AN ROINN OIDEACHAIS. G.317.

BRAINSE AN GHAIRMOIDEACHAIS.

CERTIFICATE EXAMINATIONS

for

DAY VOCATIONAL COURSES, 1962.

MECHANICS AND HEAT.

WEDNESDAY, 20th June—2.30 to 4.30 p.m.

INSTRUCTIONS.

Not more than four questions to be attempted.

All questions carry equal marks.

Illustrate your answers with sketches and diagrams where possible.

1. Describe, with sketch of apparatus, how you would determine the coefficient of linear expansion of a metal. What is meant by saying that the value of this coefficient for brass is 0·000018 per degree Centigrade ?

A metal rod has a length of 25·00 cm. at 12°C and 25·04 cm. at 92°C. Find the coefficient of linear expansion of the metal.

2. Define specific heat.

140 gm. of aluminium at 100°C were immersed in 250 gm. of a liquid of 15°C contained in a calorimeter of water equivalent 10 gm. The final temperature was 25°C. Calculate the specific heat of the liquid, taking that of aluminium as 0·2.

3. Draw a diagram of a domestic hot water supply system where the water is heated by burning turf or coal. Explain how convection currents are set up in the system and indicate on your diagram the directions of water flow.

4. Draw a diagram of a simple pulley system with a velocity ratio of three and determine the effort required to raise a load of 216 lb. Assume that the efficiency of the system is 60 per cent.

Calculate the work done by the effort in lifting the above load through a height of 7 feet.

5. State the law of flotation.

A cube of oak of side 6 cms. sinks to a depth of 4 cms. when floating in a liquid of density 1·25 gm./c.c. Calculate the weight of the cube and the density of oak.

6. (a) The normal atmospheric pressure is 30 inches of mercury. Show how to convert this pressure to feet of water given that the specific gravity of mercury is 13.6.

(b) A rubber balloon has a volume of 2 litres when filled with air at normal atmospheric pressure. The balloon is then immersed in water and held at a depth of 8·5 feet below the surface. Calculate the new volume of the balloon.