2.2 Forces

Question Paper
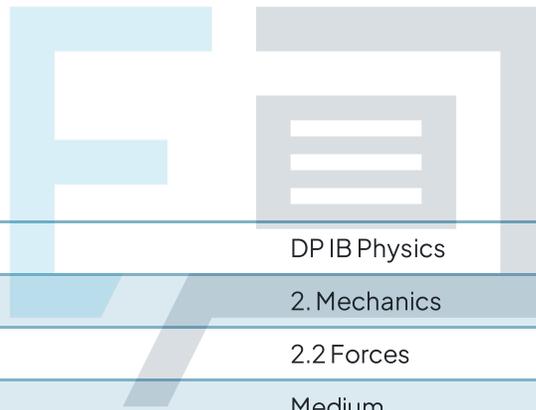
| Course	DP IB Physics
Section	2. Mechanics
Topic	2.2 Forces
Difficulty	Medium

To be used by all students preparing for DP IB Physics HL
Students of other boards may also find this useful

Question 1

A wooden block of weight W rests on a rough board that produces a friction force F. The end of the board is then raised up to angle θ until the block slides down the plane of the board at constant velocity v.
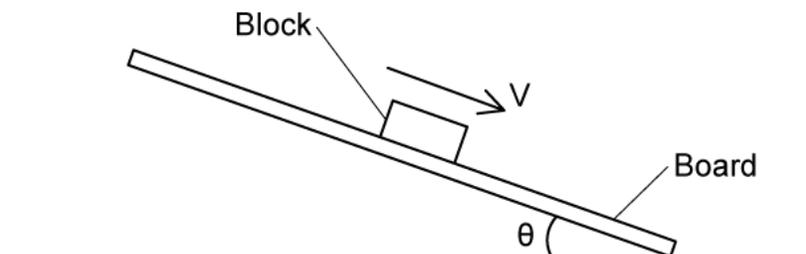
Which row describes the forces acting on the block as it slides down the board?

	Frictional force on block	Resultant force on block
A.	$W \sin \theta$	0
B.	$W \cos \theta$	$W \sin \theta - F$
C.	$W \cos \theta$	0
D.	$W \sin \theta$	$F - W \sin \theta$

[1 mark]

Question 2

Which row gives the correct Newton's third law force pair for a book on a table?

	Force A	Force B
A.	Weight of the book	Force of book on the table
B.	Gravitational force of the Earth pulling on the book	Gravitational force of the book pulling on the Earth
C.	Weight of the book	Reaction force from the table surface
D.	Gravitational force of the Earth pulling on the book	Gravitational force of the table pulling on the Earth

[1 mark]

Exam Papers Practice

Question 3

An object of mass m is connected via a frictionless pulley to an object of mass M, where $M > m$. M rests on a horizontal rough surface with a frictional force f.
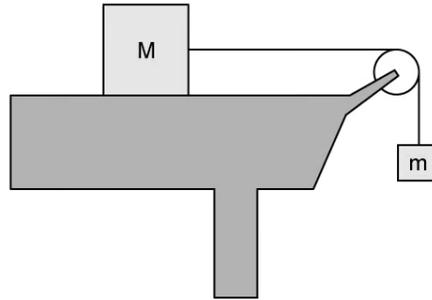
What is the acceleration of the system?

A. 0

B. $\dfrac{mg + f}{(M + m)}$

C. $\dfrac{mg - f}{(M + m)}$

D. g

[1 mark]

Question 4

A photo hangs from two strings. It has a weight W and the two strings have equal tension T.

What is the free–body diagram for this situation?

A

B

C

D
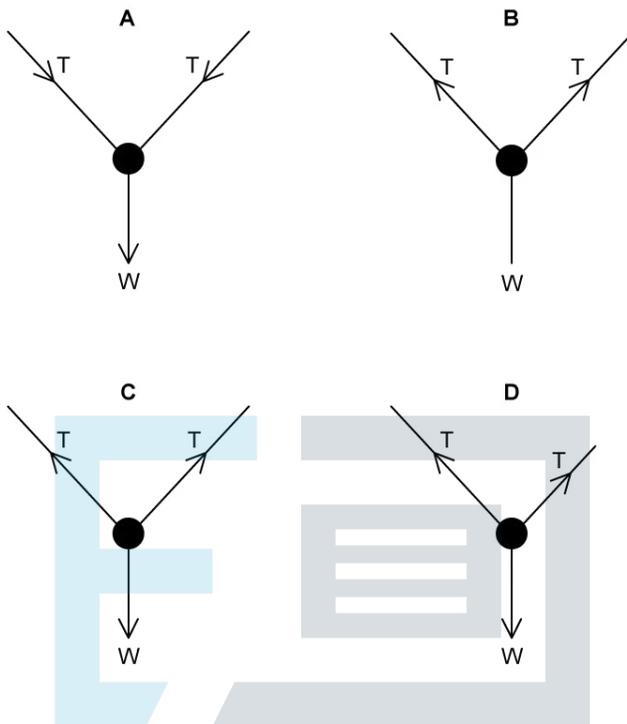
[1 mark]

Question 5

Which of the following are possible values for the maximum coefficient of static friction, μ_S and dynamic friction, μ_d?

	μ_S	μ_d
A.	0.012	0.78
B.	0.35	0.12
C.	1.50	0.90
D.	0.26	−0.77

[1 mark]

Question 6

A uniform ladder resting in equilibrium on rough ground leans against a smooth wall.

Which diagram correctly shows the forces acting on the ladder?
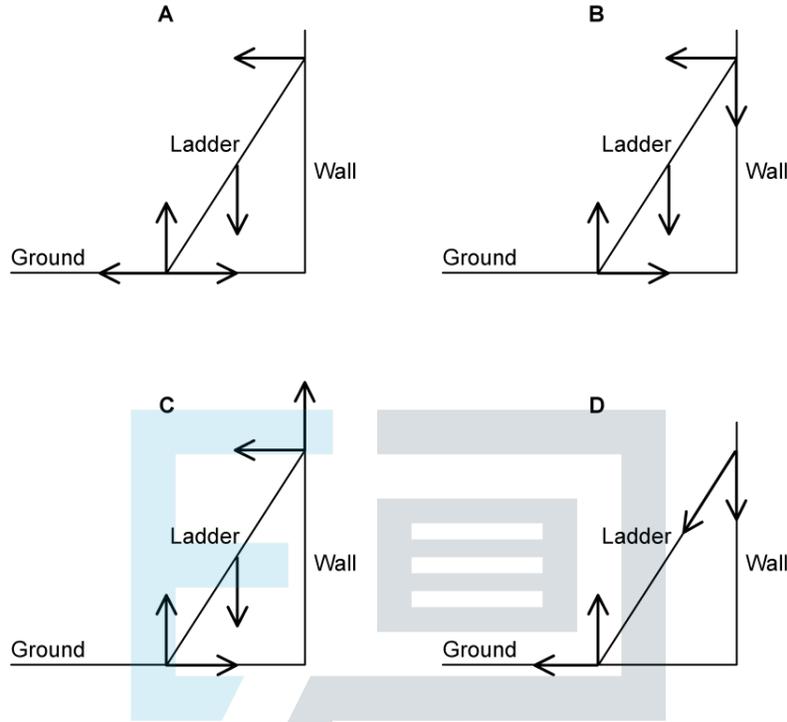
[1 mark]

Question 7

A block of mass m rests on a trolley of mass M. The coefficient of dynamic friction between the block and the trolley is μ.
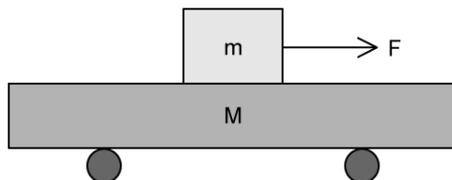
A horizontal force F acts on the block causing it to slide over the trolley. What is the acceleration of the trolley?

A. $\dfrac{F - \mu mg}{M}$

B. $\dfrac{\mu mg}{(M + m)}$

C. $\dfrac{F - \mu Mg}{m}$

D. $\dfrac{\mu mg}{M}$

[1 mark]

Question 8

A sled with a child has a combined weight of 400 N and rests on a horizontal surface. The coefficient of static friction between the sled and the surface is 0.50 and the coefficient of dynamic friction is 0.30.

A horizontal force F is applied to the sled and its magnitude increases uniformly from zero. Once the sled starts moving, the pulling force no longer increases.

What is the minimum resultant force required on the moving sled?

A. 80 N

B. –80 N

C. 320 N

D. 0 N

[1 mark]

Question 9

Two coplanar forces of 11 N and 7 N act on an object. Which force could **not** be the resultant for these two forces?

A. 18 N

B. 1 N

C. 9 N

D. 4 N

[1 mark]

Question 10

Two boxes in contact are pushed in a line along a floor with a force F. The boxes are moving at a constant speed. Box X has a mass m and box Y has a mass $3m$.
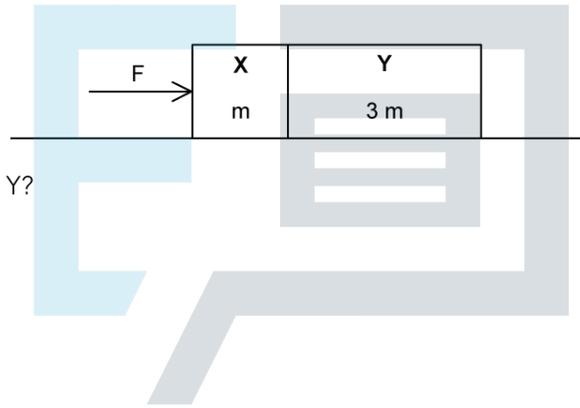
What is the resultant force acting on Y?

A. F

B. $\dfrac{F}{3}$

C. $3F$

D. 0

[1 mark]