AN ROINN OIDEACHAIS
(Department of Education).

BRAINSE AN MHEÁN-OIDEACHAIS
(Secondary Education Branch).

LEAVING CERTIFICATE EXAMINATION, 1929.

PASS

APPLIED MATHEMATICS.

THURSDAY, 20th JUNE.—AFTERNOON, 1.30 TO 3.30 P.M.

Not more than *five* questions may be answered.

Mathematical Tables may be obtained from the Superintendent.

1. Deduce the formula $s = ut + \frac{1}{2}ft^2$ for a particle moving with uniform acceleration in a straight line.

A train comes to rest in 400 yards, half a minute after the brakes are applied. If the retardation was uniform what was the speed in miles per hour when the brakes were applied?

[55 marks.]

2. A body is projected horizontally from a tower 64 feet high. What must be its velocity so that it should strike the ground at an angle of 45° to the horizontal [$g = 32$ ft./sec.].

[55 marks.]

3. A man in a lift which is rising with an acceleration of 1 foot per second holds a spring balance in his hand from which he hangs a parcel weighing 2 lbs. What will be the reading of the spring balance? What will the reading be when the motion of the lift becomes uniform? If the lift when stopping has a negative acceleration of 2 feet per second, what is the effect on the spring balance? [60 marks.]

4. A bullet weighing ·025 lb. enters a *freely suspended* block of wood weighing 10 lb. with a velocity of 2000 ft. per second. Find the velocity with which the block starts moving. How can this velocity be determined? [60 marks.]

5. A right circular cylinder of brass is 10 cm. high and 2 cm. radius. At one end a concentric hole is bored, 1 cm. in radius and 5 cm. deep. Find the centre of gravity of the remainder of the cylinder. [55 marks.]

6. Forces of 8, 8 and 16 act along the sides AB, BC, and CD of a square whose side is 10 inches in length.

Find (1) the resultant of the forces along AB and BC; (2) the point in which the resultant of the parallel forces cuts BC; (3) the line of action and magnitude of the resultant of the three forces. [60 marks.]

7. What are the conditions that a body should be in equilibrium under the action of three non-parallel forces?

A sphere is attached by a string to a point on a smooth vertical wall the length of the string being equal to the radius, of the sphere. Draw a diagram showing the position of the sphere when in equilibrium and marking the direction of each of the forces on it.

Find the tension in the string if the sphere weighs 10 lbs. [60 marks.]

8. A shell weighing 800 lbs. moving horizontally has its velocity reduced from 2200 to 2180 feet per second in 100 yards. Find the average force of the air resistance. [60 marks.]