AN ROINN OIDEACHAIS

AN BRAINSE GAIRM-OIDEACHAIS.

CERTIFICATE EXAMINATIONS
for
DAY VOCATIONAL COURSES, 1958.

MECHANICS AND HEAT.

Thursday, 19*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*) For what purpose is a siphon tube used ?

(*b*) State the Law of Flotation.

(*c*) What is the turning effect of a force of 4 lb. wt. about a point 2 ft. from its line of action ?

(*d*) Define mechanical advantage of a machine.

(*e*) How much work is done in 2 mins. by a machine developing 3 h.p. ?

(*f*) Define the British Thermal Unit of heat.

(*g*) What is meant by a convection current ?

(*h*) Distinguish between evaporation and condensation.

2. Define *specific gravity*.

Describe fully, with the aid of sketches, how you would determine the specific gravity of a liquid (*a*) using the Principle of Balancing Columns ; (*b*) using the Principle of Archimedes. Assume any necessary figures to show how you would work out the results.

3. Describe fully an experiment you have performed to verify the Principle of Moments.

Find the position of the Centre of Gravity of a light rod, 18 ins. long, which carries masses of 2 lb. at one end, 4 lb. at the middle point and 3 lb. at the other end.

4. State the *Triangle of Forces.*

A body of weight 50 lb. is at rest on a plank inclined at 30° to the horizontal. Show on a sketch the direction of (*a*) the force of friction, (*b*) the perpendicular reaction of the plank. Find by drawing, or otherwise, the magnitudes of these forces.

5. Explain the Centigrade and Fahrenheit scales of temperature. Describe, with the aid of sketches, the experiments you would perform to check the upper and lower fixed points on an ordinary Centigrade thermometer.

Convert the temperature 23°F. to °C.

6. The *specific heat* of steel is 0·11. What does this mean ?

Pieces of steel weighing 100 grams and at a temperature of 99°C. were introduced into 120 grams of turpentine at 13°C. contained in a calorimeter of water—equivalent 7 grams. The resulting temperature was 27°C. Calculate the specific heat of turpentine.

7. Explain clearly why—

(*a*) A penny, if licked and pressed to your forehead, will stay there for some time, but will fall off at once if you frown.

(*b*) A clock operated by a brass pendulum goes slow in very warm weather.

(*c*) Wearing wet clothes is dangerous to health.

(*d*) A teapot should have a polished surface.

(*e*) A cyclist can balance himself easily when riding but not when stationary.