AN ROINN OIDEACHAIS

BRAINSE AN GHAIRM-OIDEACHAIS.

CERTIFICATE EXAMINATIONS
for
DAY VOCATIONAL COURSES, 1959.

MECHANICS AND HEAT.

Thursday, 18*th June*—2.30 *to* 4.30 *p.m.*

(i) Not more than *four* questions may be attempted.

(ii) Question 1 must be attempted by all candidates.

1. Answer each of the following :—

(*a*) Distinguish between a barometer and a hydrometer.

(*b*) State Boyle's Law in words and in symbols.

(*c*) A piece of glass weighs 50 gr. in air and 30 gr. in water : find the specific gravity of glass.

(*d*) Explain moment of a force.

(*e*) Define efficiency of a machine.

(*f*) Convert the temperature 50°F to °C.

(*g*) Define coefficient of linear expansion.

(*h*) Distinguish between conduction and radiation.

2. Given a potato, a glass beaker which will contain it, a 100 c.c. graduated cylinder, a large bottle of water, gummed paper, a metre stick, a retort stand, a spool of thread and a 100 gr. weight describe, giving sketches, how you would determine the *weight*, the *volume* and the *density* of the potato.

3. State the *Triangle of Forces* and describe, giving sketches, how you would verify it by experiment.

A force of 50 lb. wt. acts at an angle of 30° to the horizontal : find the vertical and horizontal components of the force.

[P.T.O.

4. Define *energy, work, power.*

Calculate the horse-power necessary (*a*) to raise 3 tons of coal through a height of 44 ft. in 2 mins. ; (*b*) to keep a train moving at a constant speed of 60 miles per hour on a level track against a resistance of 1,800 lb. wt.

5. Describe, giving sketches, experiments you have performed, or seen performed, to investigate the effect of *increased pressure* on the melting point of ice and on the boiling point of water.

Discuss the influence of pressure in: (*a*) ice skating; (*b*) the preparation of tea at high altitudes.

6. Describe, with the aid of sketches, how you would determine the specific heat of brass, indicating the main precautions to be taken in the experiment.

In cooling from 100°C to 25°C, 40 grams of brass gave out 270 calories of heat. Find the specific heat of brass.

7. Explain clearly why :

(*a*) a simple pendulum set in motion swings to and fro and eventually comes to rest ;

(*b*) the height a suction pump will lift water is limited ;

(*c*) some parts of an engine require lubrication ;

(*d*) exposed water pipes may burst in severe frost ;

(*e*) a saucepan containing water may be placed safely on a fire, but if empty it will be damaged.