Brainiacs tKèăłÖă Olympiad Preliminary Round Sample Exam Paper 2

Category I – grades 7 and 8

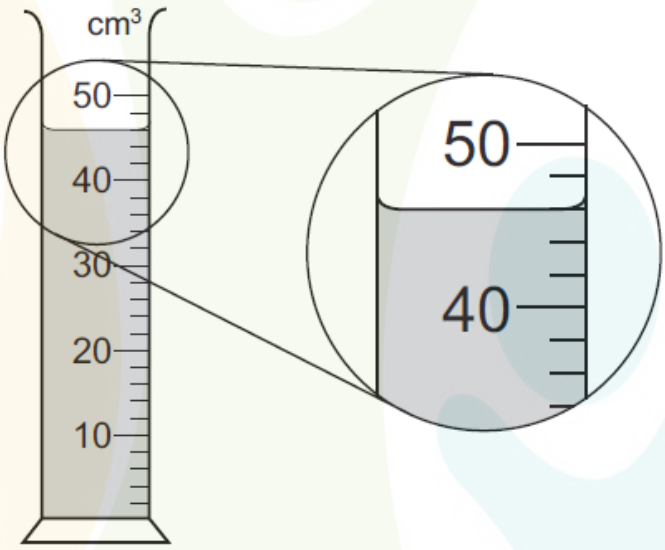
EASY

Q1.

A researcher is using the scientific method to test the effect of temperature on the strength of a material. Which of the following is the first step the researcher should take?
A. Develop a theory to explain the results
B. Make an observation and ask a question
C. Analyze the results and make conclusions
D. Test the hypothesis with a new experiment

Q2.

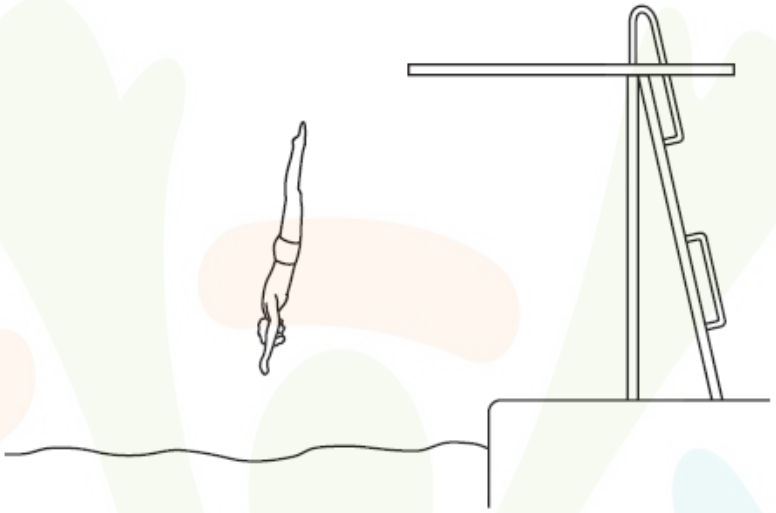
A measuring cylinder is used to measure the volume of a liquid. What is the volume of the liquid?



A. 43 cm^3 B. 46 cm^3 C. 48 cm^3 D. 54 cm^3

Q3.

The diagram shows a man diving into water. Which form of energy is increasing as he falls?



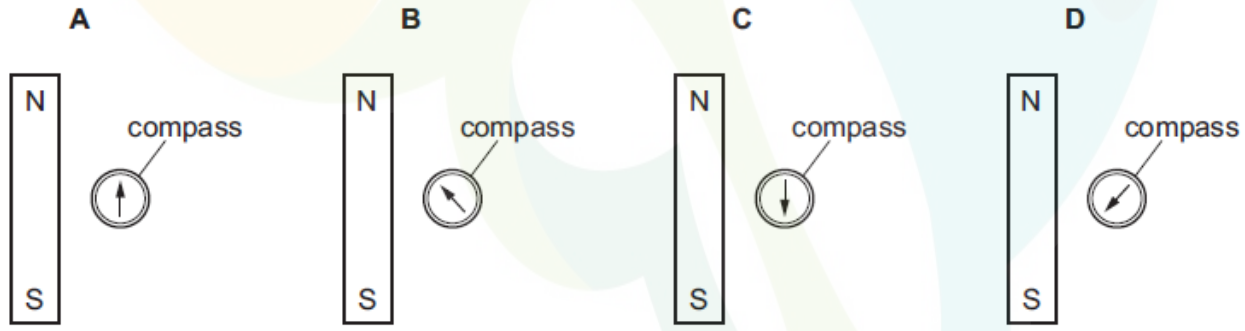
A. chemical
B. gravitational
C. kinetic
D. strain

Q4.

Which of the following is true about heat transfer by radiation?
A. It requires a medium (solid, liquid, or gas) to transfer heat.
B. It can transfer heat through a vacuum.
C. It only occurs in gases.
D. It is the fastest type of heat transfer in liquids.

Q5.

A small compass is placed close to a strong bar magnet, the same distance from each end. Which diagram shows the direction in which the compass needle points?



C

NORMAL

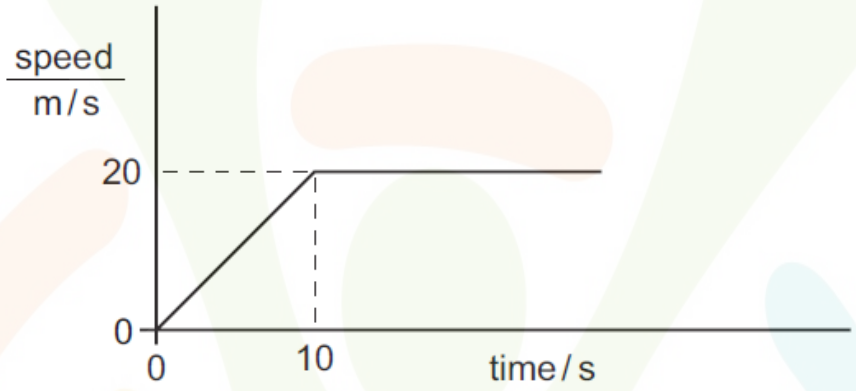
Q6.

A pendulum makes 50 complete swings in 2 min 40 s. What is the time period for 1 complete swing?

A. 1.6 s B. 3.2 s C. 4.8 s D. 6.4 s

Q7.

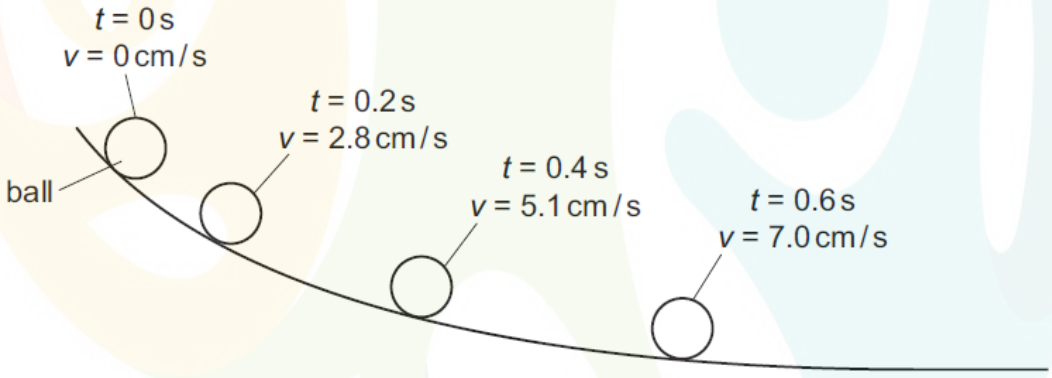
A car accelerates from traffic lights. The graph shows how the car's speed changes with time. How far does the car travel before it reaches a steady speed?



A. 10 m B. 20 m C. 100 m D. 200 m

Q8.

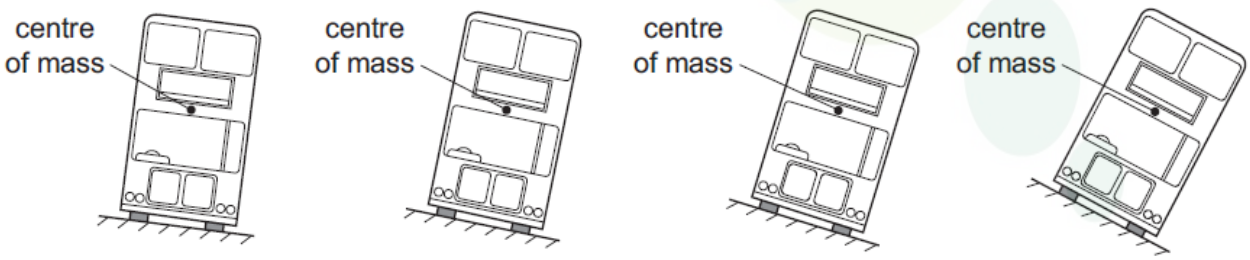
A student investigates the motion of a ball rolling down a slope. The diagram shows the speed *v* of the ball at different times *t*. Which statement describes the motion of the ball?



A. The acceleration is not constant.
B. The acceleration is negative.
C. The speed is decreasing.
D. The velocity is constant.

Q9.

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

Q10.

A block of mass 2 kg is pushed with a constant force of 10 N across a frictionless surface. What is the acceleration of the block?

A. 2 m/s²
B. 5 m/s²
C. 4 m/s²
D. 10 m/s²

Q11.

A crane lifts a 500 kg load to a height of 10 meters. How much gravitational potential energy is gained by the load? (Use g = 10 m/s²)

A. 50.000 J
B. 500 J
C. 5000 J
D. 500,000 J

Q12.

Water has a density of 1000 kg/m³. A rectangular swimming pool has an average depth of 1.6 m. The length of the pool is 25 m. The width of the pool is 10 m. What is the mass of the water in the swimming pool?

A. 2.5 kg B. 400 kg C. 400 000 kg D. 800 000 kg

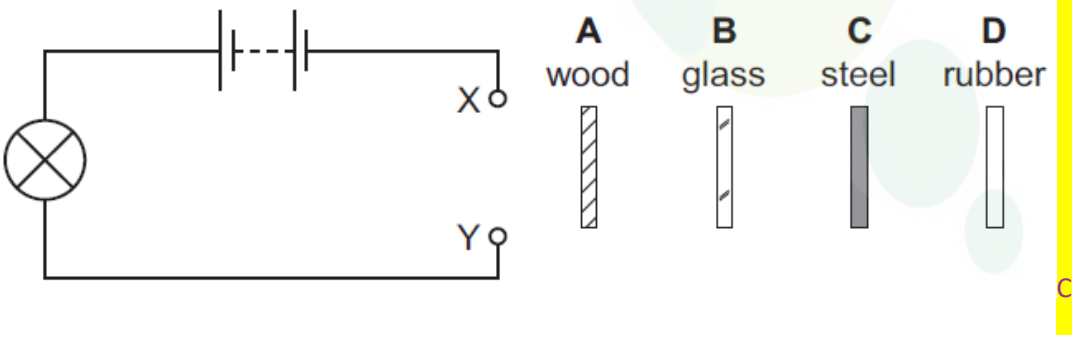
Q13.

A person holds a glass beaker in one hand and fills it quickly with hot water. It takes several seconds before his hand starts to feel the heat. Why is there this delay?

A. Glass is a poor conductor of heat.
B. Glass is a good conductor of heat.
C. Water is a poor conductor of heat.
D. Water is a good conductor of heat.

Q14.

A circuit is set up with a gap between two terminals X and Y. The four strips of material shown in the diagram are connected in turn across the gap. Which strip completes the circuit so that the lamp lights?



C

Q15.

A model of an atom consists of small particles orbiting a central nucleus. Where is the positive charge in an atom?

A. on the orbiting particles
B. in the nucleus
C. in the space between the nucleus and the orbiting particles
D. spread throughout the atom

DIFFICULT

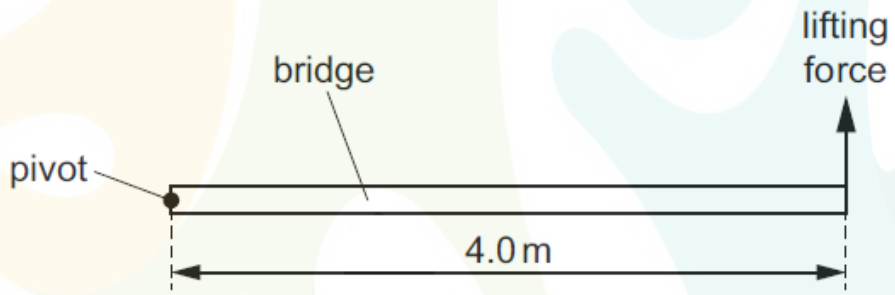
Q16.

Student P uses a force of 35 N to push a box 3.0 m across the floor. Student Q uses a force of 22 N to push another box 1.8 m across the floor. Which statement gives a full explanation why student P uses more energy than student Q?

A. Student P pushes his box a greater distance than student Q.
B. Student P pushes his box a greater distance and uses a bigger force than student Q.
C. Student P uses a bigger force than student Q.
D. Student P pushes a heavier box than student Q.

Q17.

The diagram shows a uniform bridge, 4.0 m long and weighing 10 000 N. The bridge is pivoted at one end. A force at the other end gradually increases until the bridge begins to lift. What is the lifting force as the bridge starts to move upwards?



A. 2500 N B. 5000 N C. 10 000 N D. 20 000 N

Q18.

A ball of mass 0.16 kg is moving forwards at a speed of 0.50 m/s. A second ball of mass 0.10 kg is stationary. The first ball strikes the second ball. The second ball moves forwards at a speed of 0.50 m/s. What is the speed of the first ball after the collision?

A. 0.0 m/s B. 0.19 m/s C. 0.31 m/s D. 0.50 m/s

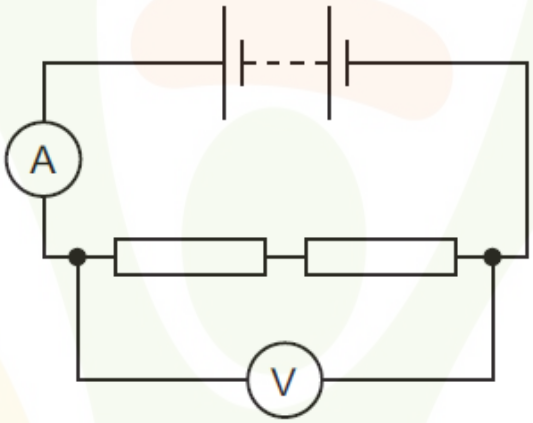
Q19.

A car, travelling on a straight horizontal road, has 1.6 MJ of kinetic energy. It accelerates for 20 s until it has 2.5 MJ of kinetic energy. What is the average power output used to increase the kinetic energy of the car?

A. 45 W B. 205 W C. 45 kW D. 205 kW

Q20.

A student uses the circuit shown to determine the resistance of two identical resistors. The voltmeter reading is 2.2 V and the ammeter reading is 0.25 A. What is the resistance of each resistor?



A. 0.275 Ω B. 0.55 Ω C. 4.4 Ω D. 8.8 Ω