Qu 1	Scheme	Marks	AO
(a)	[Let N = height from region A; P(N > 180) =] 0.24937… awrt **0.249**	B1 **(1)**	1.1b
(b)	$H_0 : \mu = 175.4$ $H_1 : \mu \neq 175.4$	B1	2.5
	[S = height from region B] $\bar{S} \sim N\left(175.4, \frac{6.8^2}{52}\right)$ Allow σ^2 = awrt 0.889	M1	3.3
	[P($\bar{S}$ > 177.2)] = 0.02814…	A1	3.4
	[0.028… > 0.025, Not sig, do not reject H_0] Insufficient evidence to support student's claim	A1 **(4)**	2.2b
(c)	[p-value = $2 \times 0.02814...$ =] 0.05628… in range **0.056~0.06** or **5.6(%)~6(%)**	B1ft **(1)**	1.2
		(6 marks)	

	Notes
(a)	B1 for awrt 0.249
(b)	B1 for both hypotheses correct in terms of μ (**See below for one-tail test**)
	M1 for selecting the correct model, may be implied by standardisation using correct values or may be implied by a correct value in 1st A1 e.g.(Prob =) 0.028 or awrt 0.972, (Z =) 1.9(08..) (CV=) 177.25 Condone use of S (or any other letter) instead of $\bar{S}$ Condone use of $\bar{S} \sim N\left(177.2, \frac{6.8^2}{52}\right)$ but **this will lose 2nd A mark**
	1st A1 for probability of awrt 0.028 (allow 0.03 if P($\bar{S}$ > 177.2) is seen) Condone 1 – 0.02814 … = 0.9718…(awrt 0..972) **only if clearly compared with 0.975**
ALT	Allow Z = 1.9(088…) and comparison with 1.96 (or better: calc gives 1.95996…) or CR of $\left[\bar{S}\right]$… 177.248…(awrt 177.25) Allow $\left[\bar{S}\right]$ >177.248…(awrt 177.25) Implied by diagram or correct interpretation of inequality with their CV (Ignore any attempt at a lower CR for $\bar{S}$)
	2nd A1 (dep on 1st A1 and use of correct model. Use of N(177.2, …) scores A0) for a conclusion using context: e.g. does not support student's claim or e.g. insufficient evidence of a difference in heights Do not allow 2nd A mark for contradictory statements e.g. "significant" so "no support for claim"
(c)	B1ft for answer in range 0.056~0.06 or 5.6%~6% (Ranges are inclusive, condone missing %) (can ft their probability, provided < 0.5, from part (b) but not 0.025 leading to 5%)
NB	**One-tail test [Max of 3/5 for (b) and (c)]** In (b) B0 (hypotheses) M1(model as above) 1st A1[for probability or Z compared with 1.6449 or CR $\left[\bar{S}\right]$… or > 176.95… (awrt 177)] 2nd A1 for conclusion in context that supports claim **or** "heights of men from B is different from/greater than from A" In (c) B0