Practice Question Set For A-Level
Subject : Physics
Paper-1 Topic : 6_ Further Mechanics

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Name of the Student:_____
Max. Marks : 19 Marks **Time : 19 Minutes**

Q1.

The International Space Station (ISS) orbits the Earth with a constant speed *v*. The orbit is circular and of radius *r*.

(i) The ISS completes one orbit in 92 minutes.

Calculate the centripetal acceleration of the ISS.
r = 6800 km

(3)

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Centripetal acceleration = ...

(ii) Astronauts in the ISS are often described as being "weightless".

Discuss whether the astronauts are "weightless" when they are orbiting the Earth in the ISS.

(4)

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(Total for question = 7 marks)

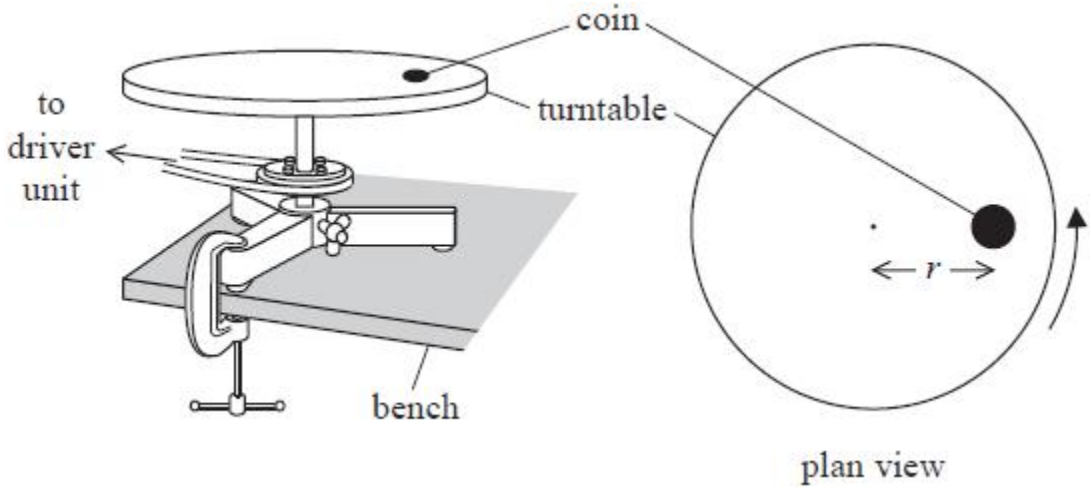
Q2.

A student was investigating the forces involved in circular motion.

He placed a small coin on a horizontal turntable as shown. The turntable was connected to a driver unit so that it

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could be rotated at a constant rate.



The student repeated the procedure with different values of *r*.

Explain how the value of ω at which the coin started to slide varied as *r* increased.

(3)

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(Total for question = 3 marks)

Q3.

The London Eye consists of a large vertical circle with 32 equally-spaced passenger cabins attached to it. The wheel rotates so that each cabin has a constant speed of 0.26 m s^{-1} and moves around a circle of radius 61 m.

(a) Calculate the time taken for each cabin to make one complete revolution.

(2)

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Time = ...

(b) Calculate the centripetal force acting on each cabin.

mass of cabin = 9.7×10^3 kg

(2)

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Centripetal force = ...

(c) (i) The diagram shows just the circle and the cabins. Draw arrows to show the direction of the centripetal force acting on a person in a cabin when the person is at each of positions **A**, **B** and **C**.

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(3)

*(ii) As the person in a cabin moves around the circle, the normal contact force between the person and the cabin varies.

State the position at which this force will be a maximum and the position at which it will be a minimum. Explain your answers.

(4)

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(Total for question = 9 marks)

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