

Name of the Student: _____

Max. Marks : 22 Marks

Time : 22 Minutes

Mark Schemes

Q1.

- (a) direction

1

- (b) 54 000

*allow 1 mark for calculating and identifying momentum as 10 800**or**allow 1 mark for correct substitution into second equation*

$$\text{ie } \frac{1200 \times 9}{0.2}$$

2

- (c) increases the time taken (for head) to stop

*accept increases impact time**do **not** accept reference to slowing down time unless qualified*

1

decreases rate of change in momentum

*accept reduces acceleration / deceleration**accept increases the time taken to reduce momentum to zero is worth 2 marks**reduces momentum is insufficient*

1

reduces the force (on the head)

1

[6]**Q2.**

- (a) 1.2

*allow 1 mark for conversion of 2.4 kN to 2400 N**or for correct transformation without conversion*

ie $d = 2880 \div 2.4$

2

metre(s)/m

1

- (b) any
- two**
- from:

- as the load increases the (total) clockwise moment increases

- danger is that the fork lift truck / the load will topple / tip forward
- (this will happen) when the total clockwise moment is equal to (or greater than) the anticlockwise moment
accept moments will not be balanced
- (load above 10.0 kN) moves line of action (from C of M) outside base (area)

2

[5]

Q3.

(a) 48

*allow for 1 mark correct method shown, ie 6×8
or correct area indicated on the graph*

2

(b) diagonal line from (0,0) to (6,48) / (6, their (a))

if answer to (a) is greater than 50, scale must be changed to gain this mark

1

horizontal line at 48m between 6 and 10 seconds

accept horizontal line drawn at their (a) between 6 and 10 seconds

1

[4]

Q4.

(a) (i) momentum before = momentum after
or

(total) momentum stays the same

accept no momentum is lost

accept no momentum is gained

1

(ii) an external force acts (on the colliding objects)

accept colliding objects are not isolated

1

(b) (i) 9600

*allow 1 mark for correct calculation of momentum before or after
ie 12000 or 2400*

or

correct substitution using change in velocity = 8 m/s

ie 1200×8

2

kg m/s

this may be given in words rather than symbols

or

Ns

1

(ii) 3 or their (b)(i) $\div$ 3200 correctly calculated

allow 1 mark for stating momentum before = momentum after

or

clear attempt to use conservation of momentum

2

[7]