

- 16 A hydroelectric power station uses the gravitational potential energy of water to generate electrical energy.

In one particular power station, the mass of water flowing per unit time is $1.5 \times 10^5 \text{ kg s}^{-1}$. The water falls through a vertical height of 120 m.

The electrical power generated is 100 MW.

What is the efficiency of the power station?

- A 5.6% B 43% C 57% D 77%

- 17 Which amount of energy is **not** 2400 J?

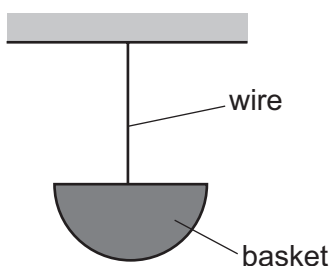
- A the decrease in gravitational potential energy of a mass of 60 kg when it moves vertically downwards through 40 m near the Earth's surface
B the energy transferred in 15 s by a machine of power 160 W
C the kinetic energy of a mass of 12 kg moving at a speed of 20 m s^{-1}
D the work done by a gas expanding against a constant external pressure of 120 kPa when its volume increases by 0.020 m^3

- 18 A train of mass 300 000 kg is accelerating at 0.80 m s^{-2} . At one instant, the speed of the train is 5.0 m s^{-1} and the resistive force to its motion is 15 kN.

At this instant, what is the rate of increase of kinetic energy of the train?

- A 0.075 MW B 1.2 MW C 1.3 MW D 3.8 MW

- 19 A wire of circular cross-section, which obeys Hooke's law, is used to suspend a basket as shown.



The Young modulus for the material of the wire is $2.5 \times 10^{11} \text{ Pa}$.

When a weight of 34 N is added to the basket, the strain in the wire increases by 6.0×10^{-5} .

What is the radius of the wire?

- A $7.2 \times 10^{-7} \text{ m}$ B $2.3 \times 10^{-6} \text{ m}$ C $8.5 \times 10^{-4} \text{ m}$ D $1.7 \times 10^{-3} \text{ m}$