

AN ROINN OIDEACHAIS.

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AN BRAINSE GAIRM-OIDEACHAIS.

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CERTIFICATE EXAMINATIONS

for

DAY VOCATIONAL COURSES, 1949.

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MECHANICS AND HEAT.

Tuesday, June 28th—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) What is meant by the Force of Gravity?
- (b) State the Law of Flotation.
- (c) The barometer reads 30.6"; what does this mean?
- (d) Define specific heat.
- (e) State the Principle of Moments.
- (f) Convert the temperature 15° C. to °F.
- (g) What quantity of heat will raise the temperature of 50 grams of water from 10° C. to 30° C?
- (h) How much work is done in 5 minutes by a machine working at the rate of 2 h.p?

2. Distinguish between *density* and *specific gravity*.

Describe fully two different methods by which you could determine experimentally the specific gravity of a liquid.

3. State *Boyle's Law* in words and in symbols.

A certain mass of gas measures 480 cc. when its pressure is 760 mms. of mercury. If no change occurs in the temperature calculate (a) the volume of this mass of gas when its pressure is 800 mms. of mercury; (b) the pressure when its volume is 570 cc.

4. Define *resultant force* and *equilibrant*.

Two forces of 29 lb. and 41 lb. respectively act with an angle of  $135^\circ$  between their lines of action. Find graphically the magnitude and direction of (a) their resultant; (b) their equilibrant.

5. Define *velocity ratio*, *mechanical advantage* and *efficiency* as applied to a machine.

For any machine with which you have worked describe fully, with the aid of a sketch, how you would proceed to get the data necessary for the plotting of the load-efficiency curve for the machine.

6. Define *coefficient of linear expansion*.

A brass rod 120 cms. long at  $10^\circ$  C. becomes 120.20 cms. long when heated to  $100^\circ$  C. Calculate (a) the coefficient of linear expansion of brass; (b) the length of the rod at  $250^\circ$  C.

7. Explain clearly why :

(a) sprinkling water on the floor cools a room in hot weather;

(b) damp clothes dry best on a windy day;

(c) exposed water pipes are liable to burst in frosty weather;

(d) steam produces more serious scalding than boiling water;

(e) ice if wrapped in flannel will not melt readily.