical copper wire 44 yds. long, weighs 23,000 grains in the air, but only 20,400 in water. Find its volume, density, and mean section.

3. State the relation between the volume, density, and intensity of pressure of perfectly elastic gas kept at constant temperature.

In performing the Torricellian experiment, $\frac{1}{2}$ inch of the tube is left occupied with air at atmospheric pressure. After the inversion, this air expands till it occupies 11 inches of the tube while the column of mercury below it is sustained at a height of 28.8 inches. Find the correct barometric height.

4. "There have been two distinct theories regarding the nature of heat." State these theories and describe any experimentum crucis between them.

What assumption was made by Mayer in his determination of the Mechanical Equivalent of heat?

How much mechanical energy is necessary to melt 10 lbs. of ice at 32° F.?

5. Distinguish between temperature and quantity of heat.

If the temperature of a body be increased, what is, in general, the effect on the volume of the body? State some remarkable exceptions to this law.

Describe some form of air-thermometer and enumerate its advantages and disadvantages.

Find the least distance between the consecutive rails on a line of railway which will allow of the expansion due to an increase of temperature of 70° F., the rails being 11 yards long and the coefficient of expansion being .000007 per degree Fahrenheit.

6. Describe briefly the three methods by which heat is conveyed from one place to another.

Describe experiments showing that radiant heat is capable of reflection, refraction, and absorption.

Give a brief statement of Prevost's theory of exchanges.

ENGLISH LITERATURE.

Examiner—J. E. Hodgson, M.A.

1. "I do not think there is an able writer in verse, of the present day, who would not be proud to acknowledge his obligations to the *Reliques*."

(a) Give names of some of the "abler writers in verse" of that day.

(b) How was Scott's poetic work affected by the *Reliques*?

2. Compare the narrative portion of the *Lady of the Lake*, with the lyrical portion, with regard to (a) metre; (b) sentiment.

3. Give a synopsis of the description of the fight between Fitz-James and Roderick Dhu. What features of the description conduce to (a) its picturesqueness; (b) its animation?

4. Now, clear the ring! for, hand to hand,
The manly wrestlers take their stand.
Two o'er the rest superior rose,
And proud demanded mightier foes,
Nor called in vain; for Douglas came.
—For life is Hugh of Lerbort lame;
Scarcely better John of Alloo's fare,
Whom senseless home his comrades bear,
Prize of the wrestling match, the King
To Douglas gave a golden ring,
While coldly glanced his eye of blue,
Douglas would speak, but in his breast
His struggling soul his words suppressed;
Indignant then he turned him where
Their arms the brawny yeomen bare,
To hurl the massive bar in air.
When each, his utmost strength and shown,
The Douglas rent an earth-fast stone
From its deep bed, then heaved it high,
And sent the fragments through the sky,
A rood beyond the furthest mark;
And still in Stirling's royal park,
The gray-haired sires, who know the past,
To strangers point the Douglas-cast,
And moralise on the decay
Of Scottish strength in modern day.

(a) Illustrate by reference to this extract, differences between prose diction, and poetic diction.

(b) Distinguish *rime* from *rhythm*. Account for the spelling *rhyne*. What constitutes a perfect rime? Point out an imperfect rime in the extract, and state in what its imperfection consists.

5. What beneficial results should flow from the study of *Rip Van Winkle*?

6. Illustrate by references to the *Rip Van Winkle*, Irving's power in (a) humor; (b) pathos; (c) observation.

7. Explain what is meant by saying that "Irving is not a distinctively American writer."

GEOGRAPHY.

Examiner—Cornelius Donovan, M.A.

1. What is meant by Circle of Illumination? Declination? Precession of the Equinoxes? Synodic Period? Prime Vertical? Radius Vector? Isothermal Lines? Isochimal Lines?

2. What are the conditions on which depends the distribution of moisture on the surface of the earth?

Illustrate by reference to the great rainy, and the great rainless, districts of the world.

3. Trace a voyage on the Danube from its source to its mouth, writing notes on all Geographical and Historical points of interest on the route.

4. Explain the origin, the characteristics, and the work of rivers. How is soil made?

5. Describe Egypt as to (1) government and races, (2) soil and productions, (3) physical features.

6. What services in nature do mountains perform? Fully illustrate by reference to five of the great mountain chains in Europe. Compare the ethnological values of mountains and valleys.

7. Explain how you would find—

(1) The length of the diameter of the earth.

(2) The length of a degree of longitude at a given latitude.

(3) The latitude and longitude of any place.

PREPARATION FOR READING.

To prepare for conducting your reading classes, try some such plan of study as this:

1. Make out a list of new or difficult words requiring class drill.

2. Decide what line of questioning will bring out the meaning of each sentence paragraph, or the entire lesson.

3. Decide what anecdotes you may tell.

4. Decide what stories the children may be led to tell in connection with the lesson.

5. Form a definite idea of the benefits which individual pupils and the class as a whole should receive from the lesson.—*School Education*.