Marks

Question 31 — The Chemistry of Art (25 marks)

(a) (i) Identify the metal ion that will produce a yellow colour in a flame test. **1**

(ii) Explain how some metal ions produce a characteristic colour in a flame. **3**

(b) Using an example from medicine or biological research, describe the bonding in a coordination complex. **4**

(c) (i) Explain what is meant by a reflectance spectrum. **2**

(ii) Outline how infrared light and ultraviolet light are used to determine the chemical composition of pigments. **3**

(d) During your practical work you performed a first-hand investigation to determine the oxidising strength of potassium permanganate.

(i) State the electronic configuration of manganese in terms of subshells. **1**

(ii) Outline the procedure used to determine the oxidising strength of potassium permanganate. **2**

(iii) Using your results from the procedure in part (d) (ii), justify a conclusion about the oxidising strength of potassium permanganate. Use half-equations in your answer. **3**

(e) Analyse trends in the physical properties of the first transition series. **6**