Section A

1. What are the units of energy?

2. What are the units of force?

Section B

1. What equation is used to calculate work done?
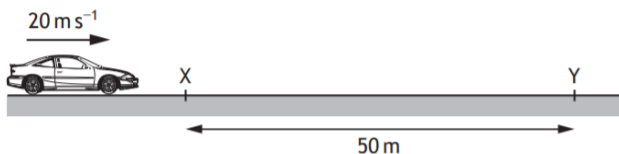
Section C

1. A crate of mass 200 kg is pushed a distance of 20 m across a level floor. The crate is pushed with a force of 150 N.

   The force of friction acting on the crate is 50 N.
   The work done in pushing the crate across the floor is
   A. 1000 J
   B. 2000 J
   C. 3000 J
   D. 4000 J
   E. 20 000 J

2. A car of mass 1200 kg is travelling along a straight level road at a constant speed of 20 m s⁻¹ .

   20 m s⁻¹

   X   Y

   50 m

   The driving force on the car is 2500 N. The frictional force on the car is 2500N.
   The work done moving the car between point X and point Y is
   A. 0 J
   B. 11 800 J
   C. 125 000 J
   D. 240 000 J
   E. 250 000 J

3. A force of 10 N acts on an object for 2 s. During this time the object moves a distance of 3 m. The work done on the object is
   A. 6·7 J
   B. 15 J
   C. 20 J
   D. 30 J
   E. 60 J

4. A broken-down car is pushed with a force of 3000 N off a road so that it doesn't cause a traffic jam. The car has a mass of 700 kg.
   If 30 kJ of work is done to move the car, how far is the car pushed?
   A. 30 m
   B. 10 m
   C. 210 m
   D. 43 m
   E. 90 m

5. 12 kJ of energy is used by a curler to move a stone across the ice. The stone moves a distance of 30 m to the target. The force applied by the curler to the stone was
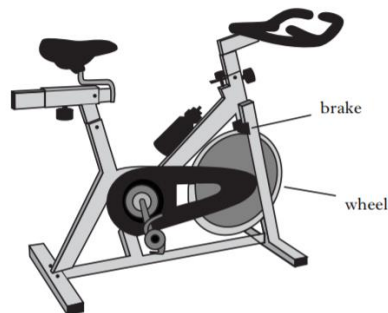   A. 0.4 N
   B. 4 N
   C. 40 N
   D. 400 N
   E. 4000N

6. In a videogame a character moves a Crete 15m. The character uses 45 kJ of energy to do this. The force applied to the crate was
   A. 90 kN
   B. 30k N
   C. 3 kN
   D. 2.25k N
   E. 9 kN

Section D

1.   One type of exercise machine is shown below.

      A person using this machine pedals against friction forces applied to the wheel by the brake. A friction force of 300 N is applied at the edge of the wheel, which has a circumference of 1.5 m.

      How much work is done by friction in one turn of the wheel?   **3**

2.   A match from a 0.02 kg box of matches is struck so that it lights.
      10 J of energy is used to strike the match down the length of the box.

                                                                                       3

      Calculate the force required to do this.

                                                5 cm