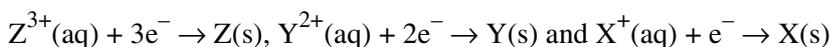


Question 13 B

Biodiesel molecules contain an ester group and so have some polarity. **A** is not correct. Both biodiesel and petrodiesel produce carbon dioxide and water as the major products on complete combustion. **B** is correct. (The minor products vary, with biodiesel producing less particulates but more NO_x than petrodiesel.) While the energy density of petrodiesel is slightly higher than that of biodiesel, the viscosity is lower, especially at lower temperatures. **C** is therefore not correct. Biodiesel is a renewable resource, but petrodiesel is sourced from a fossil fuel and so is non-renewable. **D** is incorrect.

Question 14 A

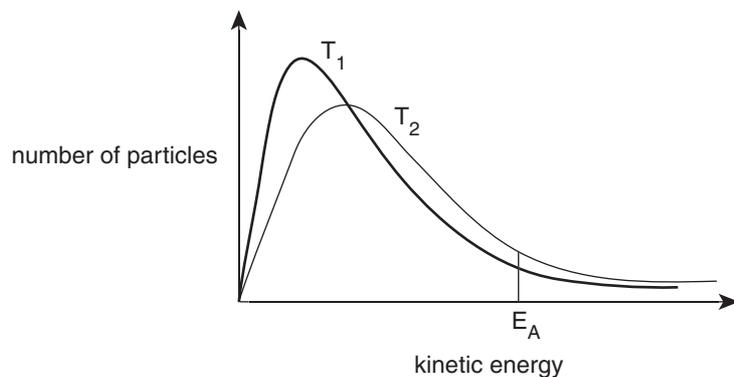
If the same amount of charge passed through each cell, then the same number of mole of electrons was used. The deposition of X, Y and Z in the mole ratio of 3 : 1.5 : 1 shows that the charge on the ions must be X^+ , Y^{2+} and Z^{3+} . This is seen in the half-equations for the depositions.

**Question 15 C**

The mass of each metal deposited depends on the amount of charge passing through each cell and this quantity is constant as the current and duration of electrolysis are unchanged. I and III would be identical to the first experiment. The amount of each metal deposited does not change but, as the initial concentration of the solute in the electrolyte in the second experiment is higher, the final concentration (II) will also be higher than for the initial experiment.

Question 16 D

As the temperature of the particles increases, the shape of the distribution graph changes as shown below. In the graph, $T_2 > T_1$.



For a lower temperature, the height of the peak is higher, but the number of particles with energies greater than the activation energy is lower.

Question 17 D

In a reaction at equilibrium, the rate of formation of the products equals the rate of formation of the reactants, but new molecules continue to be produced. **A** and **B** are incorrect. The enthalpy changes in the forward and reverse reactions have no influence on the attainment of equilibrium. **C** is incorrect. At equilibrium, new molecules are being produced but, for every new product molecule formed, another product molecule is broken apart to reform reactant molecules. Thus there is no net change in the concentrations of the molecules. **D** is the required answer.