Name of the Student:_____
Max. Marks : 18 Marks **Time : 18 Minutes**

Mark Schemes

Q1.

(a) (i) the line of action of the weight (of the bus) lies / acts outside of the base (of the bus)

allow line of action through the centre of mass lies / acts outside the base

1

there is a resultant <u>moment</u> (acting on the bus)

1

(ii) in normal use the centre of mass may be in a different position

1

or

passengers on the bus may affect the position of the centre of mass

for safety, buses should always be tested beyond the normal operating conditions / parameters

for safety is insufficient

accept in case something unexpected happens

1

(b) (i) a liquid is (virtually) incompressible

accept a liquid cannot be squashed

a liquid is difficult to compress is insufficient

1

(ii) 84000

*award **2** marks for*

$$\frac{F}{0.28} = \frac{360}{0.0012}$$

or

$$\frac{F}{0.28} = 300\ 000$$

***or** award **1** mark for*

$$P = \frac{360}{0.0012}$$

or

300 000 (Pa)

seen anywhere

3

[8]

Q2.

(a) the forces are equal in size and act in opposite directions

1

(b) (i) forwards / to the right / in the direction of the 300 N force

answers in either order

1

accelerating

1

(ii) constant velocity to the right

1

(iii) resultant force is zero

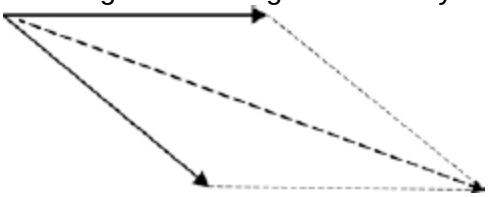
accept forces are equal / balanced

1

so boat continues in the same direction at the same speed

1

(iv) parallelogram or triangle is correctly drawn with resultant



3

value of resultant in the range 545 N – 595 N

*parallelogram drawn without resultant gains **1** mark*

If no triangle or parallelogram drawn:

*drawn resultant line is **between** the two 300 N forces gains **1** mark*

*drawn resultant line is between and longer than the two 300 N forces gains **2** marks*

1

[10]