AN ROINN OIDEACHAIS

AN BRAINSE GAIRM-OIDEACHAIS.

CERTIFICATE EXAMINATIONS
for
DAY VOCATIONAL COURSES, 1957.

MECHANICS AND HEAT.

Friday, 14th June—2.30 *to* 4 *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 calipers used ?

(*b*) State the Principle of Archimedes.

(*c*) What is meant by an elastic substance ?

(*d*) Distinguish between kinetic and potential energy.

(*e*) Define resultant force.

(*f*) Convert the temperature 15°C. to °F.

(*g*) The specific heat of mercury is $\frac{1}{30}$. What does this mean ?

(*h*) Distinguish between evaporation and boiling.

2. Sketch a specific gravity bottle and describe how you would use it to determine the specific gravity of a liquid.

A specific gravity bottle full of water weighs 68 grams. Grains of lead shot weighing 125 grams are dropped into the bottle of water, and the bottle and contents then weigh 182 grams. Calculate the specific gravity of lead.

3. Define *centre of gravity*. How would you find the centre of gravity of an irregular piece of cardboard ?

Explain stable, unstable and neutral equilibrium, giving an example in each case.

[P.T.O.

4. In a lifting machine an effort of 500 lb. moves through a distance of 352 feet in raising a load of 3,000 lb. through a height of 44 feet in 2 minutes. Calculate (*a*) the work done by the effort; (*b*) the work done on the load; (*c*) the work done against friction; (*d*) the efficiency of the machine; (*e*) the mechanical advantage; (*f*) the velocity ratio; (*g*) the H.P. developed by the effort.

5. Give the general sources of heat. Explain *three* practical applications of expansion due to heat.

A metal bar 120 cms. long at 10°C. expands 0·162 cms. when heated to 100°C. Find the coefficient of linear expansion of the metal.

6. Distinguish between *sensible heat* and *latent heat.*

When 12 grams of dry ice at 0°C. are added to 65 grams of water at 25°C. in a calorimeter of water-equivalent 7 grams, the resulting temperature is 10°C. Calculate the latent heat of ice.

7. Explain clearly why:

(*a*) a barometer can be used to measure altitudes;

(*b*) a submarine can submerge in the sea;

(*c*) an oar can propel a row boat;

(*d*) frosts assist the farmer in his preparation of the soil;

(*e*) a sea-breeze is usual at the seaside on a sunny, summer day.