Forces

Answers

GCSE science knowledge recall

This topic online

Q	Answer	Remember
1	vector	Velocity, force and displacement are vectors; speed, mass and distance are scalars.
2	non-contact	Gravity, magnetic and electrostatic forces all act across a gap.
3	gravitational field strength	W = m g. On Earth g is about 9.8 N/kg.
4	490	50 × 9.8 = 490 N. Mass is in kg, weight is a force in N.
5	centre of mass	For a symmetrical object it sits on the line of symmetry.
6	18	Opposite directions, so subtract: 30 - 12 = 18 N to the right.
7	distance	W = F s. One joule is one newton moving through one metre.
8	200	40 × 5 = 200 J. Work done against friction warms the surfaces.
9	extension	F = k e - but only up to the limit of proportionality.
10	limit of proportionality	On the graph, it is where the straight line starts to curve.
11	10	25 × 0.4 = 10 N. Always convert cm to m first.
12	perpendicular distance	M = F d, with d measured at right angles from the pivot to the line of the force.
13	Nm	Newtons times metres. Do not confuse it with joules, even though the units match.
14	6	20 × 0.3 = 6 N m. A longer spanner gives a bigger moment for the same push.
15	area	p = F ÷ A, measured in pascals (Pa), where 1 Pa = 1 N/m^2.
16	increases	Deeper means a taller column of water above, so more weight pressing down.
17	upthrust	An object floats when the upthrust equals its weight before it is fully submerged.
18	decreases	Less air above you, and the air is less dense, so fewer molecules collide with each square metre.
19	1.5	Walking about 1.5 m/s, running about 3 m/s, cycling about 6 m/s.
20	speed	Steeper line, faster motion. A flat line means stationary.
21	5	a = Δv ÷ t = 20 ÷ 4 = 5 m/s^2.
22	distance	The gradient gives acceleration; the area gives distance.
23	9.8	Same number as g in N/kg - it is the same quantity seen two ways.

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Q	Answer	Remember
24	terminal velocity	Resultant force is zero, so there is no more acceleration.
25	acceleration	F = m a. Double the force, double the acceleration.
26	inertia	Inertial mass measures how hard it is to change an object's velocity.
27	braking distance	Tiredness, drugs and alcohol add to thinking distance; wet or icy roads and worn brakes add to braking distance.
28	Friction in the brakes does work to transfer a large amount of the car's kinetic energy to the thermal store of the brakes, raising their temperature.	Kinetic energy rises with speed squared, so a fast stop dumps a lot of energy into the brakes.
29	300	p = m v = 60 × 5. In a closed system, total momentum before equals total momentum after.
30	It increases the time taken for the car to stop, so the rate of change of momentum is smaller and so the force is smaller.	Force = change in momentum ÷ time. Same momentum change over a longer time means less force.

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