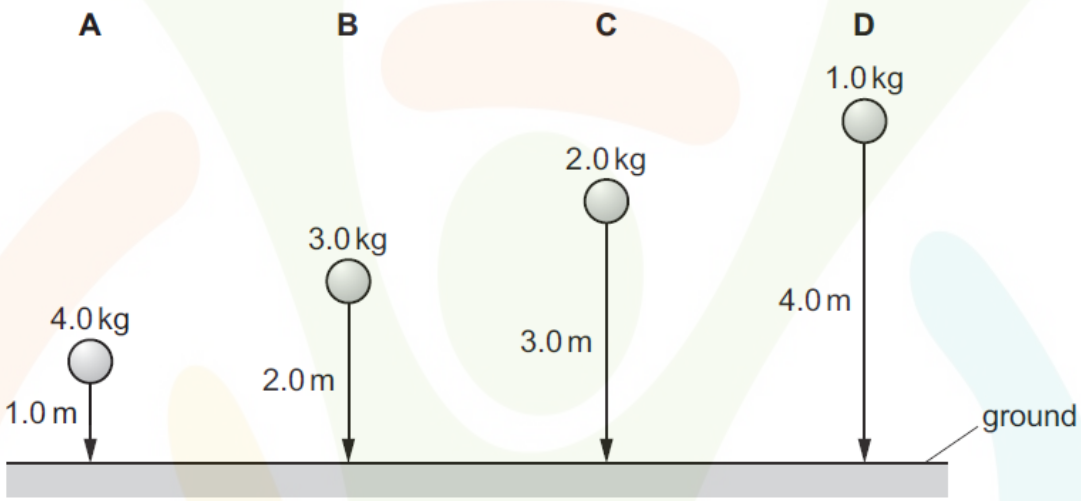
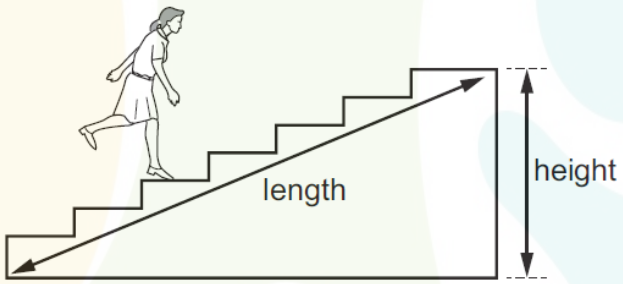
EASY

1. Four balls with different masses are dropped from the heights shown. Air resistance may be ignored. Which ball has the smallest average speed?



A

2. A student runs up a flight of stairs. Which information is not needed to calculate the rate at which the student is doing work against gravity?



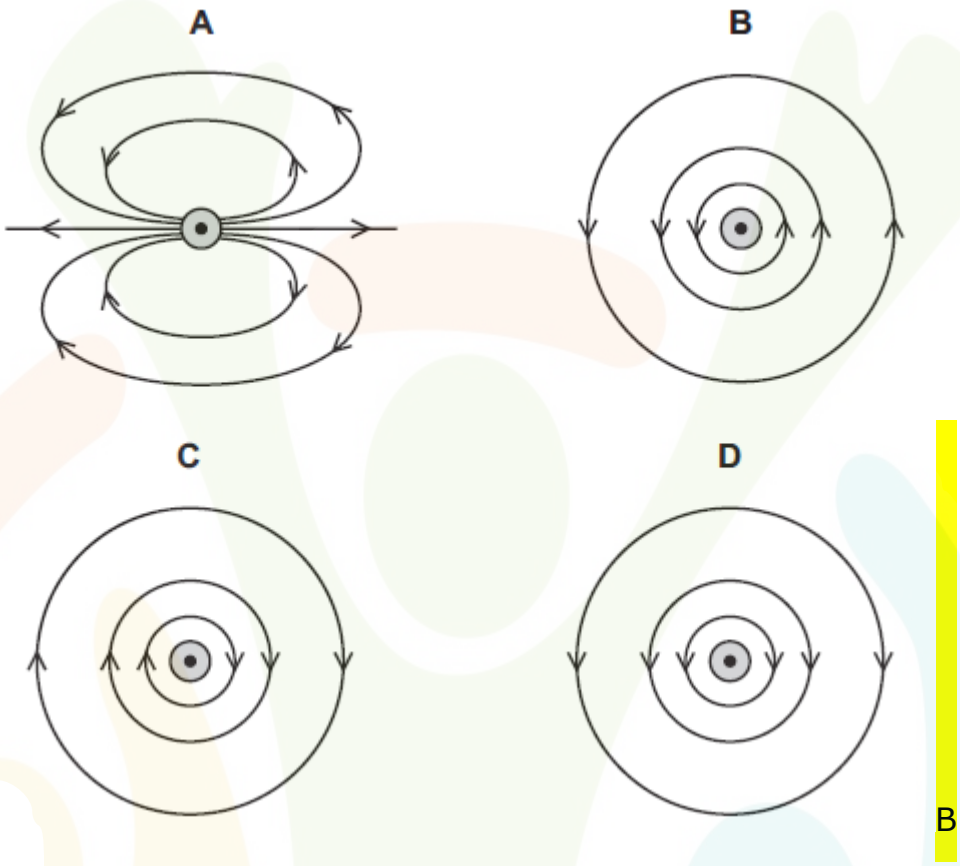
A the height of the flight of stairs

B the length of the flight of stairs

C the time taken to run up the stairs

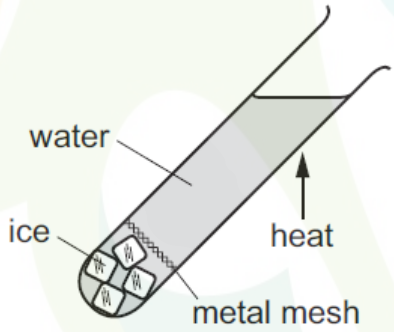
D the weight of the student

3. The diagrams show patterns around a straight wire carrying a current perpendicularly out of the page. Which pattern represents the magnetic field due to the current in the wire?



B

4. A teacher demonstrates an experiment to a class. A boiling tube is filled with water and some ice cubes are trapped at the bottom of the tube. The teacher then heats the boiling tube in the position shown until the water at the top boils. The ice does not melt. What does this demonstrate?



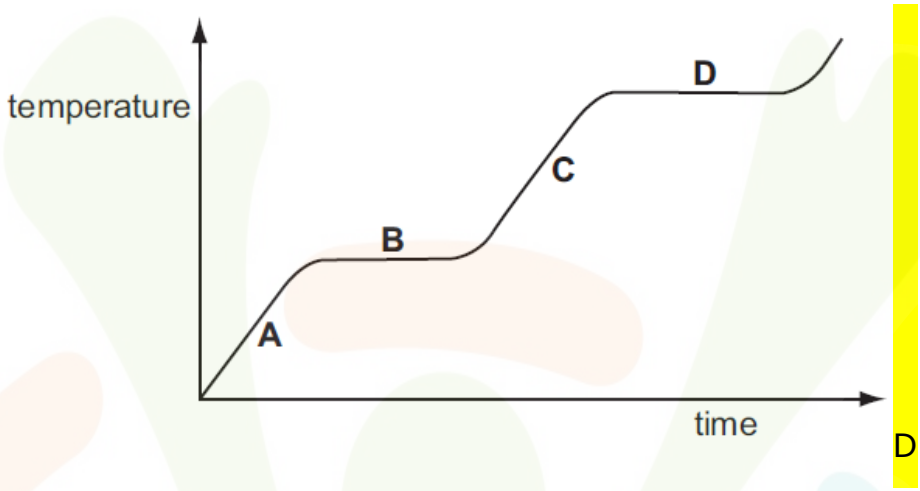
A Water is a good conductor of thermal energy.

B Water is a good convector of thermal energy.

C Water is a poor conductor of thermal energy.

D Water is a poor convector of thermal energy.

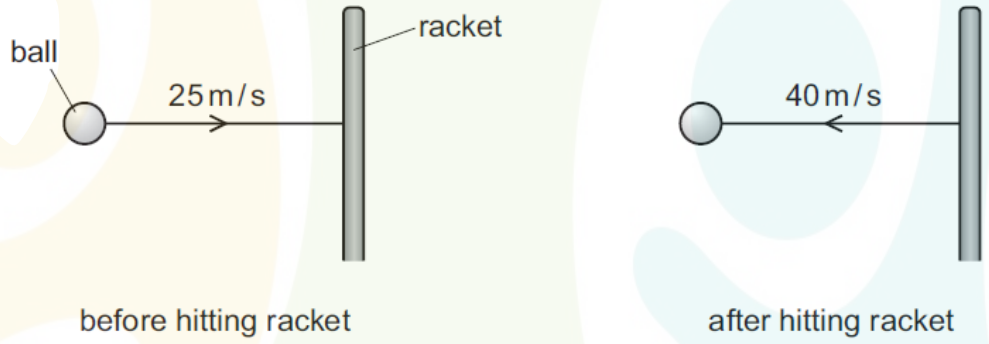
5. The graph shows the change in temperature of a material as it is heated. Which part on the graph shows when the material is boiling?



D

NORMAL

6. A tennis ball of mass 0.060 kg travels horizontally at a speed of 25 m/s. The ball hits a tennis racket and rebounds horizontally at a speed of 40 m/s. The ball is in contact with the racket for 50 ms. What force does the racket exert on the ball?



A 0.018 N B 0.078 N C 18 N D 78 N

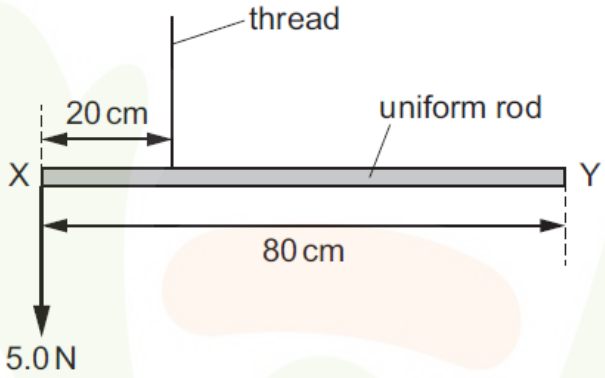
7. A student cycles along a level road at a speed of 5.0 m/s. The total mass of the student and bicycle is 120 kg. The student applies the brakes and stops. The braking distance is 10 m. What is the average braking force?

A 150 N B 300 N C 15 000 N D 30 000 N

8. An object, initially at rest, is dropped from a height of 12.0 m. The change in gravitational potential energy when it falls to the ground is 565 J. The frictional forces are negligible. What is its speed when it hits the ground?

A 4.71 m/s B 15.5 m/s C 47.1 m/s D 240 m/s

9. A uniform rod XY of weight 2.0 N has a length of 80 cm. The rod is suspended by a thread 20 cm from end X. A weight of 5.0 N is suspended from end X. A student hangs a 6.0 N weight on the rod so that it is in equilibrium. What is the distance of the 6.0 N weight from end X?



A 6 cm B 10 cm C 26 cm D 30 cm

10. A block of copper has a mass of 2.0 kg. The block of copper absorbs 12 000 J thermal energy. The specific heat capacity of copper is 385 J/(kg °C). What is the temperature rise of the copper?

A 15.6 °C B 31.2 °C C 46.8 °C D 62.4 °C

11. Light travels in a vacuum and then enters a glass block. The speed of the light in the glass block is 2.0×10^8 m/s. Which statement about the speed of light is correct?

A The speed in a vacuum is 1.5 times the speed in the glass.

B The speed in the glass is the same as the speed in a vacuum.

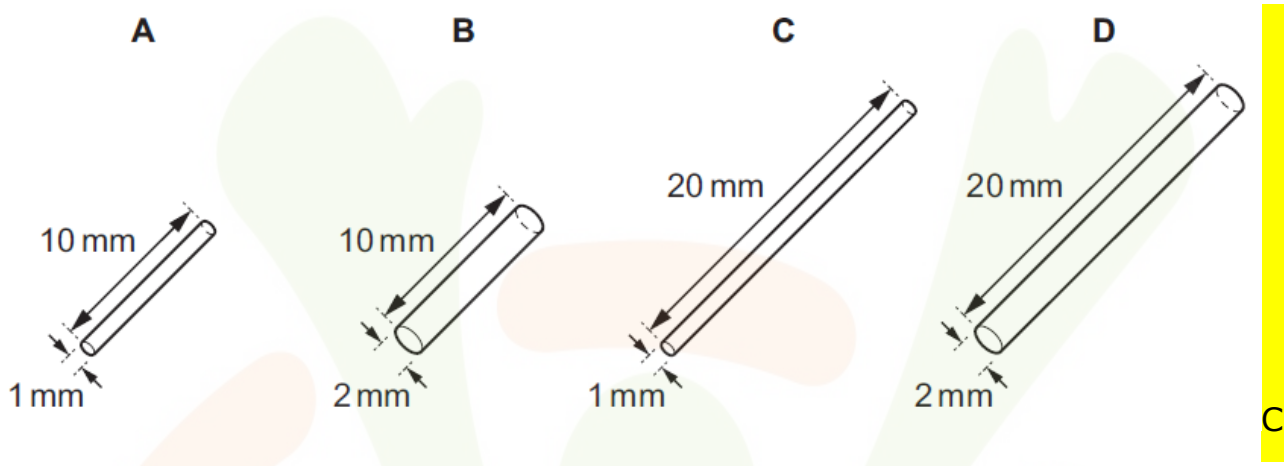
C The speed in the glass is 1.5 times the speed in a vacuum.

D The speed in the glass is 1.0×10^8 times the speed in a vacuum.

12. A player kicks a football at a velocity of 30 m/s, making an angle of 37° with the horizontal, as shown in the figure. What is the horizontal component of its initial velocity? (cos37° = 0.8, sin37° = 0.6)

A 18 m/s B 24 m/s C 30 m/s D 40 m/s

13. The diagrams represent four copper wires. Which wire has the greatest resistance?



C

14.The diagram shows a current-carrying wire. The wire is at 90° to a magnetic field. The direction of the magnetic field is into the page. A force acts on the wire due to the current and the magnetic field. In which direction does the force act?

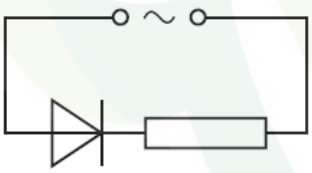
A into the page

B out of the page

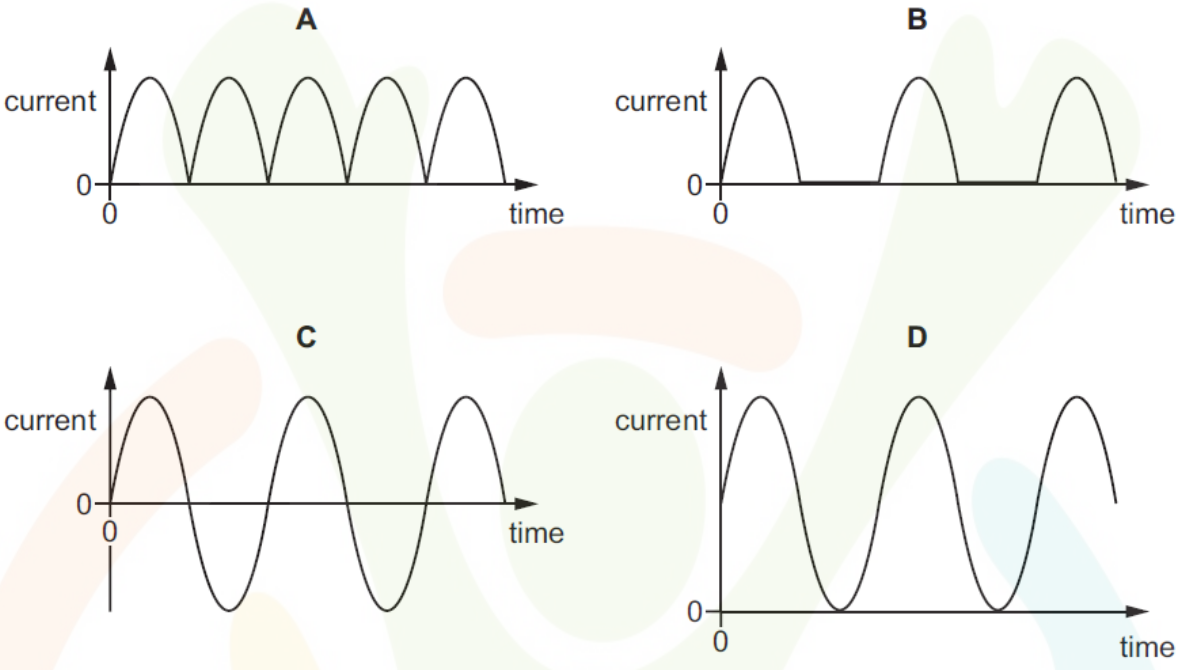
C towards the bottom of the diagram

D towards the top of the diagram

15.A student connects the circuit shown.



Which graph shows the variation with time of the current in the resistor?



B

DIFFICULT

16. A ball of mass 1.2 kg is dropped from a height of 30 m. As it falls, 25% of its initial gravitational potential energy is transferred to thermal energy. What is the kinetic energy of the ball just before it hits the ground?

A 27 J B 90 J C 270 J D 360 J

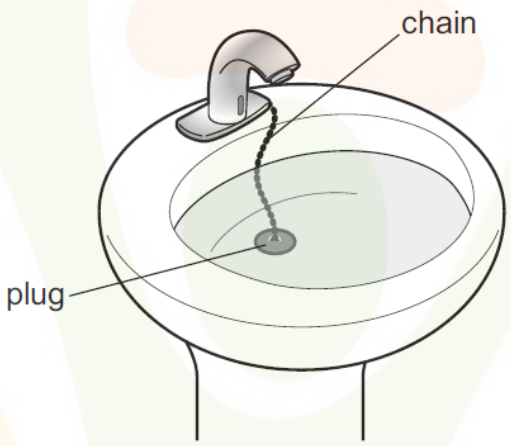
17. A diver under water uses breathing apparatus at a depth where the pressure is 1.25×10^5 Pa. A bubble of gas breathed out by the diver has a volume of 20 cm^3 when it is released. The bubble moves upwards to the surface of the water. At the surface of the water, the atmospheric pressure is 1.00×10^5 Pa. The temperature of the water is the same at all depths. What is the volume of this bubble when it reaches the surface?

A 15 cm^3 B 16 cm^3 C 20 cm^3 D 25 cm^3

18. The average current during a lightning strike between a cloud and the ground is 1.5×10^4 A. The lightning releases 3.0×10^8 J of energy and lasts for 2.0×10^{-4} s. What is the average electromotive force (e.m.f.) between the cloud and the ground?

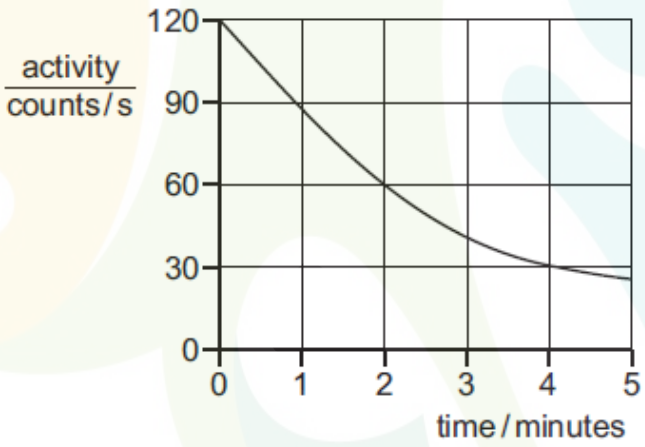
A 4.0 V B 100 V C 1.0×10^8 V D 9.0×10^8 V

19. A washbasin has an exit pipe covered with a plug of area 12 cm^2. A chain is attached to the centre of the plug to assist in pulling the plug away from the exit hole. The washbasin contains water to a depth of 0.080 m. The density of the water is 1000 kg/m^3. What is the force acting on the plug due to the water?



A 0.96 N B 800 N C 9600 N D 80 000 N

20. The graph shows the activity of a radioactive source over a period of time. What is the half-life of the source?



A 1.0 minute B 2.0 minutes C 2.5 minutes D 4.0 minutes