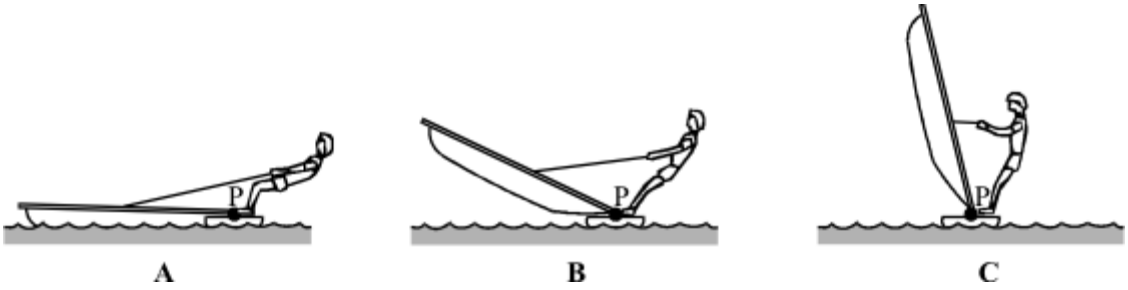
Name of the Student:_____
Max. Marks : 17 Marks **Time : 17 Minutes**

Q1.

(a) The diagrams show a windsurfer pulling up the sail of a sailboard. The mast pivots at point P.



A B C

In which position, **A**, **B** or **C** must the windsurfer pull with the largest force? Give a reason for your answer.

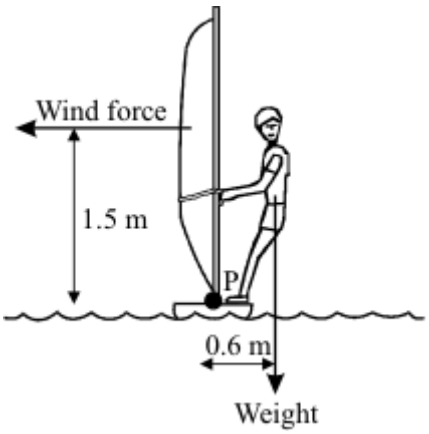
_____

_____

_____

(2)

(b) Once the mast is upright, the windsurfer and the sailboard are *in equilibrium.*



(i) What does *in equilibrium* mean?

_____

_____

(1)

(ii) The weight of the windsurfer is 700 newtons. Calculate the moment exerted by the

windsurfer on the sailboard. Show clearly how you work out your answer.

_____

_____

Moment = _____ Nm

(2)

(iii) Calculate the horizontal force of the wind on the sail. Show clearly how you work out your answer.

_____

_____

Force = _____ N

(2)

(c) As the wind speed increases the windsurfer leans further out from the sailboard.

This position allows the windsurfer and sailboard to stay in equilibrium. Explain why.

_____

_____

_____

_____

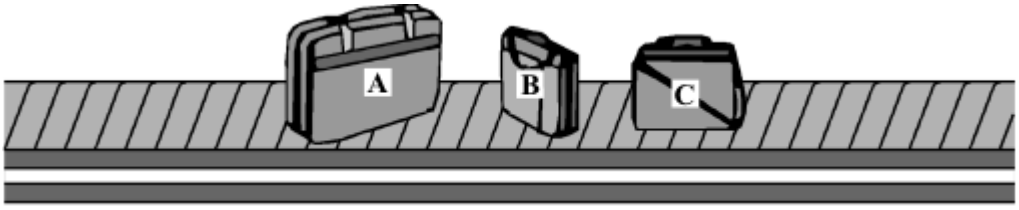
_____

(3)

(Total 10 marks)

Q2.

The picture shows luggage which has been loaded onto a conveyor belt.



Each piece of luggage has a different mass.

Mass of **A** = 22 kg mass of **B** = l2 kg mass of **C** = 15 kg

(a) (i) What is the momentum of the luggage before the conveyor belt starts to move?

_____

Give a reason for your answer.

_____

_____

(2)

(ii) When the conveyor belt is switched on the luggage moves with a constant speed. Which piece of luggage **A**, **B** or **C** has the most momentum?

_____

Give a reason for your answer.

_____

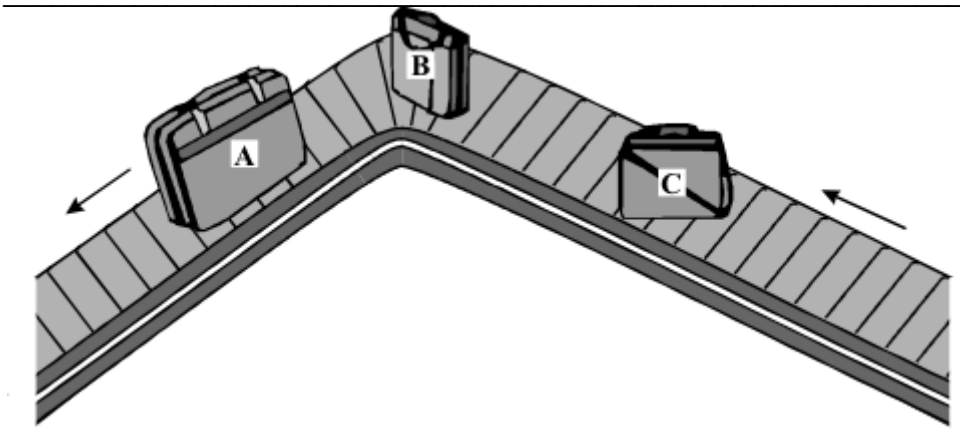
_____

(2)

(iii) At one point the conveyor belt turns left. The luggage on the belt continues to move at a constant speed.

Does the momentum of the luggage change as it turns left with the conveyor belt?

_____



Give a reason for your answer.

_____

_____

(2)

(b) Draw a circle around the unit which can be used to measure momentum.

J/s kg m/s Nm

(1)

(Total 7 marks)