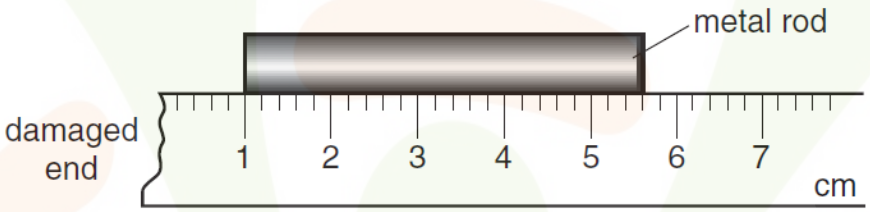
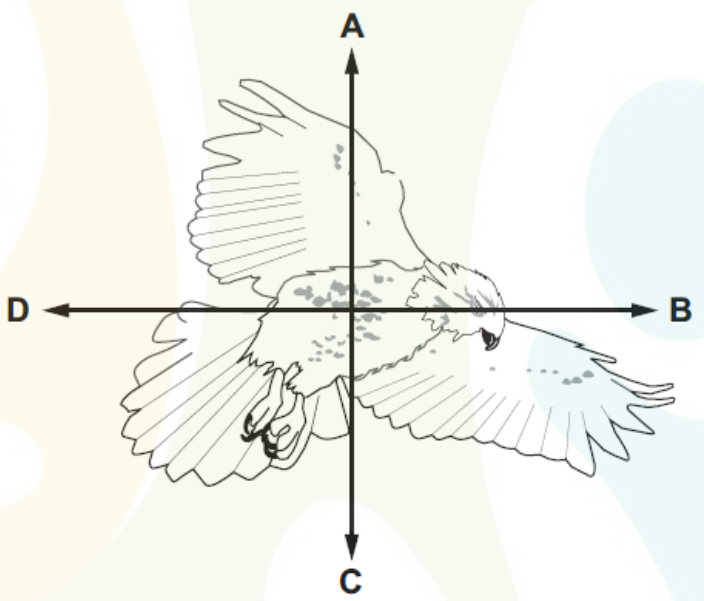
EASY

1. A girl uses a rule to measure the length of a metal rod. Because the end of the rule is damaged, she places one end of the rod at the 1 cm mark as shown. How long is the metal rod?



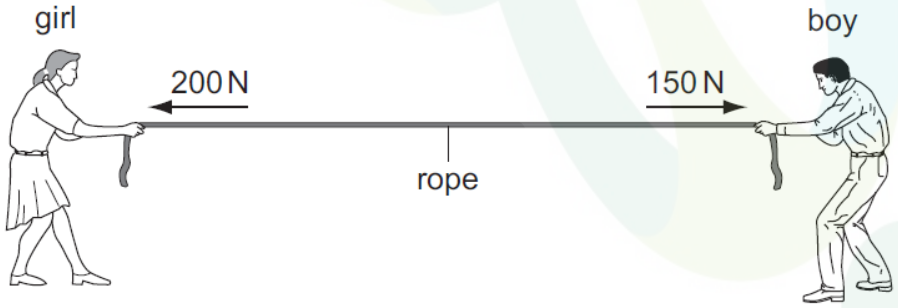
A 43 mm B 46 mm C 53 mm D 56 mm

2. The diagram shows a bird in flight. The bird is flying in a horizontal direction to the right. In which direction does air resistance act on the bird?



D

3. A girl and a boy are pulling in opposite directions on a rope. The forces acting on the rope are shown in the diagram. Which single force has the same effect as the two forces shown?



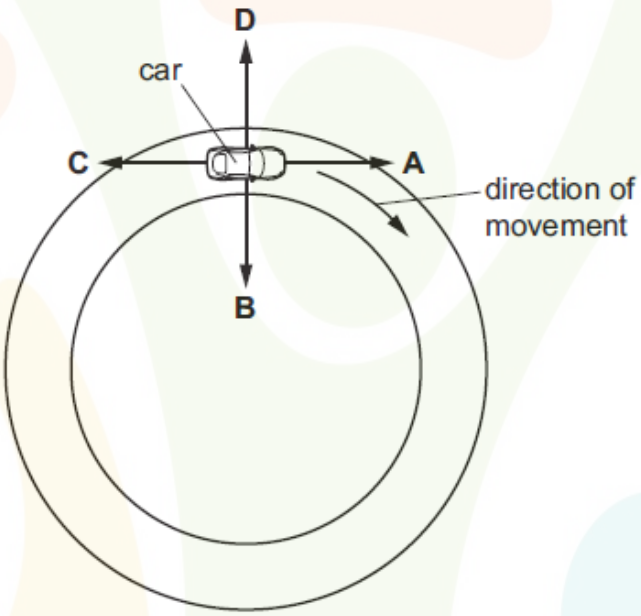
A 50 N acting towards the girl

B 350 N acting towards the girl

C 50 N acting towards the boy

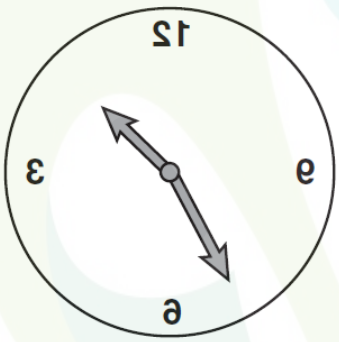
D 350 N acting towards the boy

4. A car is travelling around a circular track at a constant speed, as shown. In which direction is the resultant force on the car?



B

5. The image of a clock face as seen in a plane mirror is shown. What is the actual time on the clock?



A 1:25

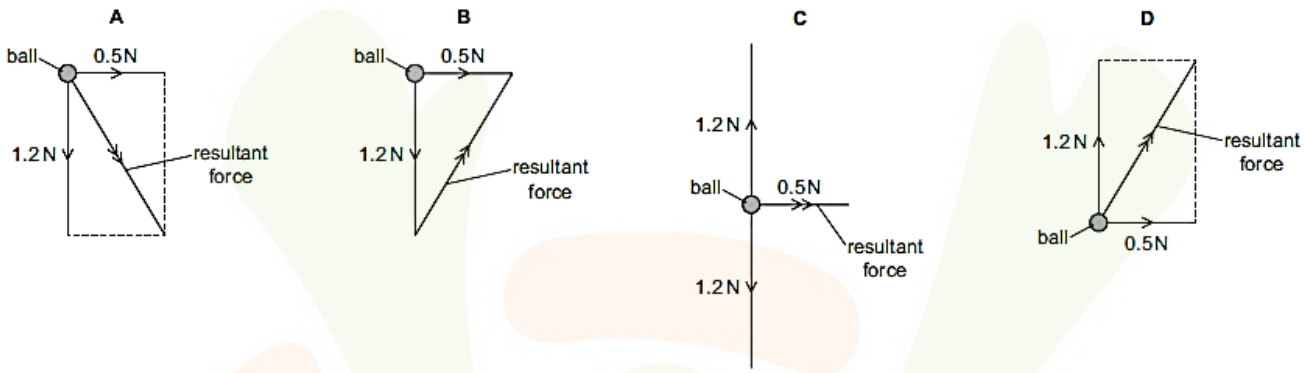
B 1:35

C 10:25

D 10:35

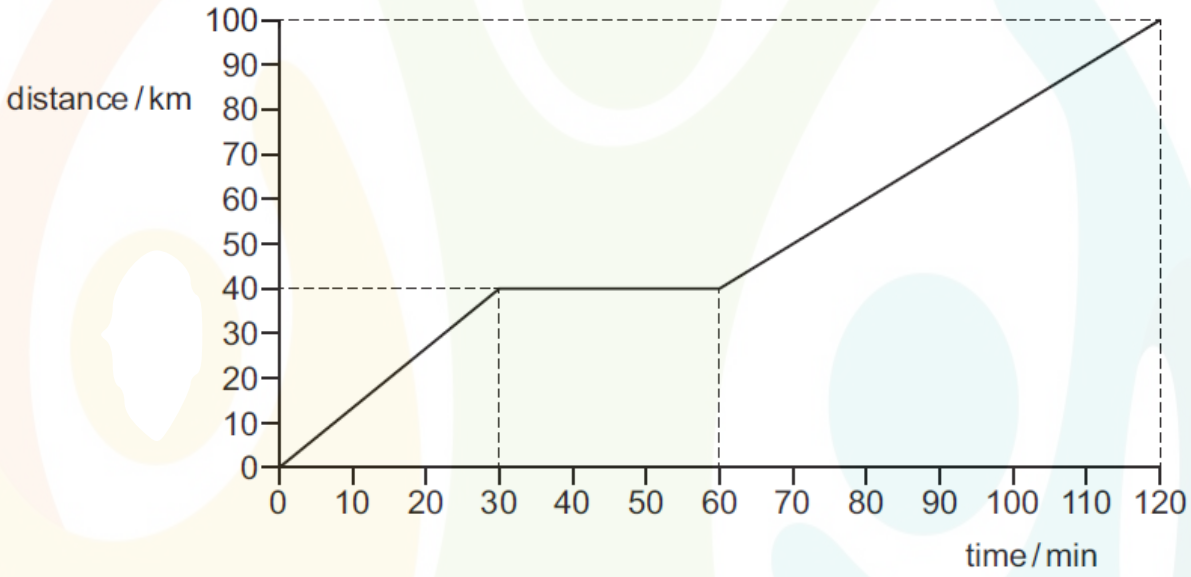
NORMAL

6. A ball of weight 1.2 N drops through the air at terminal velocity. A sudden gust of wind exerts a horizontal force of 0.5 N on the ball from the left. Which diagram shows the resultant force on the ball while the wind is blowing?



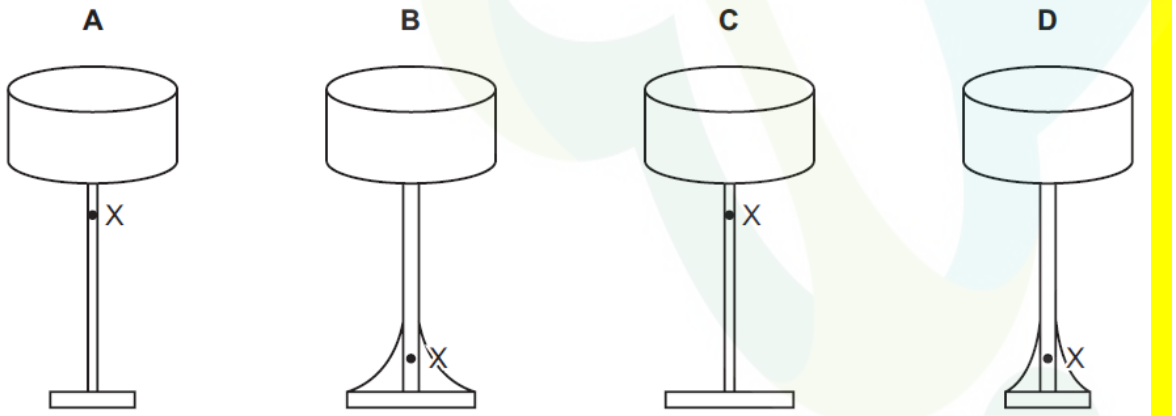
C

7. The distance–time graph for a motorway journey is shown. What is the average speed for the journey?



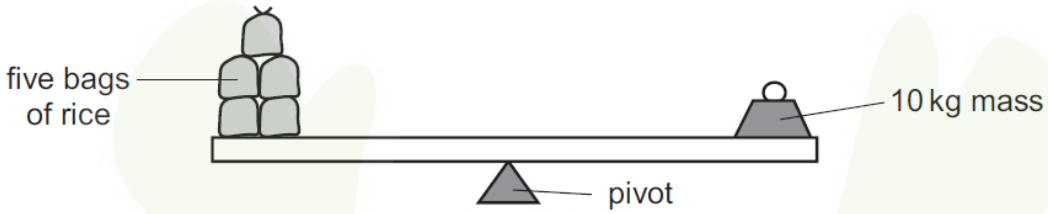
A 50 km/h B 67 km/h C 70 km/h D 83 km/h

8. The diagrams show four table lamps resting on a table. The position of the centre of mass of each lamp is labelled X. Which lamp is the most stable?



B

9. In an experiment, five identical bags of rice are balanced by a 10 kg mass. Two bags of rice are added to the other five. What mass will now balance the bags?



A 3.5 kg B 7.0 kg C 10 kg D 14 kg

10. A ball is at rest at the top of a hill. It rolls down the hill. At the bottom of the hill the ball hits a wall and stops. Which energy changes occur?

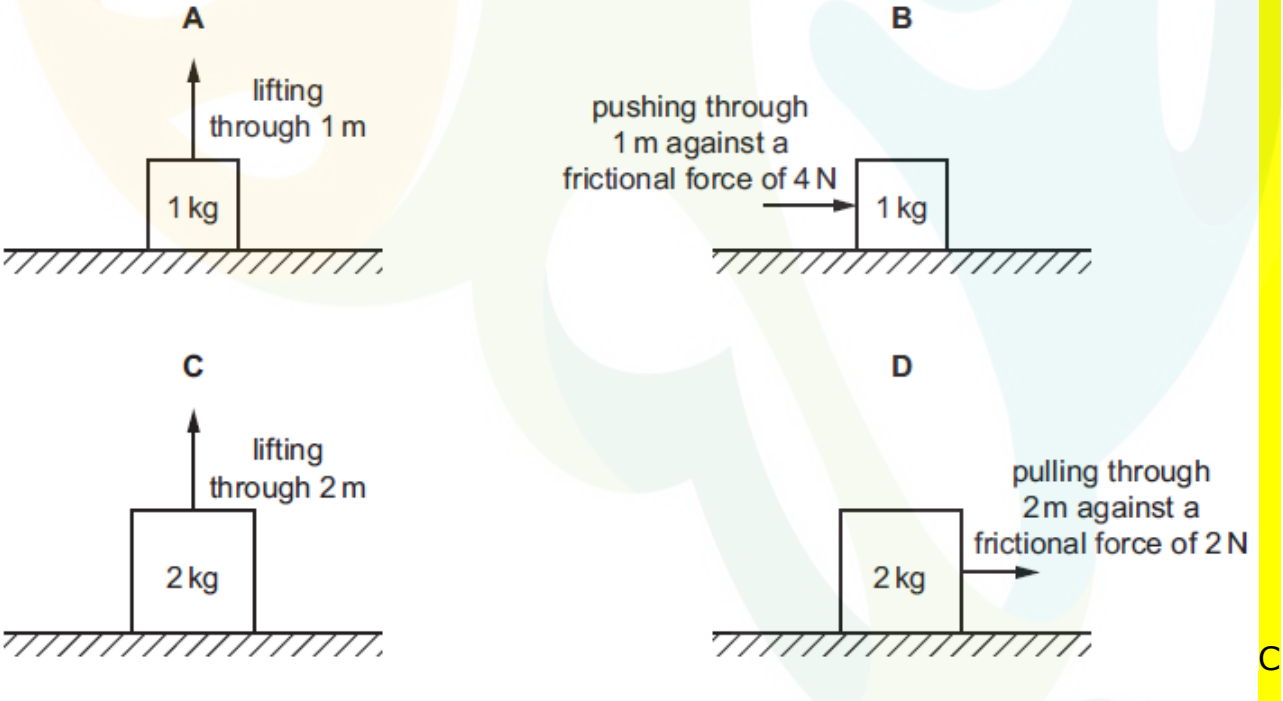
A gravitational potential energy → internal energy → kinetic energy

B gravitational potential energy → kinetic energy → internal energy

C kinetic energy → gravitational potential energy → internal energy

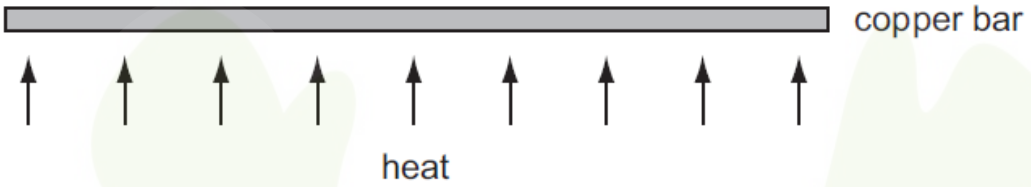
D kinetic energy → internal energy → gravitational potential energy

11. A student carries out some simple exercises. In which exercise is the most work done?



C

12. A long thin bar of copper is heated evenly along its length. What happens to the bar?



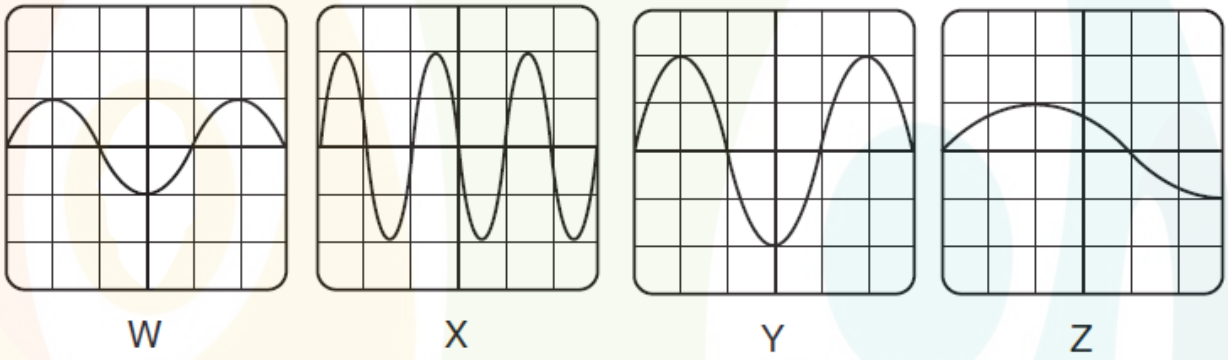
A It becomes lighter.

B It becomes longer.

C It becomes shorter.

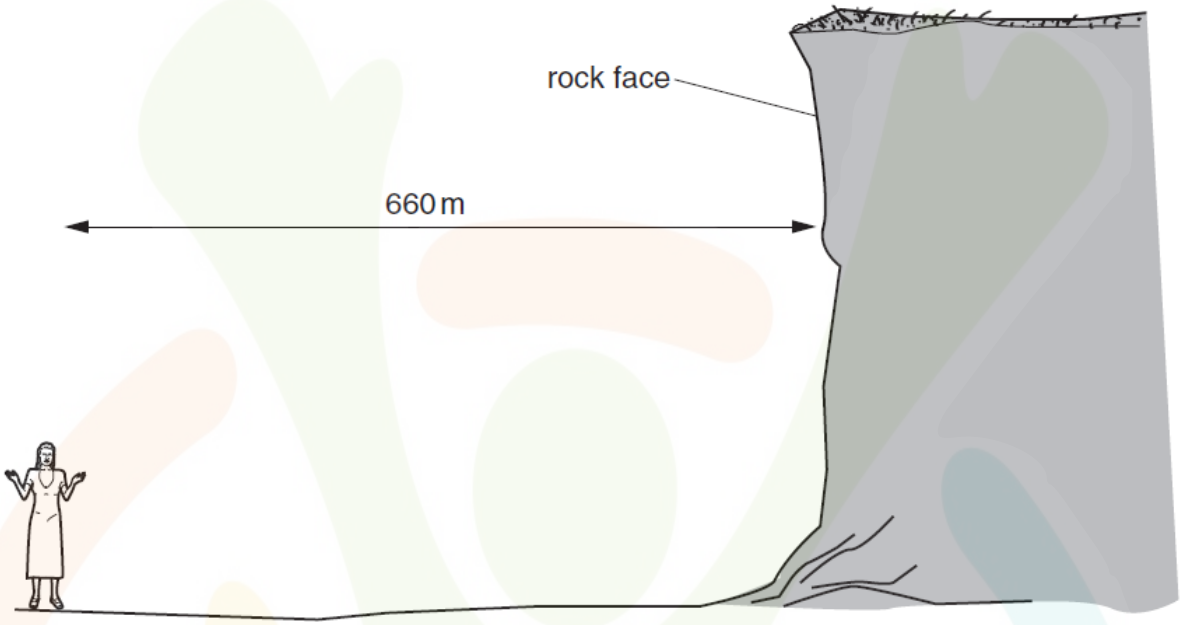
D It bends at the ends.

13. Four sound waves W, X, Y and Z are displayed by an oscilloscope screen. The oscilloscope settings are the same in each case. Which two sounds have the same pitch?



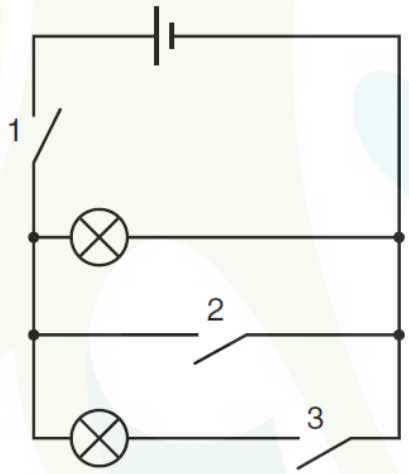
A W and X
B W and Y
C X and Y
D X and Z

14. A girl stands in front of a rock face. She claps her hands once. The speed of sound in air is 330 m/s, and the distance to the rock face is 660 meters. How long will it take before she hears the echo?



A. 2 seconds
B. 4 seconds
C. 6 seconds
D. 8 seconds

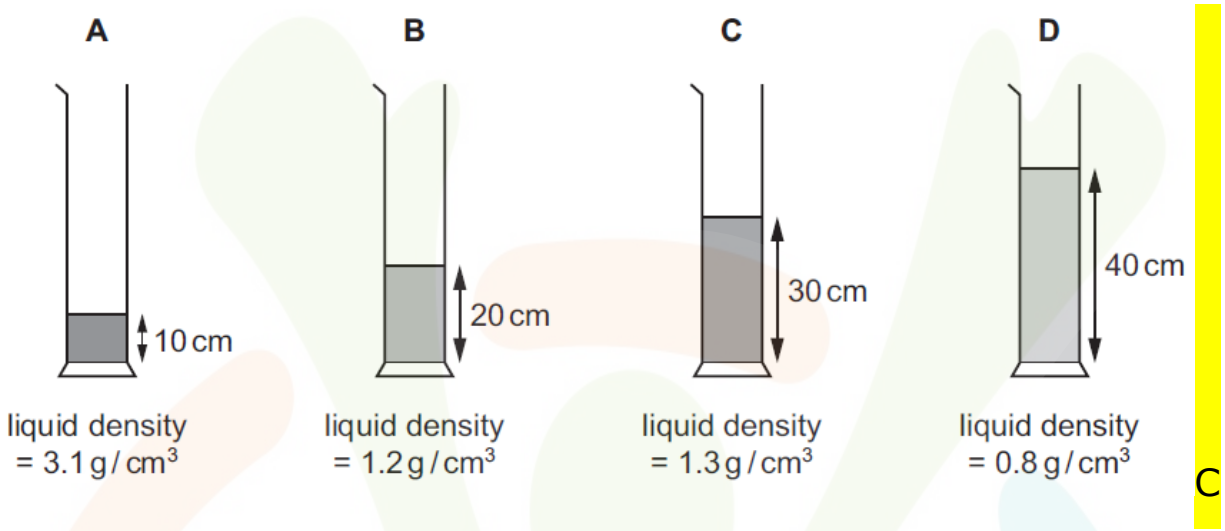
15. A student connects two lamps in the circuit shown. Which switches must he close to light both lamps?



A 1 and 2
B 1, 2 and 3
C 1 and 3
D 2 and 3

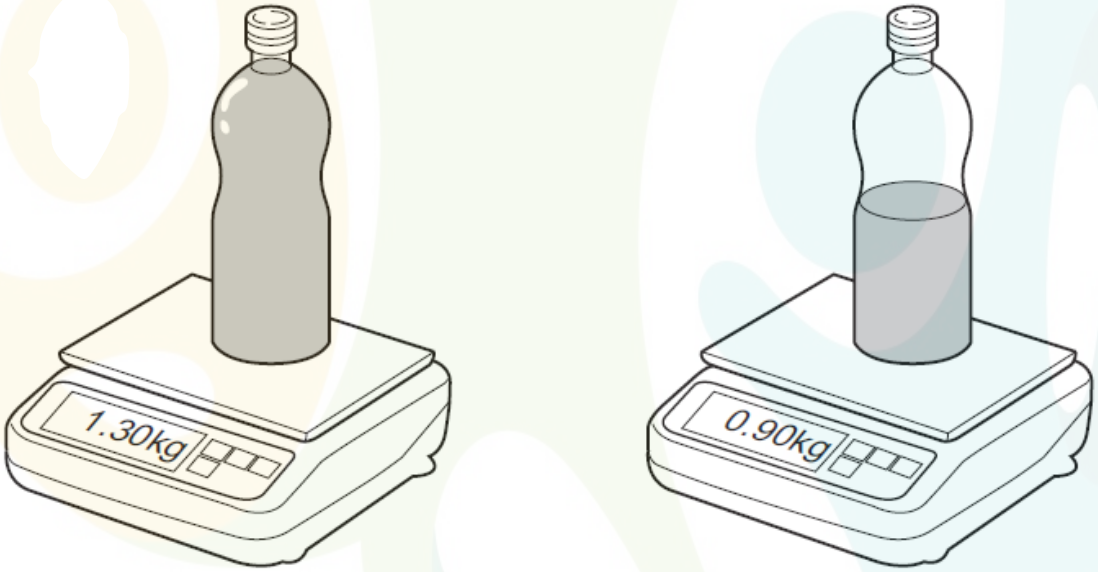
DIFFICULT

16. Four different liquids are poured into four containers. The diagrams show the depth and the density of liquid in each container. In which container is the pressure on its base the greatest?



C

17. The mass of a full bottle of cooking oil is 1.30 kg. When exactly half of the oil has been used, the mass of the bottle plus the remaining oil is 0.90 kg. What is the mass of the bottle?



A 0.40 kg B 0.50 kg C 0.65 kg D 0.80 kg

18. A car of mass 500 kg is moving at 10 m/s. The engine does work on the car and the speed increases to 16 m/s. How much work is done by the engine to increase the speed of the car?

A 3000 J B 9000 J C 39 000 J D 78 000 J

19. A bullet of mass 0.10 kg travels horizontally at a speed of 600 m/s. It strikes a stationary wooden block of mass 1.90 kg resting on a frictionless, horizontal surface. The bullet stays in the block. What is the speed of the bullet and the block immediately after the impact?

A 30 m/s B 32 m/s C 60 m/s D 134 m/s

20. A cyclist is traveling with a speed of 10 m/s. If the cyclist suddenly applies the brakes, resulting in an acceleration of -2 m/s², how long will it take for the cyclist to stop?

A 5 s B 10 s C 2 s D 1 s