EXAMINATION PRACTICE 2

CANDIDATE NAME	ENGLISH	CHINESE

Date | **Candidate No.**

MATHEMATICS **9709/04**
Paper 4 Mechanics

30 Minutes

You must answer on this question paper.

You will need: List of formulae (MF19)

READ THESE INSTRUCTIONS FIRST

- Answer **all** questions.
- Write your name, date & class on all the work you hand in.
- Write in dark blue or black pen.
- You may use an HB pencil for any diagrams or graphs.
- Do not use staples, paper clips, glue, or correction fluid.
- Write your answer to each question in the space provided.
- If additional space is needed, you should use the lined page at the end of this booklet; the question number or numbers must be clearly shown.
- Where a numerical value for the acceleration due to gravity is needed, **use 10 m s^{-2}**.
- You must show all necessary working clearly; no marks will be given for unsupported answers from a calculator.
- Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place for angles in degrees, unless a different level of accuracy is specified in the question.

INFORMATION

- The total mark for this paper is **24**.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **3** pages. Blank pages are indicated.

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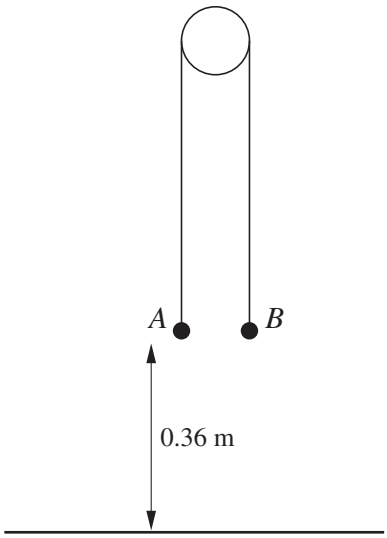

Particles A and B are attached to the ends of a light inextensible string which passes over a smooth pulley. The system is held at rest with the string taut and its straight parts vertical. Both particles are at a height of 0.36 m above the floor (see diagram). The system is released and A begins to fall, reaching the floor after 0.6 s.

(i) Find the acceleration of A as it falls. [2]

The mass of A is 0.45 kg. Find

(ii) the tension in the string while A is falling, [2]

(iii) the mass of B, [3]

(iv) the maximum height above the floor reached by B. [3]

7 A particle P travels in a straight line from A to D, passing through the points B and C. For the section AB the velocity of the particle is $(0.5t - 0.01t^2)\ \text{m s}^{-1}$, where t s is the time after leaving A.

(i) Given that the acceleration of P at B is $0.1\ \text{m s}^{-2}$, find the time taken for P to travel from A to B. [3]

The acceleration of P from B to C is constant and equal to $0.1\ \text{m s}^{-2}$.

(ii) Given that P reaches C with speed $14\ \text{m s}^{-1}$, find the time taken for P to travel from B to C. [3]

P travels with constant deceleration $0.3\ \text{m s}^{-2}$ from C to D. Given that the distance CD is 300 m, find

(iii) the speed with which P reaches D, [2]

(iv) the distance AD. [6]