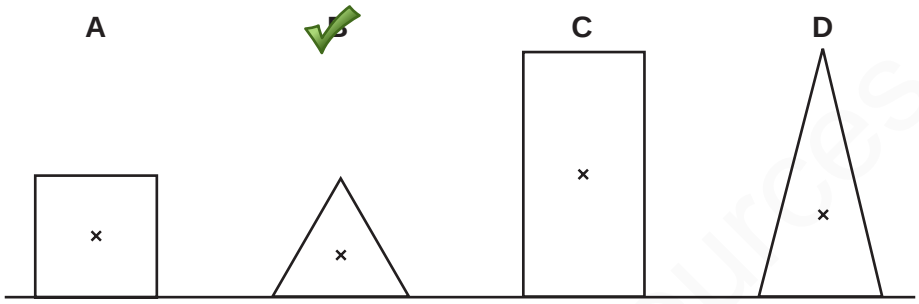
# CENTRE OF MASS

**1** The diagram shows sections of four objects, all of equal mass. The position of the centre of mass of each object has been marked with a cross.

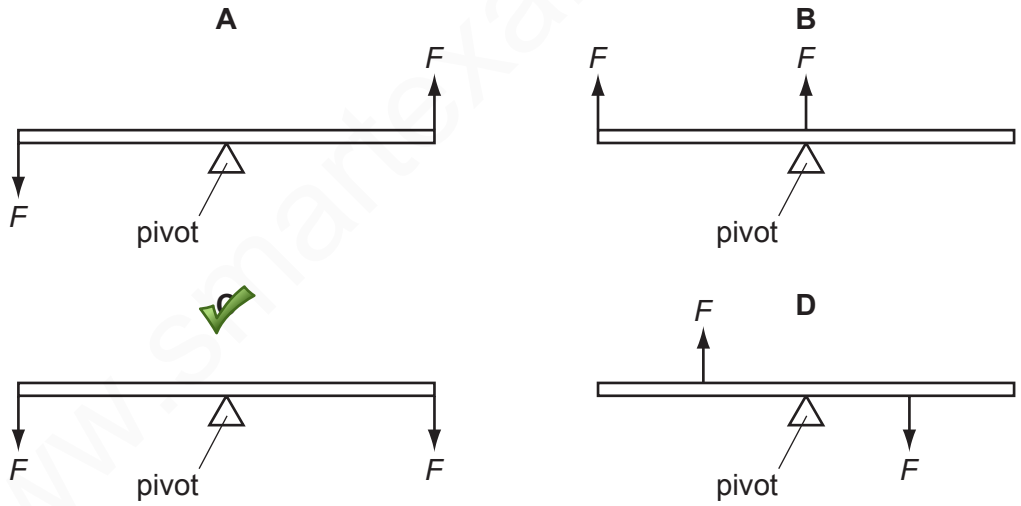
Which object is the most stable?



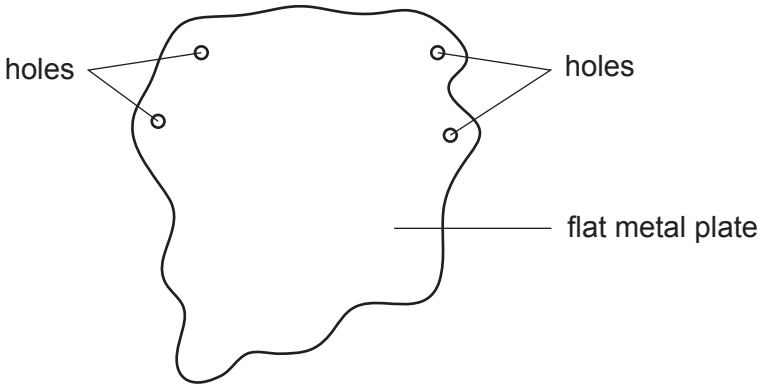

**2** The diagrams show a uniform rod with its midpoint on a pivot.

Two equal forces *F* are applied to the rod, as shown.

Which diagram shows the rod in equilibrium?



**3** The diagram shows a flat metal plate that may be hung from a nail so that it can rotate about any of four holes.

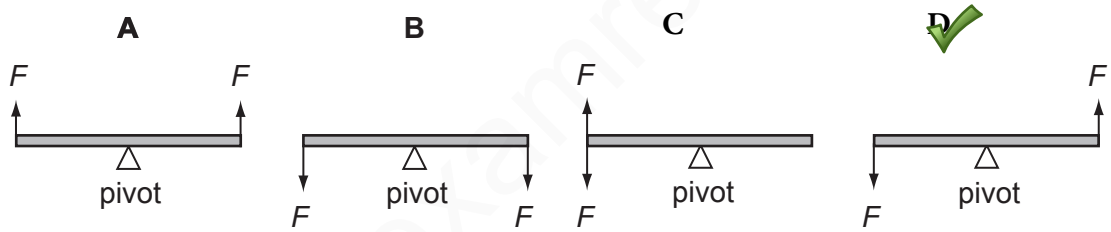



What is the smallest number of holes from which the flat metal plate should be hung in order to find its centre of gravity?

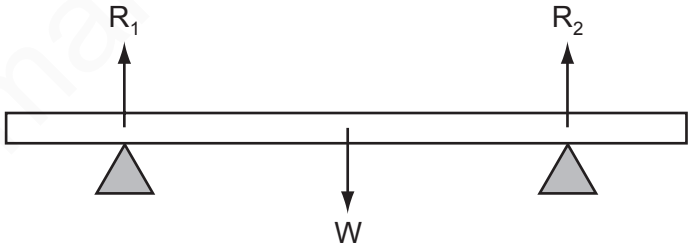
**A** 1 **B** 2 **C** 3 **D** 4

**4** Two equal forces *F* act on each of four planks.

Which plank turns?




**5** A heavy beam is resting on two supports, so that there are three forces acting on it.




The beam is in equilibrium.

Which statement is correct?

**A** All the forces are equal in value.

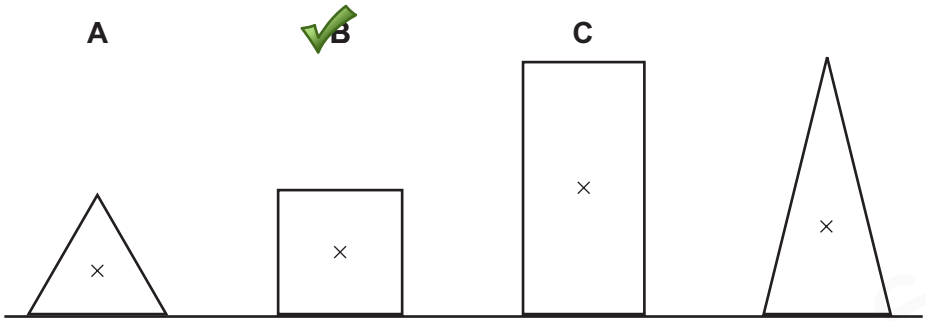
**B** The forces are in one direction and their turning effects are in the opposite direction.

**C** The resultant force is zero and the resultant turning effect is zero.

**D** The total upward force is twice the total downward force.

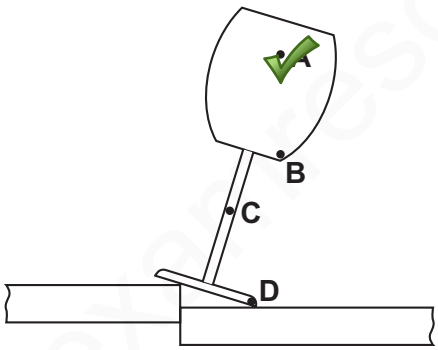
**6** The diagram shows sections of four objects of equal mass. The position of the centre of mass of each object has been marked with a cross.

Which object is the most stable?

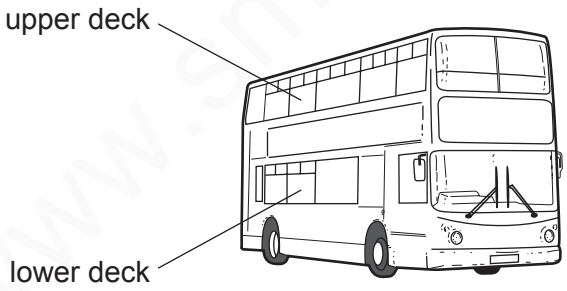



**7** An empty glass is placed on a join between two tables as shown. The glass remains stable.

Which point is the centre of mass of the glass?




**8** Passengers are **not** allowed to stand on the upper deck of double-decker buses.




Why is this?

**A** They would cause the bus to become unstable.

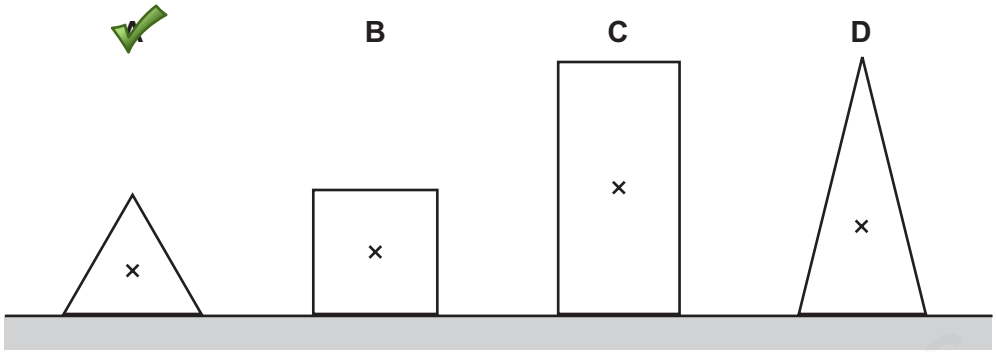
**B** They would cause the bus to slow down.

**C** They would increase the kinetic energy of the bus.

**D** They would lower the centre of mass of the bus.

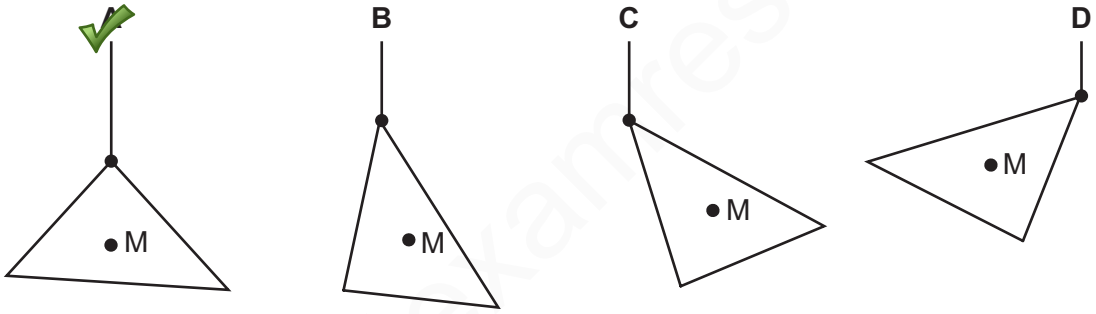
**9** The diagram shows sections of four objects of equal mass. The position of the centre of mass of each object has been marked with a cross.

Which object is the most stable?

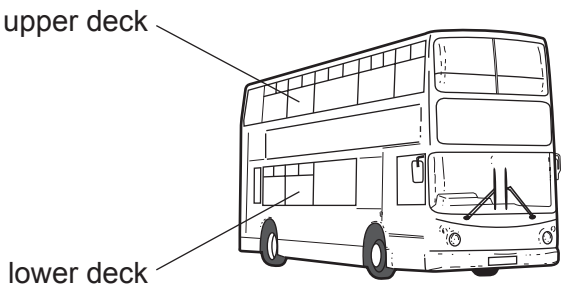



**10** A piece of card has its centre of mass at M.

Which diagram shows how it hangs when suspended by a thread?




**11** Passengers are **not** allowed to stand on the upper deck of double-decker buses.




Why is this?

**A** They would cause the bus to become less stable.

**B** They would cause the bus to slow down.

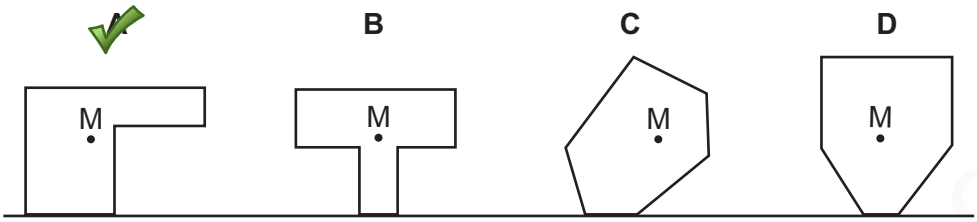
**C** They would increase the kinetic energy of the bus.

**D** They would lower the centre of mass of the bus.

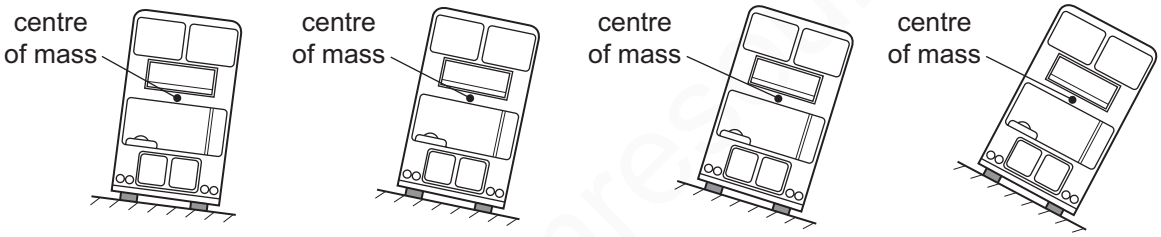
**12** The diagram shows four objects standing on a flat surface.

The centre of mass of each object is marked M.

Which object will fall over?




**13** The diagram shows four models of buses placed on different ramps.

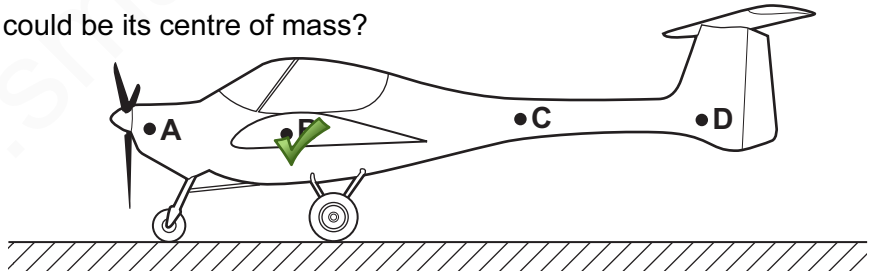



How many of these models will fall over?

**A** 1 **B** 2 **C** 3 **D** 4

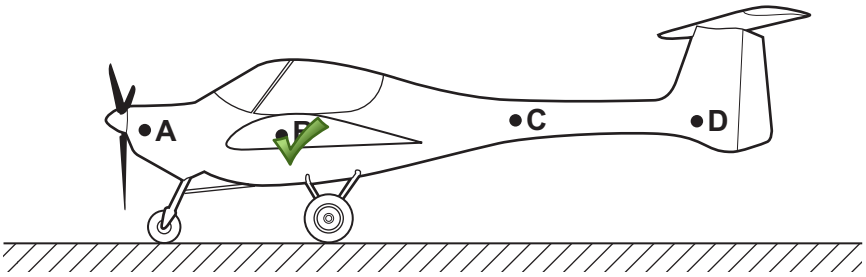
**14** A light aircraft stands at rest on the ground. It stands on three wheels, one at the front and two further back.

Which point could be its centre of mass?



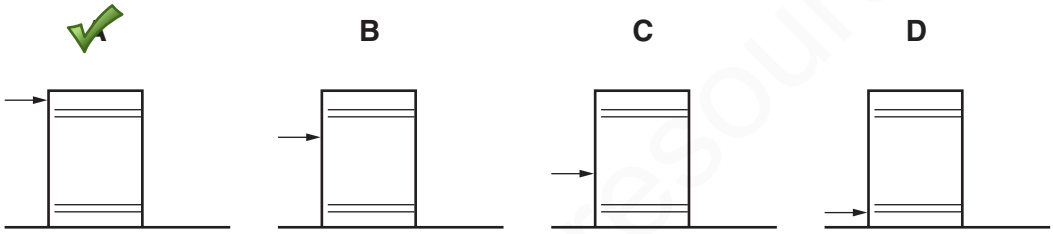
**15** A light aircraft stands at rest on the ground. It stands on three wheels, one at the front and two further back.

Which point could be its centre of mass?




**16** A child tries to push over a large empty oil drum.

Where should the drum be pushed to topple it over with least force?




**17** The diagrams show four solid cones. The centre of mass of each cone is marked by a point labelled M.

Which cone is the most stable?