Mark scheme

Moments

Physics 0625 · Questions from Paper 3 and Paper 4

Total marks

67

MARKS FOR EACH QUESTION

1	2	3	4	5	6	7	8	9	10	Total
4	5	6	6	7	7	7	8	8	9	**67**

Question 1 [4]

1	moment = force × (perp.) distance (from pivot/bracket)	1
	25 × 90 or 25 × 0.9	1
	2250 or 22.5	1
	N cm or N m	1

Question 2 [5]

2(a)	moment	B1
2(b)(i)	(sum of) clockwise moment(s) = (sum of) anticlockwise moment(s)	C1
	1.2 × 400 = 0.3 × F	C1
	1600 (N)	A1
2(b)(ii)	use a longer lever **OR** pivot closer to log / force F	B1

Question 3 [6]

3(a)	(moment =) force × distance (from pivot)	B1
	(moment =) 5.0 × 40	B1
3(b)	(sum of) clockwise moments = (sum of) anticlockwise moments	C1
	200 = (2.0 × 10) + (F × 60)	C1
	F = (200 – 20) ÷ 60 OR 180 ÷ 60	C1
	(F =) 3.0 (N)	A1

STEM | Exam Builder

Question 4 [6]

4(a)	force × perpendicular distance from pivot / point	**B1**
4(b)	($F_1d_1 = F_2d_2$ =) $500 \times 20 = F \times 12$ numbers substituted in any form	**C1**
	(F = 10 000 / 12 =) 830 N	**A1**
4(c)	clear diagram or description (of object) with pivot and vertical forces / weights / masses / cord tension causing moments in each direction	**B1**
	indicate / measure forces and perpendicular distances	**B1**
	calculates a moment or shows / describes how to AND confirms equality of total moment (in each direction) AND statement of equilibrium / balance	**B1**

Question 5 [7]

5(a)	moment = force × distance from pivot in any form	**C1**
	(distance of force from pivot = (25 – 10) =) 15 (cm)	**C1**
	8×15	**C1**
	120	**A1**
	N cm	**B1**
5(b)	arrow giving clockwise moment	**B1**
	arrow drawn 10 cm from pivot by eye	**B1**

Question 6 [7]

6(a)	(moment of weight =) weight × (perpendicular) distance (of weight from pivot)	**C1**
	(moment of weight =) 150×1.8	**C1**
	270	**A1**
	N m	**B1**
6(b)	barrier no longer balanced OR cannot be lowered (easily)	**B1**
	(more) force needed to lower barrier	**B1**
	(because) moment of heavy weight (has) increased	**B1**

STEM | Exam Builder

Question 7 [7]

7	(a)	(i)	3 appropriate examples: e.g. spanner, scissors, tap etc. –1e.e.o.o.	B2
		(ii)	there is a resultant force OR more force down than up	B1
			there is a resultant moment OR clockwise moment is not equal to anticlockwise moment	B1
	(b)	(i)	$F \times 0.5 = 12 \times 0.3$	C1
			7.2 N	A1
		(ii)	weight has no moment about centre of rod / has no perpendicular distance from centre of rod	
			OR weight acts at centre of rod / pivot / centre of mass	B1

[Total: 7]

Question 8 [8]

8(a)	both boxes ticked	**B1**
8(b)	moment = force × distance in any form	**C1**
	300 × 1.4	**C1**
	420 (Nm)	**A1**
8(c)	clockwise moments = anticlockwise moments	**C1**
	W x 0.6 = candidates (b) **OR** *W* = candidates (b) / 0.6	**C1**
	700 (N)	**A1**
8(d)	child 's OR left side goes down **OR** adult side goes up **OR** right side goes up **OR** child's moment is larger **OR** child's turning force larger	**B1**
	Total:	**8**

Question 9 [8]

9	(a)	(i)	120 Ncm OR 1.2 Nm	B1
		(ii)	60 Ncm OR 0.6 Nm	B1
		(iii)	idea of CW moments = ACW moments	C1
			$60 + 20F = 120$ OR $0.6 + 0.2F = 1.2$ e.c.f.	C1
			3.0 N OR 3 N e.c.f.	A1
	(b)		$1.2 \times 20 = 2.0 \times d$ OR $1.2 \times 0.2 = 2.0 \times d$	C1
			(d =) 12 OR 0.12	C1
			18 c.a.o. OR special case (30 – his 12) correctly evaluated B1	A1

[Total: 8]

STEM | Exam Builder

Question 10 [9]

10(a)	force × perpendicular distance (from point)	**B1**
10(b)(i)	0.80 N	**B1**
10(b)(ii)	(moment = force × distance =) 0.8 × 0.25	**C1**
	(moment =) 0.20 N m	**A1**
10(b)(iii)	same value as (ii) with correct unit	**B1**
10(b)(iv)	$F \times 0.75 = 0.20$ in any form OR (F =) 0.2 / 0.75	**C1**
	(F = 0.2 / 0.75 =) 0.27 N	**A1**
10(c)	(perpendicular) distance (from pivot) of F decreases / is less (than 0.75 m) OR (perpendicular) distance (from pivot) of W increases / is more (than 0.75 m)	**M1**
	(so) increased / greater (force F) (needed for greater moment)	**A1**

STEM | Exam Builder