

AN ROINN OIDEACHAIS

LEAVING CERTIFICATE EXAMINATION, 1994

APPLIED MATHEMATICS – HIGHER LEVEL

FRIDAY, 24 JUNE – MORNING, 9.30 to 12.00

Six questions to be answered. All questions carry equal marks.

Mathematics Tables may be obtained from the Superintendent.

Take the value of g to be 9.8 m/s^2 .

Marks may be lost if necessary work is not shown or you do not indicate where a calculator has been used.

1. (a) A lift, in a continuous descent, had uniform acceleration of 0.6 m/s^2 for the first part of its descent and a retardation of 0.8 m/s^2 for the remainder. The time, from rest to rest, was 14 seconds.
- Draw a time-velocity graph and hence, or otherwise, find the distance descended.
- (b) In a lift, moving upwards with acceleration f , a spring balance indicates an object to have a weight of 98 N. When the lift is moving downwards with acceleration $2f$ the weight appears to be 68.6 N.
- Calculate
- the actual weight
 - the downward acceleration of the lift.
2. A cyclist A is pedalling at 3 m/s due east along a straight road. A second cyclist B is pedalling at 4 m/s due north along another straight road intersecting the first at a junction p .
- (a) If A is 80 m and B is 40 m from p at a given moment, calculate
- the velocity of B relative to A.
 - how far each cyclist is from p when they are nearest together.
- (b) If when A and B are 80 and 40 m from p , respectively, then A immediately accelerates at 0.1 m/s^2 and B decelerates at $q \text{ m/s}^2$.
- Find the velocity of B relative to A in terms of time t .
 - Determine the value of q which causes them to arrive at p together.

