

2001 HIGHER SCHOOL CERTIFICATE EXAMINATION

Physics

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Centre Number

Section I – Part B (continued)

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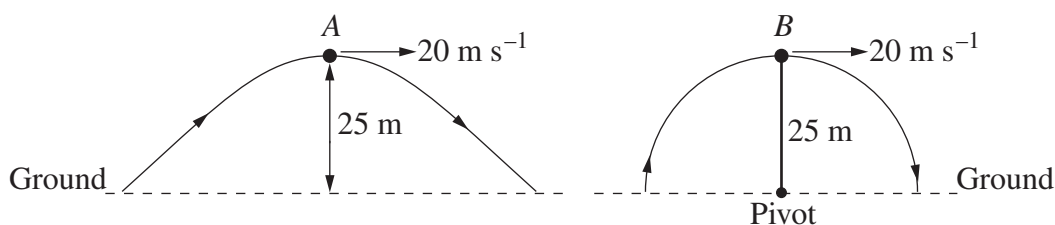
Student Number

Marks

Question 18 (6 marks)

A 30 kg object, *A*, was fired from a cannon in projectile motion. When the projectile was at its maximum height of 25 m, its speed was 20 m s^{-1} .

An identical object, *B*, was attached to a mechanical arm and moved at a constant speed of 20 m s^{-1} in a vertical half-circle. The length of the arm was 25 m.



Ignore air resistance.

- (a) Calculate the force acting on object *A* at its maximum height. 1

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- (b) Calculate the time it would take object *A* to reach the ground from its position of maximum height. 2

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- (c) Describe and compare the vertical forces acting on objects *A* and *B* at their maximum heights. 3

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Marks

Question 19 (4 marks)

How does Einstein's Theory of Special Relativity explain the result of the Michelson–Morley experiment?

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Question 20 (4 marks)

The electrical supply network uses a.c. and a variety of transformers between the generating stations and the final consumer.

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Explain why transformers are used at various points in the network.

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