38. A metal oxide has the formula M_2O_3. It can be reduced by hydrogen to give free metal and water. 0.1596 g of the metal oxide required 6 mg of hydrogen for complete reduction. The atomic mass of the metal is
(a) 111.60
(b) 159.60
(c) 79.80
(d) 55.80

39. If 0.250 g of an element, M, reacts with excess fluorine to produce 0.547 g of the hexafluoride, MF_6, the element should be ($Cr = 52$, $Mo = 95.94$, $S = 32$, $Te = 127.6$, $F = 19$)
(a) Cr   (b) Mo
(c) S   (d) Te

40. Fluorine reacts with uranium hexafluoride, UF_6, as represented by this equation:

$$U(s) + 3F_2(g) \rightarrow UF_6(g)$$

How many fluorine molecules are required to produce 2.0 mg of uranium hexafluoride, UF_6, from an excess of uranium? The molar mass of UF_6 is 352.0 g mol^{-1}.
(a) 5.13×10^{18}
(b) 1.026×10^{19}
(c) 2.052×10^{19}
(d) 1.026×10^{20}

41. What is the total mass of the products formed, when 51 g of H_2S is oxidized by oxygen to produce water and sulphur dioxide?
(a) 72 g   (b) 27 g
(c) 123 g   (d) 96 g

42. A quantity of 1.08 g of $Cr_2O_7^{2-}$ is reduced in an acidic solution by an excess of SO_2 to form HSO_4^- and Cr^{3+}. What is the minimum number of moles of H^+ that must be present for this reaction to occur? ($Cr = 52$)
(a) 0.025   (b) 0.020
(c) 0.005   (d) 0.070

43. Diborane tetrachloride was treated with NaOH and the following reaction occurred:

$$B_2Cl_4 + NaOH \rightarrow NaBO_2 + H_2O + H_2 + NaCl$$

If 1362 ml of hydrogen gas is formed at STP, how much B_2Cl_4 was consumed? ($B = 11$)
(a) 9.97 g   (b) 9.84 g
(c) 0.0968 g   (d) 23.57 g

44. What total volume, in litre at 727°C and 1 atm, could be formed by the decomposition of 16 g of NH_4NO_3? Reaction: $2NH_4NO_3 \rightarrow 2N_2 + O_2 + 4H_2O(g)$.
(a) 57.47 l   (b) 114.94 ml
(c) 41.78 l   (d) 24.63 l

45. A compound of iron and chlorine is soluble in water. An excess of silver nitrate was added to precipitate all chloride ions as silver chloride. If a 127 mg sample of the compound gave 287 mg AgCl, what is the formula of the compound? ($Fe = 56$, $Ag = 108$)
(a) $FeCl_2$ (b) $FeCl_3$
(c) FeCl   (d) $FeCl_6$

46. From the following reactions:

$$2CoF_2 + F_2 \rightarrow 2CoF_3$$
$$(CH_2)_n + 4n\ CoF_3 \rightarrow (CF_2)_n + 2n\ HF + 4n\ CoF_2$$

Calculate how much F_2 will be consumed to produce 1 kg of $(CF_2)_n$. ($F = 19$)
(a) 1.52 kg   (b) 2.04 kg
(c) 0.76 kg   (d) 4.56 kg

47. An element 'A' reacts with the compound BO_3 to produce A_3O_4 and B_2O_3. The number of moles of A_3O_4 produced if 1 mole each of A and BO_3 are allowed to react, is
(a) 3   (b) 1
(c) 1/3   (d) 2/3