<u>Energy Conversions Answers – NAT 5</u>

1) a) 0.16J

   b) i) 0.16J.

   ii) 4ms^{-1}.

2) a) 8820J.

   b) 735W.

3) a) i) 0.16ms^{-1}.

   ii) 637N.

   iii) 2038J.

   b) i) 7.9ms^{-1}.

   ii) Actual speed is less due to air resistance in the fall. All of the gravitational potential

   is not converted into kinetic energy due to the work done against friction in the fall.

4) a) 55,000J **or** 5.5x10^{4}J.

   b) i) 55,000J **or** 5.5x10^{4}J.

   ii) 11.9ms^{-1}.

5) a) 2254N.

   b) 2254N.

   c) 13,500J **or** 1.35 x 10 ^{4}J.

   d) i) 10.8ms^{-1}.

   ii) This is due to the air resistance acting against the tiles motion.

6) a) 1350J.

   b) 1145J.

7) a) 3000kWh.

   b) 45,000p = £450.

   c) £6,900.

8) a) i) Light Energy -> Electrical Energy.

      ii) 32W.

   b) i) 24W.

      ii) 2.5A.

   c) The rechargeable battery is in use when it is dark with no wind.

9) a) Fossil fuels are finite ie they will run out.

   b)

Renewable	Non- Renewable
Hydroelectric	Coal
Solar	Gas
Wind	Nuclear

   c) 4.

   d) i) Power produced from coal would decrease.

      ii) Power produced from wind would increase.

10) a) i) 60%.

      ii) 80%.

   b) i) Switch off lights, do not leave appliances on standby etc.

      ii) Car share, use public transport etc

11) a) i) Gravitational potential energy into kinetic energy.

ii) Kinetic energy into electrical energy.

b) To reduce the current, which cuts down the energy and power losses(from heat energy).

12) a) i) 1.1MW.

ii) Expensive to build, dangerous to build, power output not consistent etc

b) i) $1.8 \times 10^6 W = 1.8MW$.
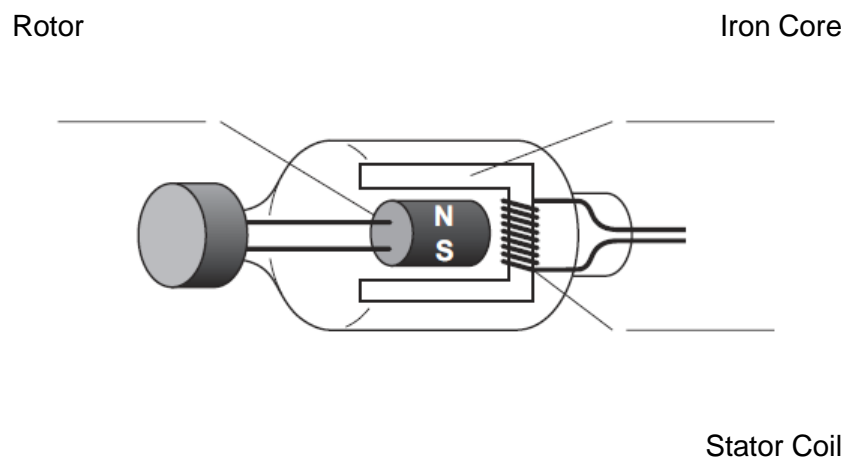
ii) 1.71MW.

13) a) 75s.

b) 400W.

c) Number of coils of wire, the strength of the magnet and the speed of the magnet spinning(relative to the coils). (**any two**)

14) a) 50 kilowatt-hours.

b) 6.25kW per day.

c) i)

Rotor   Iron Core

Stator Coil

ii) The rotating magnetic coils produce a changing magnetic field. Voltage /Current is induced in the stator coils.

iii) Increase the speed of rotation.

Increase the strength of the Iron core.

15) a)

Renewable	Non- renewable
Wind	Gas
Solar	Oil
Wave	Coal
Hydro	

b) i) Boiler -> Chemical Energy into Heat Energy.

ii) Turbine -> Heat Energy into Kinetic Energy.

iii) Generator -> Kinetic Energy into Electrical Energy.