'O' Level Power Revision Series
Physics

EVALUATION TEST PAPER

REAL EXAMINATION QUESTIONS
for Secondary 4

Name: ______________________ **Time Start:** ___________

Date: ______________________ **Time End:** ___________

Total Marks : **/ 40**

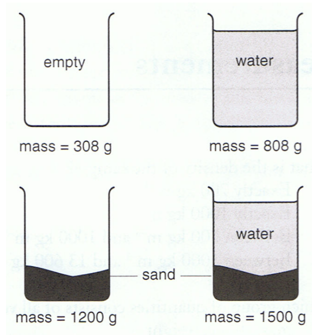
40 questions

Total time: 60 min

DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO. FOLLOW ALL INSTRUCTIONS CAREFULLY.

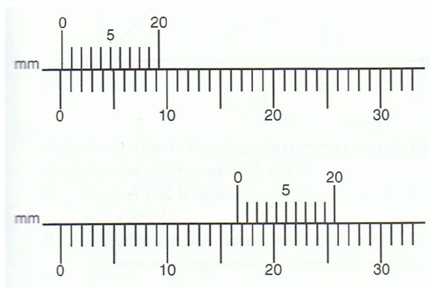
(Hint: Revise the first 7 chapters before taking this test)

1. In an experiment to determine the density of sand, the measurements as shown below are obtained. If the density of water is 1.00 g cm^{-3}, what is the density of the sand?



A	2.22 g cm^{-3}	**B**	2.47 g cm^{-3}
C	3.13 g cm^{-3}	**D**	4.46 g cm^{-3}

2. Shown below are two enlarged vernier scales. The one on the top shows when the vernier is closed and the other after measuring the diameter of a steel ball bearing.



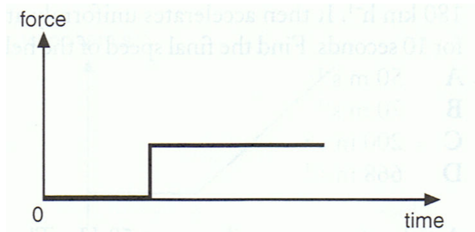
The correct value for the diameter of the steel ball bearing is

A	1.54 cm	**B**	1.56 cm
C	1.58 cm	**D**	1.64 cm

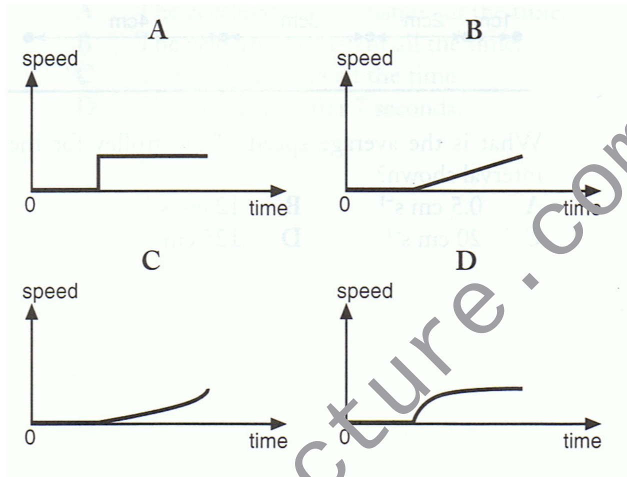
3. An astronaut has a mass of 60 kg on Earth. He can jump 2.0 m high on the surface of Earth. Which of the following statements regarding the distance he can jump on the Moon and the corresponding reason are correct? Assume that the acceleration due to gravity on the Moon is 1.6 ms^{-2}.

	Distance he can jump on the Moon	**Reason**
A	higher than 2.0 m	his mass is less than on Earth
B	higher than 2.0 m	his weight is less than on Earth
C	lower than 2.0 m	his weight is more than on Earth
D	lower than 2.0 m	his weight is me than on Earth

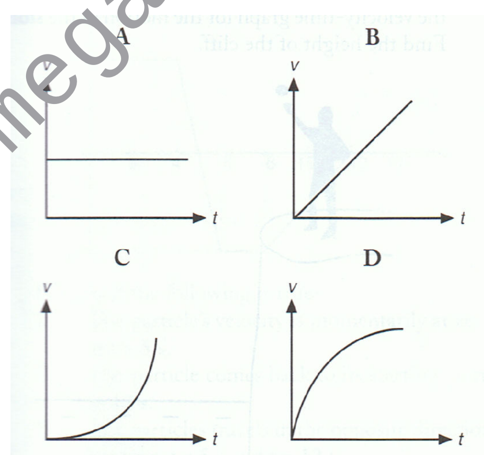
4. A car driver presses the accelerator sharply when the traffic lights turn green. The force on the car varies with time as shown.



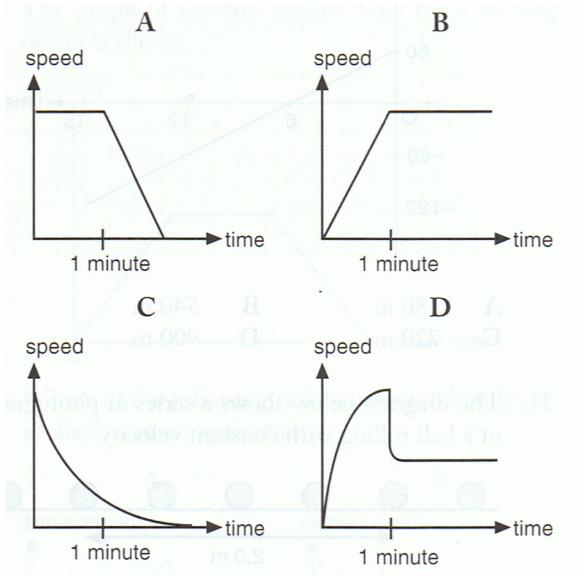
Which graph shows the variation with time of the car's speed?



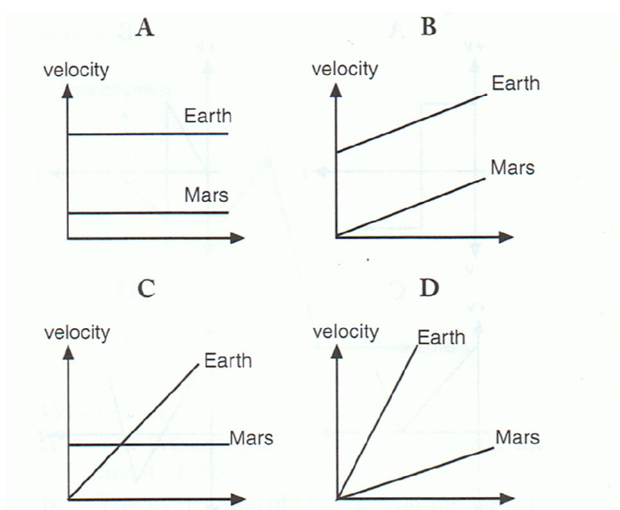
5. Which of the following velocity-time graphs shows the motion of an object in free fall in the absence of air resistance?



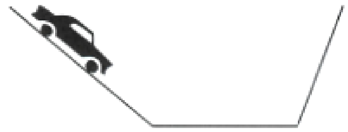
6. After a parachutist has been falling for 1 minute, his parachute opens. Which graph best shows how his speed varies with time?



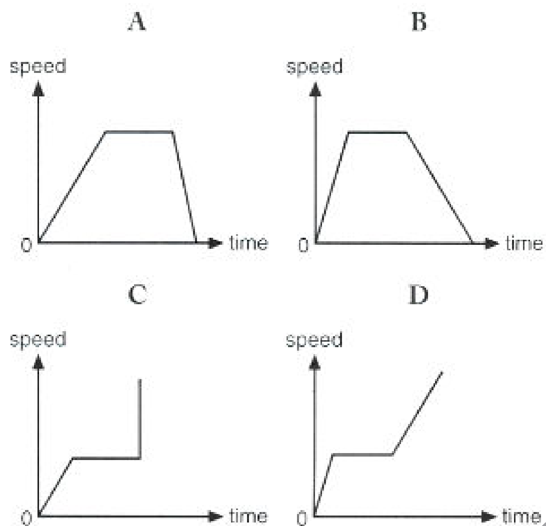
7. When someone on Earth drops a rock, it accelerates at about 10 ms^{-2}. When a rock is dropped on the Mars, the rock accelerates at about 2.0 ms^{-2}. Which diagram shows the velocity-time graph for rocks dropped on the Earth and on the Mars?



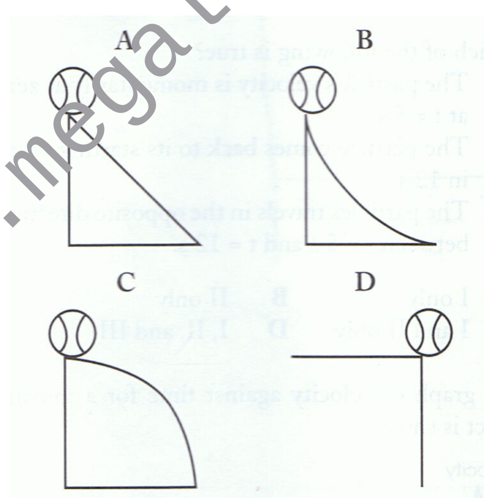
8. A car which is initially at rest rolls down a smooth inclined plane as shown below.



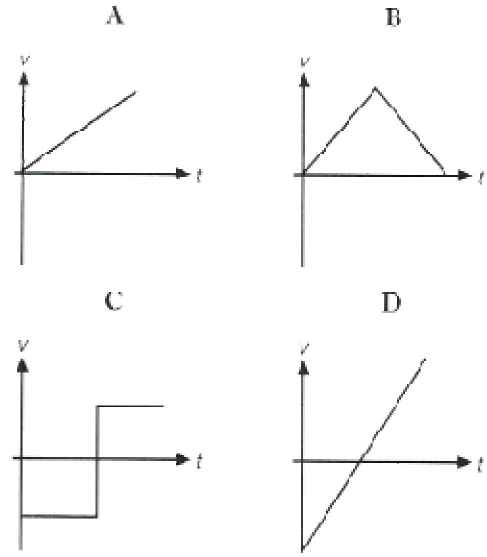
Which of the speed –time graphs best represents the motion of the car?



9. On which of these slopes does the ball roll down with increasing speed and decreasing acceleration? (Neglect frictional forces)



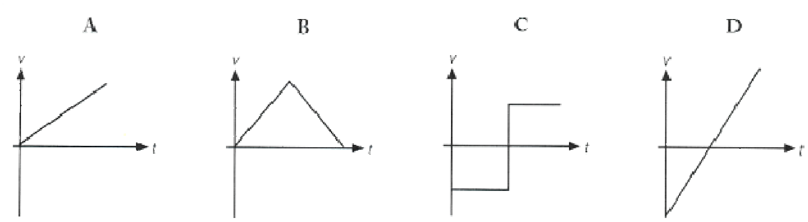
10. A small ball is given an initial push up an inclined slope. It moves up the frictionless slope and down again. Which of the following graphs best represents the velocity-time graph of its motion from point A to B and back to A again?



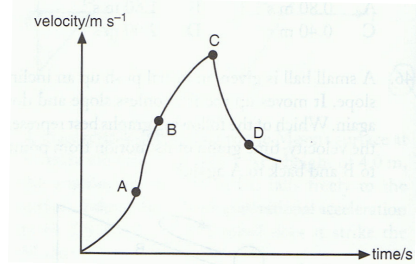
11. A boy throws a stone vertically up to a man standing at a height of 2.0m above the boy. If the stone is thrown up with a velocity of 7.0ms^{-1}, what is the velocity of the stone at the instant when it is caught by the man?

A 3.0 ms^{-1} B 6.2 ms^{-1} C 9.0 ms^{-1} D 9.4 ms^{-1}

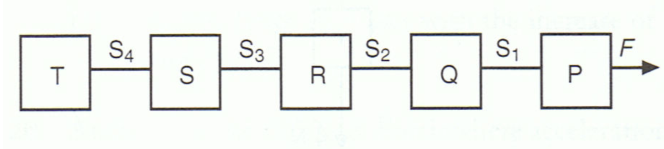
12. A small ball is given an initial push up an inclined slope. It moves up the frictionless slope and down again. Which of the following graphs best represents the velocity-time graph of its motion from point A to B and back to A again?



13. The graph shows how the velocity of an object changes with time. Which point on the graph shows the objects moving with the greatest acceleration?



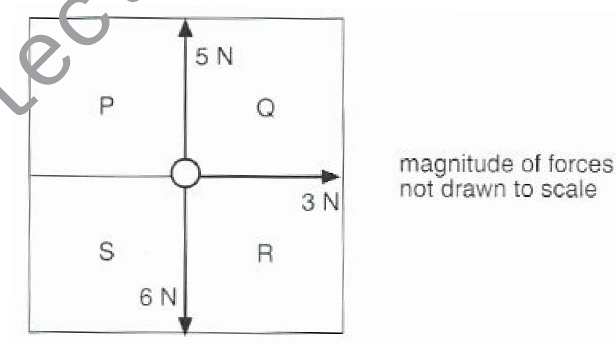
14. Five blocks of equal masses V, W, X, Y and Z are connected by four identical strings as shown in the diagram. They are pulled by a steadily increasing force F. Which of the strings A, B, C or D is most likely to break first?



15. A stone rolls off the edge of a vertical cliff. Neglecting air resistance, which of the following describes its subsequent motion?

	Vertically	Horizontally
A	Increasing velocity	Decreasing velocity
B	Constant velocity	Constant acceleration
C	Constant acceleration	Constant velocity
D	Increasing acceleration	Decreasing velocity

16. The diagram below shows the top view of a field separated into four sectors P, Q, R and S. A cart tied to three ropes is placed in the middle of the field. Three bull carts start to pull the ropes (with forces indicated in the diagram) at the same time. In which sector will the cart start to move initially?



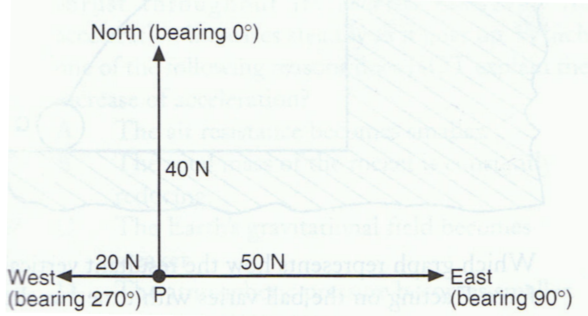
A Sector P

B Sector Q

C Sector R

D Sector S

17. Three coplanar forces, of magnitude 20 N, 40 N, and 50 N, act on a body at P in the directions shown in the diagram below.



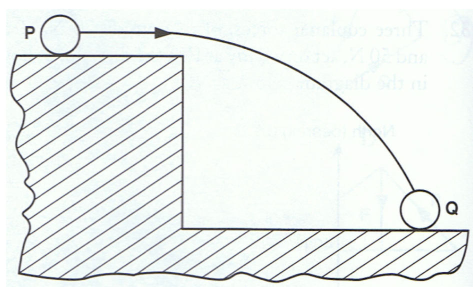
Which one of the following is the approximate bearing of the additional force required to maintain equilibrium?

A 37° B 127° C 143° D 217°

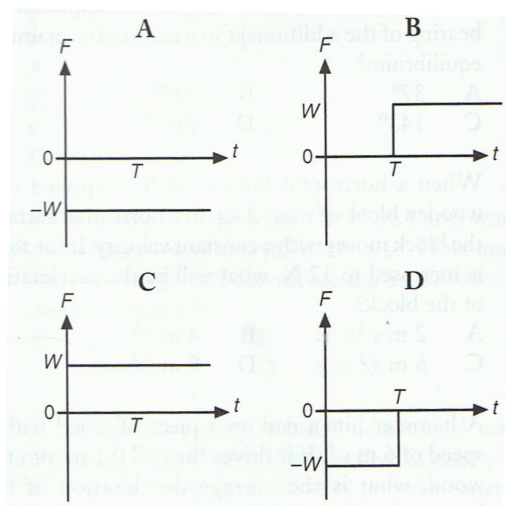
18. A 4.0 kg block of wood is pulled along a horizontal ground from rest, and a force on 15 N is required to produce an acceleration of 2.0 ms-2. What should the magnitude of the force be in order to pull the block of wood at constant speed of 5.0 ms-1 on the same horizontal ground?

A 5 N B 7 N C 8 N D 10 N

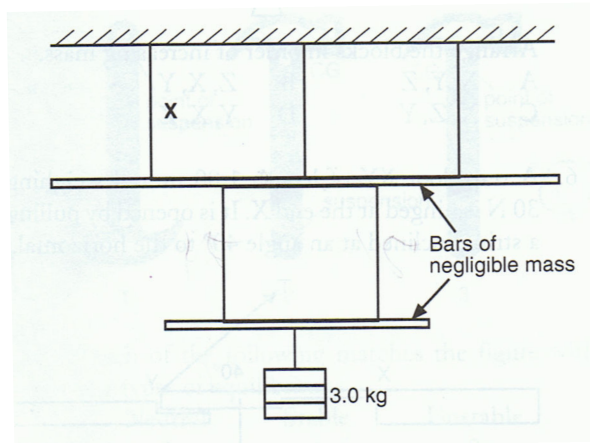
19. A ball of weight *W* slides along a smooth horizontal surface until it falls off the edge at time *T*.



Which graph represents how the resultant vertical force *F* acting on the ball varies with time *t* as the ball moves from position P to position Q?

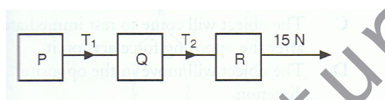


20. Two diagrams show a mass of 3.0 kg suspended from two bars of negligible mass connected by five light strings. What tension in the string labeled X?



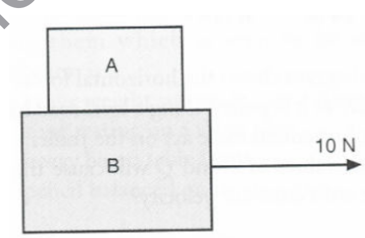
A 1.0 N B 5.0 N C 10.0 N D 15.0 N

21. P, Q and R are three identical blocks resting on a smooth surface. A force of 15 N is applied at one end as shown in the diagram below. What are the tensions T_1, between blocks P and Q and T_2, between blocks Q and R in the strings?



	T_1	T_2
A	15 N	15 N
B	5 N	10 N
C	10 N	5 N
D	7.5 N	7.5 N

22. Two objects, A (of mass 3 kg) and B (of mass 2 kg), are stacked one on top of the other as shown.

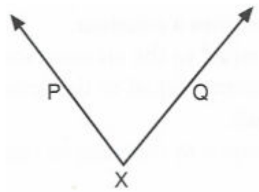


If all surfaces are regarded as frictionless, then the acceleration of A in ms^{-2}, when B is pulled by a force of 10N, is

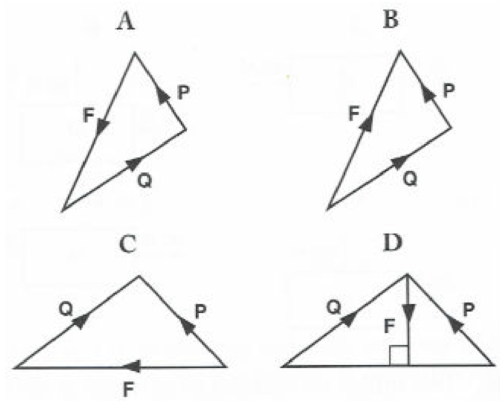
A 5 B 3.3

C 2 D 0

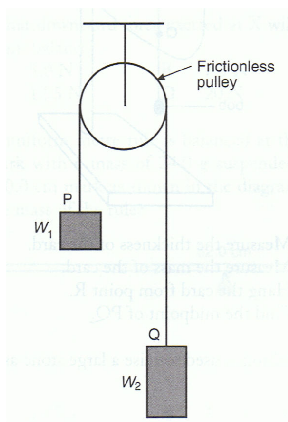
23. Two forces P and Q act at a point X as shown in the vector diagram below.



In which of the following diagram does the vector **F** represent the resultant force of **P** and **Q**?



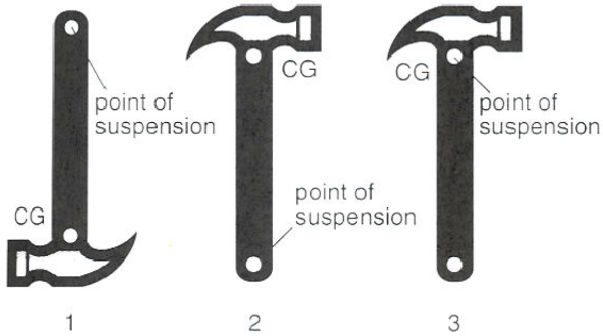
24. Two loads, W_1 and W_2 are attached to the ends of a rope PQ which is hung over a frictionless pulley as shown in the figure below.



Load W_1 moves downwards when it is released from rest. Which of the following statement is true?

A Load W_1 moves downwards with uniform acceleration.
B Load W_2 moves upwards with uniform velocity.
C Tension in the rope equals to W_2.
D Tension in the rope equals to (W_1 + W_2)

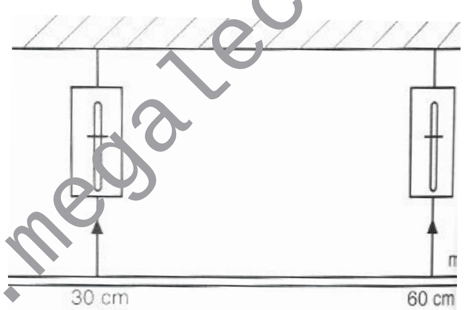
25. 3A hammer can be suspended in equilibrium from three different positions as shown.



Which of the following matches the figure with their types of equilibrium?

	Neutral	Stable	Unstable
A	3	1	2
B	1	2	3
C	2	1	3
D	3	2	1

26. A uniform metre rule of mass 0.2 kg is supported by two identical spring balances as shown in the diagram below. The points of suspension are at the 30 cm and 60 cm mark.

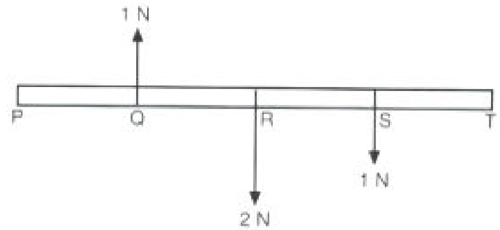


Find the position at which a 0.1 kg mass must be placed in order that the spring balances have the same reading.

A 15 cm mark B 25 cm mark

C 25 cm mark D 45 cm mark

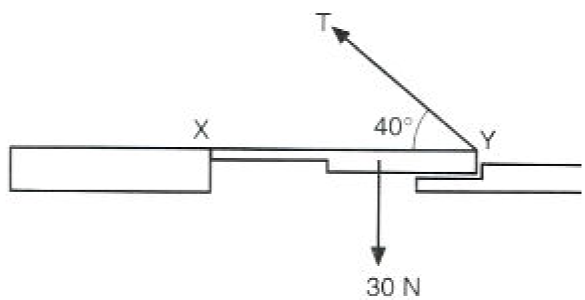
27. The diagram below shows a light rod under the action of three vertical forces. The points P, Q, R, S and T are equally placed along the rod. At which point must an upward vertical force of 2 N be applied to hold the rod in equilibrium?



A S B R

C Q D P

28. A trap door XY of length 1.00 m and weighing 30 N is hinged at the end X. It is opened by pulling a string inclined at an angle 40° to the horizontal.

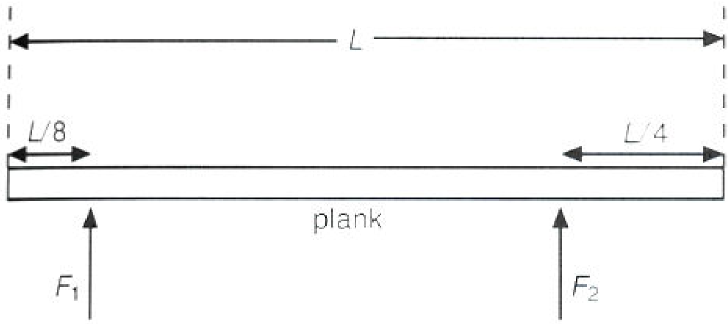


Given that the centre of gravity of the trap door is 60 cm from X, what is the tension *T* in t he string required to just lift the trap door?

A 180 N B 60 N

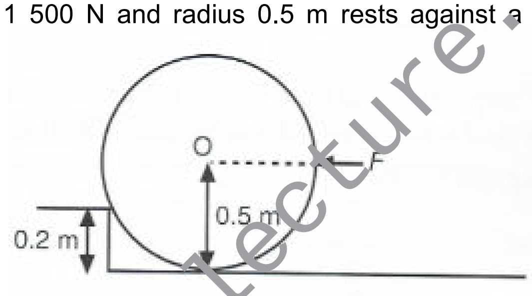
C 28 N D 18 N

29. A heavy uniform plank of length *L* is supported by two forces F_1 and F_2 at points distant *L*/8 and *L*/4 from its ends as shown in the diagram below. What is the ratio of F_1 to F_2?



A 2:5 B 3:5
C 2:3 D 3:2

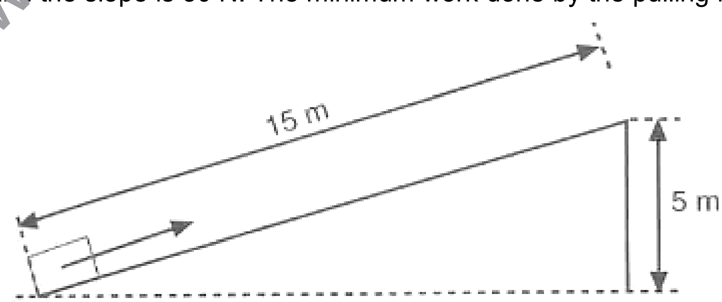
30. A barrel of weight 1 500 N and radius 0.5 m rests against a step of height 0.2 m as shown.



What is the smallest horizontal force F through the centre O needed to push the barrel over the step?

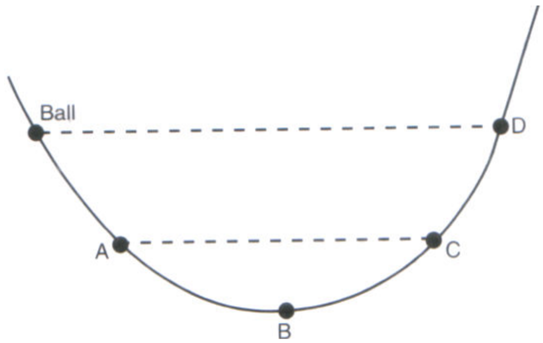
A 1125 N B 1200 N
C 1875 N D 2000 N

31. An object of mass 20 kg is pulled up a slope of 15 m long. The frictional force between the object and the slope is 30 N. The minimum work done by the pulling force is



A 450 J B 1000 J
C 1450 J C 3000 J

32. A ball is released from rest from one side of a smooth curved rail as shown in the diagram below. Neglecting air resistance and friction, which of the following statements about the motion of the ball is/are correct?



I The speed of the ball at C is the same as that at point A.

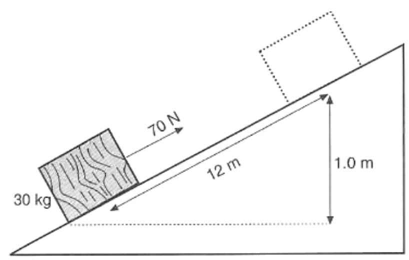
II The ball has a maximum potential energy at point B.

III The ball would not rise to a level higher than point D.

A III only B I and III only

C II and III only C I, II and III only

33. A wooden block of mass of 30 kg is pulled up a rough inclined plane at a constant speed by a force of 70 N parallel to the plane. When the distance moved along the plane is 12 m, the increase in height is 1.0 m (see diagram below).

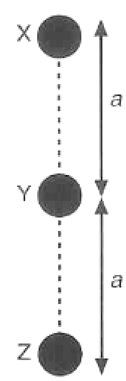


What is the work done against friction?

A 300 J B 540 J

C 360 J D 840 J

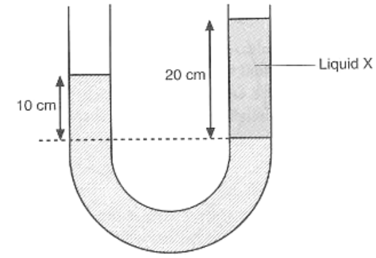
34. An object falls freely from rest (point X) to the ground (point Z). What is the ratio of the kinetic energy of the object at Y to its kinetic energy at Z?



A 1 : 1.41 B 1 : 2

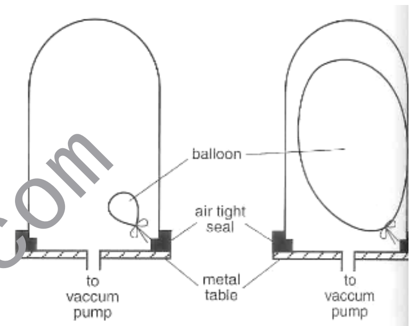
C 1 : 4 D 2 : 1

35. A column of liquid X floats on water in a U-tube of uniform cross-section area. If the density of water is 1000 kgm^{-3}, find the density of liquid X.



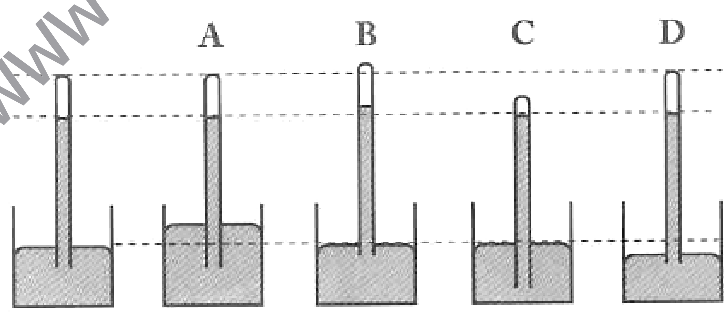
A	1500 kgm^{-3}	B	1000 kgm^{-3}
C	800 kgm^{-3}	D	500 kgm^{-3}

36. A partially inflated toy balloon is placed under a bell jar (see diagram below).
After the vacuum pump has been turned on for several minutes, the volume of the balloon has increased (see diagram on the right above).
Which pressure changes have occurred within the bell jar and within the balloon?

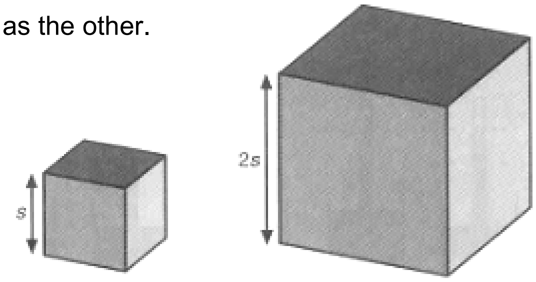


	Pressure change In bell jar	Pressure change in balloon
A	Decrease	Decrease
B	Decrease	Increase
C	Increase	Decrease
D	Increase	Increase

37. The first diagram on the left shows a simple barometer in its original state. The next four diagrams show the barometer after something has been done on it. Which of the following diagrams A, B, C or D is correct?



38. Two solid cubes are made from the same material. One cube has sides that are two times as long as the other.

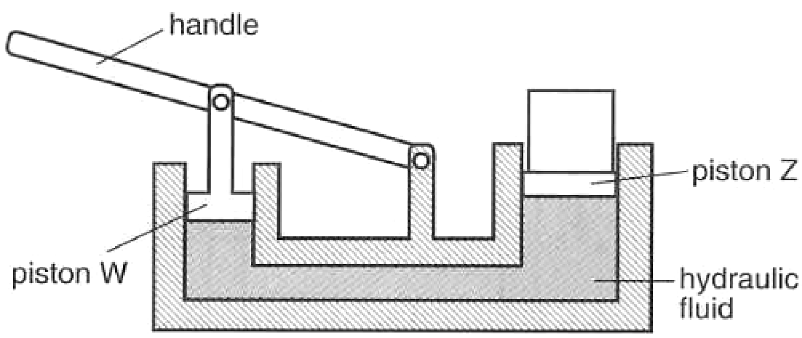


When placed on one side, the small cube exerts a pressure *p* on the ground. If one area of each side of the small cube is *A*, determine the pressure exerted by the large cube standing on one of its faces.

A 2*p* B 4*p*

C 8*p* D 13*p*

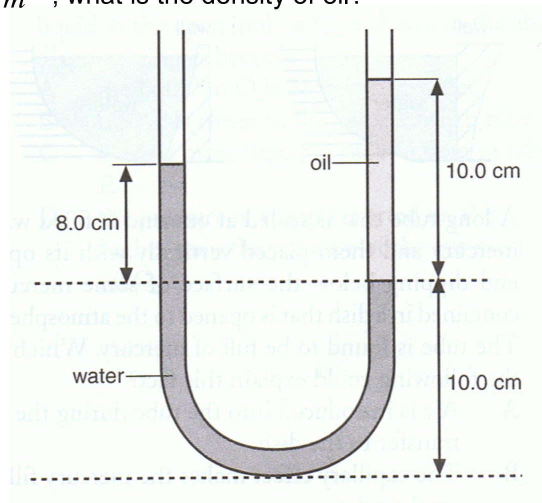
39. The diagram below shows a simple hydraulic jack.



Which of the following alteration will enable heavier loads to be lifted?

	Diameter of W	Diameter of Z
A	Doubled	Remains the same
B	Doubled	Halved
C	Remains the same	Halved
D	Halved	Doubled

40. The diagram below shows a U-tube containing water and oil. Given that the density of water is 1000 kg m^{-3}, what is the density of oil?



A 0.80 g cm^{-3}

B 1.25 g cm^{-3}

C 0.90 g cm^{-3}

D 1.11 g cm^{-3}

Answer Key:

1.	D	15.	C	29.	C
2.	B	16.	C	30.	D
3.	B	17.	D	31.	C
4.	B	18.	B	32.	B
5.	B	19.	B	33.	B
6.	A	20.	C	34.	B
7.	D	21.	B	35.	D
8.	A	22.	D	36.	A
9.	B	23.	B	37.	C
10.	D	24.	B	38.	A
11.	A	25.	A	39.	D
12.	C	26.	C	40.	A
13.	A	27.	A		
14.	A	28.	C		