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Centre Number

Section I – Part B (continued)

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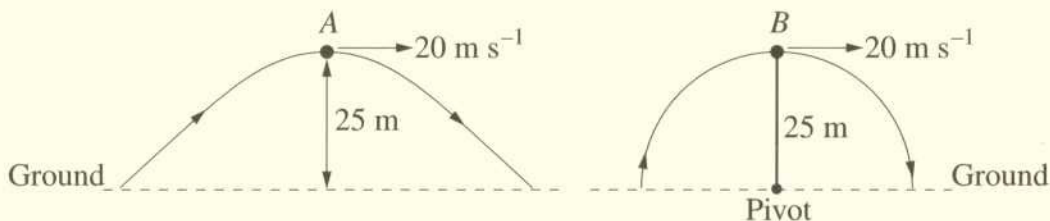
Student Number

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  $20 \text{ m s}^{-1}$ .

An identical object, *B*, was attached to a mechanical arm and moved at a constant speed of  $20 \text{ m s}^{-1}$  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

$9.8 \text{ m s}^{-2}$   
 .....  
 .....

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

$25 \div 9.8 = 2.55 \text{ s}$   
 .....  
 .....

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

Less  
 There is ~~more~~ force acting on *A* than *B*  
 because it is a projectile motion here. So there is  
 not much force acting on it.  
 more force on *B* because it is a circle  
 and it ~~isn't~~ will never go any where  
 near a low speed.

Question 19 (4 marks)

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

4

Einstein's Theory of Special Relativity explain the result of Michelson Morley experiment as the ether not existing. The Michelson experiment was to show a light in a half silver mirror and one later turn that 90 degree and he found that it was the same and propose that ether did not appear.

Question 20 (4 marks)

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

4

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

The Network need a transformers because it need to change the voltage because some time it will be too big or too small for the voltage. So the transformers can be able to control the voltage.