Multiple choice questions - Forces in two dimensions and friction

Year: Year 13 · 10

Question 1 The horizontal component of 20 N at 30° above the horizontal is

- ◯ **A.** 17.3 N
- ◯ **B.** 10 N
- ◯ **C.** 20 N
- ◯ **D.** 34.6 N

Question 2 The weight of a 5 kg mass is

- ◯ **A.** 5 N
- ◯ **B.** 49 N
- ◯ **C.** 9.8 N
- ◯ **D.** 0.51 N

Question 3 In equilibrium the resultant force is

- ◯ **A.** the weight
- ◯ **B.** equal to R
- ◯ **C.** zero
- ◯ **D.** the friction

Question 4 Limiting friction is

- ◯ **A.** mg
- ◯ **B.** $\mu mg\sin\alpha$
- ◯ **C.** R/μ
- ◯ **D.** μR

Question 5 On a slope of angle α, the weight component down the slope is

- ◯ **A.** $mg\sin\alpha$
- ◯ **B.** $mg\cos\alpha$
- ◯ **C.** $mg\tan\alpha$
- ◯ **D.** mg

Question 6 A block rests on a slope with $\mu = 0.5$. The maximum angle for equilibrium is

- ◯ **A.** $\sin^{-1}0.5$
- ◯ **B.** $\tan^{-1}0.5$

- ◯ **C.** $\cos^{-1} 0.5$
- ◯ **D.** 45°

Question 7 Friction acts

- ◯ **A.** in the direction of motion
- ◯ **B.** perpendicular to the surface
- ◯ **C.** opposing the motion or tendency to move
- ◯ **D.** vertically

Question 8 The normal reaction on a horizontal surface with a rope pulling upwards at angle θ is

- ◯ **A.** $mg + T\sin\theta$
- ◯ **B.** mg
- ◯ **C.** $mg - T\cos\theta$
- ◯ **D.** $mg - T\sin\theta$

Question 9 A 2 kg particle has resultant force 10 N. Its acceleration is

- ◯ **A.** $5\ \mathrm{m\,s^{-2}}$
- ◯ **B.** $20\ \mathrm{m\,s^{-2}}$
- ◯ **C.** $0.2\ \mathrm{m\,s^{-2}}$
- ◯ **D.** $12\ \mathrm{m\,s^{-2}}$

Question 10 The resultant of 3 N and 4 N at right angles is

- ◯ **A.** 7 N
- ◯ **B.** 5 N
- ◯ **C.** 1 N
- ◯ **D.** 12 N

Answer grid - Forces in two dimensions and friction

Year: Year 13

Question	Answer	Explanation
1	**A**	20cos30.
2	**B**	mg.
3	**C**	No acceleration.
4	**D**	Maximum friction.
5	**A**	Resolve.
6	**B**	tanα=μ.
7	**C**	Definition.
8	**D**	Vertical balance.
9	**A**	F=ma.
10	**B**	Pythagoras.