Question number	Answer	Notes	Marks
6 (a) (i)	only 2.65 (mm) circled;		1
(ii)	discards anomaly; performs averaging; quotes answer to 3sf / 2 d.p.; e.g. 3.60 + 3.62 + 3.63 + 3.61 ~~+ 2.65~~ + 3.62 + 3.60 + 3.61 (= 25.29) 25.29 ÷ 7 = 3.612857... = 3.61 (to 3 sf	÷ 7 or ÷ 8 sufficient even if sum is incorrect e.g. 3.61→3 marks 3.6128 →2 marks (wrong sf) 3.49→ 2 marks (includes anomaly) 3.4925→ 1 mark (includes anomaly and wrong sf)	3
(b) (i)	Bar chart/graph;	condone histogram	1
(ii)	Idea that (size) data is discontinuous; and either of - Idea that there are no values between sizes; Idea that a line graph would indicate continuity;	discrete, categoric, non continuous allow "no half sizes"	2
(iii)	Idea of inverse relationship; Idea of non-linearity;	allow a pattern sentence, condone negative correlation allow "almost" linear Ignore idea of proportionality	2

Question number	Answer	Notes	Marks
6 (c)	Any four of - MP1. idea of a displacement method; MP2. instrument to measure volume (of liquid displaced); MP3. a relevant experimental detail; MP4. second relevant experimental detail; MP5. use of **known liquid density** to find volume from mass (if appropriate);	 Allow overspill or rise in level Allow balance if mass method used (see MP5) Including • idea of repetition or averaging at any stage • **full** immersion of object • check liquid level in displacement can, • subtracting before and after volume measurements , • care with meniscus (e.g. in the measuring cylinder), • check zero or tare of balance • avoid parallax when reading scale as above	4

Total 13 marks

Question number	Answer	Notes	Marks
8 (a) (i)	gravitational potential energy = mass x g x height	Allow symbols and rearrangements, e.g. GPE = m x g x h	1
(ii)	Substitution into correct equation; Calculation; e.g. GPE = 2.75 x 10 x 0.61 = 17 (J)	16.8, 16.775, 16.78 (J) allow calculation with g = 9.81 =16.46 (J)	2
(iii)	Any two of- MP1. idea that system is inefficient OR not 100% efficient; MP2. idea that energy is lost / wasted / dissipated ; MP3. explanation /detail of fate of energy; e.g. used when working against {friction / drag / air resistance} as thermal energy to parts of the apparatus or surroundings transferred to surroundings by sound converted into KE as mass fell	condone used / transferred elsewhere Need mention of 'object' Ignore light allow to overcome friction allow heat for thermal energy	2
(iv)	Substitution into correct equation; Calculation; e.g. Energy transferred = 0.46 x 12.7 x 1.3 7.6 (J)	allow answer without working or equation seen (7.5946)	2
(b)	three of the following ideas- MP1. water has (initial) GPE; MP2. KE of (moving) water; MP3. Work done on turbine / generator; MP4. Work done against magnetic force; MP5. Electrical energy/power/current/voltage (produced);	allow KE in turbine / generator	3

Total 10 marks