Qu 1	Scheme	Marks	AO
(a)	**Disadvantage:** e.g. Not random; cannot use (reliably) for inferences	B1 **(1)**	1.1b
(b) **(i)** **(ii)**	[Sight or correct use of] $X \sim B(36, 0.08)$ $P(X = 4) = 0.167387\ldots$ awrt **0.167** $[P(X \geqslant 7) = 1 - P(X \leqslant 6) =]$ $0.022233\ldots$ awrt **0.0222**	M1 A1 A1 **(3)**	3.3 1.1b 1.1b
(c)	P(In dance club and dance tango) $= 0.4 \times 0.08 = $ **0.032** or $\dfrac{4}{125}$ or **3.2%**	B1 **(1)**	1.1b
(d)	[Let T = those who can dance the Tango. Sight or use of] $T \sim B(50, \text{“}0.032\text{”})$ $[P(T < 3) = P(T \leqslant 2) =]$ $0.7850815\ldots$ awrt **0.785**	M1 A1 **(2)**	3.3 1.1b
		(7 marks)	

	Notes
(a)	B1 for a suitable disadvantage:

Allow (B1)	**Do NOT allow (B0)**
Not random or less random (o.e.)	Not representative
Cannot use (reliably) for inferences	Less accurate
(More likely to be) biased	Any comment based on time or cost
	Any mention of skew
	Any mention of non-response

(b)	M1 for sight of B(36, 0.08) Allow in words: <u>binomial</u> with $\underline{n = 36}$ and $\underline{p = 0.08}$
	    may be implied by one correct answer to 2sf <u>or</u> sight of $P(X \leqslant 6) = 0.97776\ldots$i.e. awrt 0.98
	    Allow for $36C4 \times 0.08^4 \times 0.92^{32}$ as this is "correct use"

(i)	1st A1 for awrt 0.167 NB An answer of just awrt 0.167 scores M1$(\Rightarrow)$1st A1
(ii)	2nd A1 for awrt 0.0222
(c)	B1 for 0.032 o.e. (Can allow for sight of 0.4×0.08)
(d)	M1 for sight of B(50, "0.032") ft their answer to (c) provided it is a probability $\neq 0.08$ may be implied by correct answer <u>or</u> sight of $[P(T \leqslant 3)] = 0.924348\ldots$i.e. awrt 0.924 or $P(T \leqslant 2)$ as part of $1 - P(T \leqslant 2)$ calc. A1 for awrt 0.785
MR	Allow MR of 50 (e.g. 30) provided clearly attempting $P(T \leqslant 2)$ and score M1A0

Qu 2	Scheme	Marks	AO
(a)	Hectopascal or hPa	B1 **(1)**	1.2
(b)	$\bar{x} = \bar{y} + 1010$ or $\dfrac{214}{30} + 1010$	M1	1.1b
	$= 1017.1333\ldots$ awrt **1017**	A1 **(2)**	1.1b
(c)	$\sigma_x = \sigma_y$ (or statement that standard deviation is not affected by this type of coding)	M1	3.1b
	$\left[\sigma_y =\right] \sqrt{\dfrac{5912}{30} - \left("7.13[33\ldots]"\right)^2}$ or $\sqrt{146.1822\ldots}$	M1	1.1b
	$= 12.0905\ldots$ awrt **12.1**	A1 **(3)**	1.1b
(d)	High pressure (since approx. mean + sd) so clockwise Locations are (from North to South): Leuchars, Heathrow, Hurn	B1	2.4
	Wind direction is direction wind blows <u>from</u> So: Heathrow (**NE**) Hurn (**E**) Leuchars (**W**)	B1 **(2)**	2.2a
		(8 marks)	
	Notes		
FYI	1 hPa = 100 Pa; 10hPa = 1 kPa; 1Pa = 1 Nm^{-2}		
(a)	B1 for "hectopascal" <u>or</u> hPa (condone pascals, allow millibars <u>or</u> mb) o.e. Do NOT allow kPa <u>or</u> kilopascals <u>or</u> Pa on its own		
(b)	M1 for a strategy to find $\bar{x}$ Allow an attempt to find $\sum x$ that gets as far as $\sum x = \sum y - 30 \times 1010 \, [= 30\,514]$ A1 for awrt 1017 (accept 1020) [Ignore incorrect units]		
(c)	1st M1 for an overall strategy using the fact $\sigma_x = \sigma_y$ (can be implied by correct <u>final</u> ans) <u>or</u> for $\sum x = 30\,514$ and $\sum x^2 = 31\,041\,192$ (both seen and correct) 2nd M1 for a correct expression (with $\sqrt{}$)(ft their $\bar{y}$ to 3sf) allow awrt 146 for 146.1822.. <u>or</u> for correct expression in x can ft their $\sum x > 30\,000$ or their answer to (b) A1 (dep on 2nd M1) for awrt 12.1 [Ignore incorrect units]		
Final answer	Final ans of awrt 12.1 scores 3/3 **but** if they then adjust for x e.g. add 1010 (M0M1A1)		

(d)	1st B1 for at least one of these reasons (these 2 lines) clearly stated (may see diagram)
	        Need "high pressure" **and** "clockwise" to score on 1st line
	        Contradictory statements B0 e.g. correct N~S list but say "anticlockwise"
	
	2nd B1 (indep of 1st B1) for deducing the 3 correct directions either in the table or stated
	        as above
	        If the answers in table and text are different we take the table (as question says)		