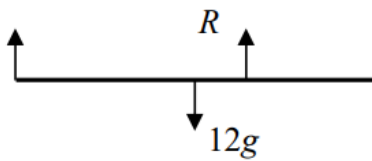


Moments In 1 Dimension (From Edexcel 6677)

Q1, (Jun 2005, Q6)



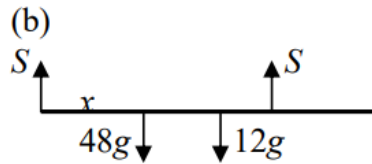
(a) $M(A): 12g \times 1.5 = R \times 2$

$R = \underline{9g \text{ or } 88.2 \text{ N}}$

M1 A1

A1

(3)



$R(\uparrow) \quad 2S = 48g + 12g$

$S = 30g$

M1 A1

$M(A): S \times 2 = 12g \times 1.5 + 48g \times x$

M1 A2,1,0

↓↓

Sub for S and solve for $x: x = \underline{7/8 \text{ or } 0.875 \text{ or } 0.88 \text{ m}}$

M1 A1

(7)

Q2, (Jan 2007, Q2)

(a) $M(C) \quad 80 \times x = 120 \times 0.5$
 $x = 0.75 \text{ *}$

cso

M1 A1

A1 3

(b) Using reaction at $C = 0$
 $M(D) \quad 120 \times 0.25 = W \times 1.25$
 $W = 24 \text{ (N)}$

ft their x

B1

M1 A1

A1 4

(c) i $X = 24 + 120 = 144 \text{ (N)}$

ft their W

M1 A1ft

2

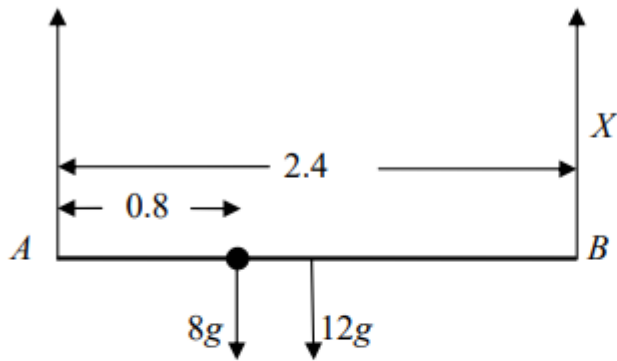
(d) The weight of the rock acts precisely at B .

B1

1

10

(a)



$$M(A) \quad 8g \times 0.8 + 12g \times 1.2 = X \times 2.4$$

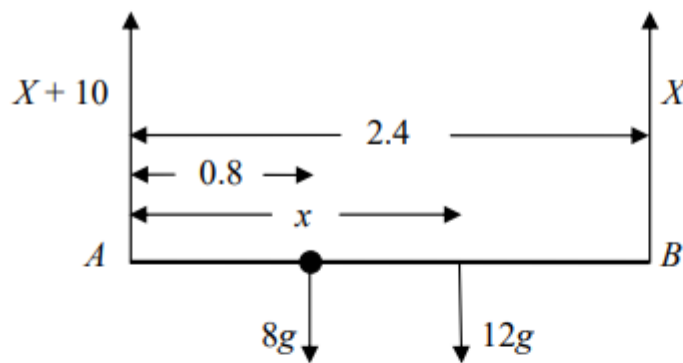
$$X \approx 85 \text{ (N)}$$

accept 84.9, $\frac{26g}{3}$

M1 A1

DM1 A1 (4)

(b)



$$R(\uparrow) \quad (X+10) + X = 8g + 12g$$

$$(X = 93)$$

M1 B1 A1

$$M(A) \quad 8g \times 0.8 + 12g \times x = X \times 2.4$$

$$x = 1.4 \text{ (m)}$$

accept 1.36

M1 A1

A1 (6)

[10]

Q4, (Jan 2011, Q3)

(a)

Taking moments about B: $5 \times R_C = 20g \times 3$
 $R_C = 12g$ or $60g/5$ or 118 or 120

Resolving vertically: $R_C + R_B = 20g$
 $R_B = 8g$ or 78.4 or 78

M1A1
 A1
 M1
 A1
 (5)

(b)

Resolving vertically: $50g = R + R$

Taking moments about B:

$$5 \times 25g = 3 \times 20g + (6 - x) \times 30g$$

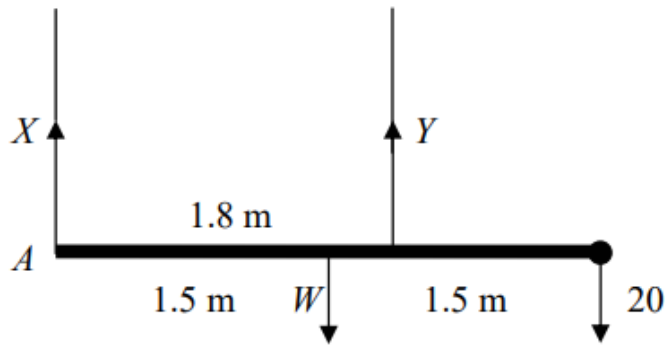
$$30x = 115$$

$$x = 3.8$$
 or better or $23/6$ oe

B1
 M1 A1 A1
 A1
 (5)
 [10]

Q5, (Jan 2010, Q4)

(a)



M (A) $W \times 1.5 + 20 \times 3 = Y \times 1.8$

$$Y = \frac{5}{6}W + \frac{100}{3} \quad *$$

cs0

M1 A2 (1, 0)

A1 (4)

(b) \uparrow

$$X + Y = W + 20$$

$$X = \frac{1}{6}W - \frac{40}{3}$$

or equivalent

M1 A1

A1 (3)

(c)

$$\frac{5}{6}W + \frac{100}{3} = 8 \left(\frac{1}{6}W - \frac{40}{3} \right)$$

$$W = 280$$

M1 A1 ft

A1 (3)

[10]

Alternative to (b)

M(C) $X \times 1.8 + 20 \times 1.2 = W \times 0.3$

$$X = \frac{1}{6}W - \frac{40}{3}$$

M1 A1

A1

Q6, (Jun 2013, Q6)

(a)		
	$M(P), \quad 50g \times 2 = Mg \times (x - 2)$	M1 A1
	$M(Q), \quad 50g \times 3 = Mg \times (12 - x)$	M1 A1
(i)	$M = 25 \text{ (kg)}$	DM1 A1
(ii)	$x = 6 \text{ (m)}$	DM1 A1
		(8)
(b)		
	$(\uparrow)R + R = 25g + 50g$	M1 A1 ft
	$M(A), \quad 2R + 12R = 25g \times 6 + 50g \times AX$	M1 A1 ft
	$AX = 7.5 \text{ (m)}$	DM1 A1
		(6)
		[14]

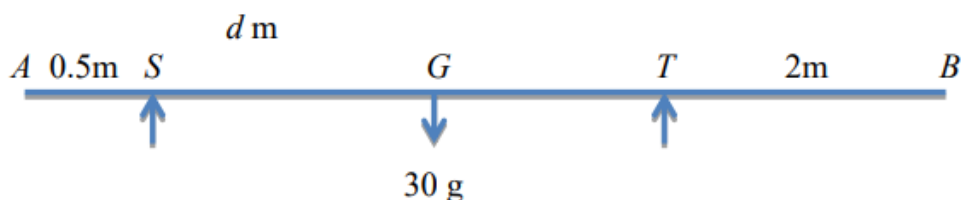
Q7, (Jan 2013, Q2)

(a)	$M(D), \quad 8R = (80g \times 6) + (200g \times 4)$ $R = 160g, 1600, 1570$	M1 A1 A1 (3)
(b)	$(\uparrow), \quad 2S = 80g + 200g$ $S = 140g, 1400, 1370$	M1 A1 (2)
(c)	$M(B), \quad Sx + (S \times 10) = (80g \times 8) + (200g \times 6)$ $140x + 1400 = 640 + 1200$ $140x = 440$ $x = \frac{22}{7}$	M1 A2 A1 (4) 9

Q8, (Jun 2014, Q4)

a	Resolving vertically: $T + 2T (= 3T) = W$ Moments about A: $2W = 2T \times d$ Substitute and solve: $2W = 2 \frac{W}{3} d$ $d = 3$	M1A1 M1A1 DM1 A1 (6)
b	Resolving vertically: $T + 4T = W + kW \quad (5T = W(1+k))$ Moments about A: $2W + 4kW = 3 \times 4T$ Substitute and solve: $2W + 4kW = \frac{12}{5} W(1+k)$ $2 + 4k = \frac{12}{5} + \frac{12}{5}k$ $\frac{8}{5}k = \frac{2}{5}, \quad k = \frac{1}{4}$	M1A1 ft M1A1 ft DM1 A1 (6) [12]

Q9, (Jun 2016, Q6)



$M(S): Mg \cdot 0.5 = 30g(d - 0.5)$

$M(T): Mg \cdot 2 = 30g(4 - d)$

dividing: $4 = \frac{(4 - d)}{(d - 0.5)} \Rightarrow$ (i) $d = 1.2$
 \Rightarrow (ii) $M = 42$

M1 A1
 M1 A1
DM1 A1

 A1

Q10, (Jun 2015, Q5)

(a)	$T_A + T_C = 85g$ OR $M(A), 25g \times 2.5 + 60g \times 5 = 4.5 \times T_C$ OR $M(C), T_A \times 4.5 + 60g \times 0.5 = 25g \times 2$ OR $M(B), T_A \times 5 + T_C \times 0.5 = 25g \times 2.5$ OR $M(G), T_A \times 2.5 + 60g \times 2.5 = 2 \times T_C$ $T_A = \frac{40g}{9} = 44N \text{ or } 43.6N; T_C = \frac{725g}{9} = 790N \text{ or } 789N$	M1 A1 M1 A1 A1; A1 (6)
(b)	$M(C), 25g \times 2 = Mg \times 0.5$	M1 A1
(i)	$M = 100$	A1
(ii)	$T_c = 25g + 100g$ $T_c = 125g \text{ (1200 or 1230)N}$	M1 A1 B1 (6) 12