GCSE and IGCSE Physics: Forces Worksheet - Mark Scheme

Year 10-11 · GCSE (AQA 4.5.1-4.5.5) and Cambridge IGCSE 0625 topic 1 · Exam-style questions

Section A: Types of force and resultant force [13 marks]

1	Mass is the amount of matter, in kg (1). Weight is the force of gravity on the mass, in newtons (1). Mass is constant but weight changes with gravitational field strength (1).	**3**
2	Earth: 65 × 10 (1) = 650 N (1). Moon: 65 × 1.6 (1) = 104 N (1).	**4**
3	7 N right; 0 N (balanced); 12 N backwards. Guidance: 1 mark for each correct value or direction.	**6**

Section B: Newton's laws [14 marks]

4	An object stays at rest or moves at constant velocity (1) unless acted on by a resultant force (1).	**2**
5	F = ma = 1200 × 2.5 (1) = 3000 N (1).	**2**
6	m = F ÷ a (1); 450 ÷ 1.5 (1) = 300 kg (1).	**3**
7	800 N (1) because the forces are balanced so there is no acceleration (1).	**2**
8	When two objects interact they exert equal and opposite forces on each other (2). Example: a book pushes down on a table and the table pushes up on the book (1).	**3**
9	The lorry has more mass (1). For the same force the acceleration is smaller because a = F ÷ m (1).	**2**

Section C: Work, springs and moments [11 marks]

10	W = Fs = 40 × 6 (1) = 240 J (1).	**2**
11	e = F ÷ k (1); 4 ÷ 25 (1) = 0.16 m (1).	**3**
12	The extension is no longer directly proportional to the force (graph curves) / spring does not return to its original length.	**1**
13	M = Fd = 50 × 0.40 (1) = 20 N m (1).	**2**
14	Clockwise moment = anticlockwise moment (1); 300 × 1.5 = 450 × d (1); d = 1.0 m (1).	**3**

Section D: Circular motion and stopping distance (Higher tier / Extended) [7 marks]

15	Its direction is changing so its velocity changes (1). Acceleration is a change in velocity (1).	**2**
16	(a) Gravity / gravitational force (1). (b) Friction between the tyres and the road (1).	**2**
17	12 + 24 = 36 m (2). Any one: tiredness, alcohol, drugs, distractions (1).	**3**

Total: 45 marks. Accept any scientifically correct alternative wording.