Mark schemes

Q1.

(a) (nanoparticles)
any **two** from:
- have a higher surface area to volume ratio
- less (material) needed (for the same effect)

  allow a thinner coating is needed
- more light gets through

2

allow converse arguments for fine particles

(b) (M_r TiO_2 =) 80

1

(conversion 100 kg =) 100 000 (g)

1

$\left(\text{moles } TiO_2 = \frac{100\,000}{80} = \right)$
1250

allow correct use of an incorrectly determined M_r
allow correct use of an incorrect / no conversion of mass

1

(moles Cl_2 = 1250 × 2 =) 2500

allow correct use of an incorrectly determined number of moles of TiO_2

1

(volume Cl_2 =) 2500 x 24

allow correct use of an incorrectly determined number of moles of Cl_2

1

= 60 000 (dm^3)

1

[8]