Data analysis task

Marking Scheme

(a) Any suitable example given e.g. gravitational force, light [or em radiation] from star. [1]

(b) (i) Any sensible and practical precaution e.g. use tongs to handle source, source pointed away from body/limit exposure/shielding [not goggles only] [1]

(ii) Table:

Distance (d)/mm	Count rate/Bq	1/distance^2 (mm^{-2} or m^{-2})
13	215 ± 8	0.0059 (5900)
17	125 ± 6	0.0035 (3500)
20	94 ± 5	0.0025 (2500)
25	59 ± 4	0.0016 (1600)
30	44 ± 3	0.0011 (1100)
50	19 ± 2	0.00040 (400)

Correct values in table (1)
2 significant figures used [allow 1sf in bottom cell] (1)
Unit mm^{-2} or m^{-2} (1)
[NB The unit used must be consistent with the values, e.g. mm^{-2} with 5900 in the first box loses the unit mark] [3]

(c) Graph
Titles and units (ecf) on both axes and correctly orientated graph (1)
Sensible scales (over half page used to plot the points, not multiples of 3) (1)
All points plotted correctly to within ½ division (1)
All error bars plotted correctly (1)
Lines of steepest fit and least steep fit consistent with data (not ~ parallel lines) (1) [5]

(d) Gradient

(i) Large triangles used (should be close to the extremities of the lines) or 2 suitable widely separated points on each graph (1)
Both gradients calculated correctly (ignore unit and significant figures) (1 + 1)
[allow e.c.f. for incorrect lines] [3]

(ii) Mean gradient correct (1)
Uncertainty correct (1) [2]