Question Number	Scheme	Notes	Marks
4. (a)	Label academic (1-1680) and vocational (1-2520)	For numbering/labelling/ordering (o.e.) students in **each** group	B1
	Use **random** numbers to select from each group.	For use of random sample/numbers/selection	B1
	28 academic and 42 vocational	Both numbers correct with the associated group	B1
			(3)
4(b)	$H_0 : \mu_v - \mu_a = 0$ $H_1 : \mu_v - \mu_a > 0$	If the hypotheses are given in terms of $\mu_a - \mu_b$, a and b must be defined.	B1
	$\text{se} = \sqrt{\frac{70}{80} + \frac{60}{50}}$	Correct attempt at se – condone slip in sample sizes.	M1
	$z = \frac{62-57}{\sqrt{\frac{70}{80} + \frac{60}{50}}}$	Dep on previous M1 standardising with (62 – 57) and their se (Allow $\pm$)	dM1
	$z = 3.471...$ (or probability of 0.0003)	awrt ± 3.47 (or awrt 0.0003)	A1
	cv $z = 1.6449$	Allow $\pm$ but signs must be compatible Or allow comparison with probability of 0.05	B1
	Reject H_0 / significant	Dependent on 2nd M1. A correct non-contextual statement based on their **normal** cv and their test statistic.	dM1
	There is evidence that the **mean(o.e.)** basic skills score for **vocational** students is greater than the **mean** basic skills score for **academic** students.	Correct comment in context. Must mention "mean", "academic" and "vocational". Allow f.t. on their normal cv and their test statistic.	A1f.t.
			(7)
4(c)	Mean / $\bar{X}_a$ (basic skills) score for academic students and mean/ $\bar{X}_v$ (basic skills) score for vocational students…	Must mention **both** means.	B1
	…have (approximately) a normal distribution (as sample sizes are large.)	Must mention normal.	B1
			(2)
4(d)	Sample**s** are (large enough) so that $s^2 = \sigma^2$	Must imply for both samples	B1
			(1)
4(e)	Test no longer significant so insufficient evidence to reject H_0	Can be implied by correct comment in context.	M1
	Insufficient evidence that mean (basic skills) **score** for vocational students is greater than the mean (basic skills) **score** for academic students/There is no longer a difference in **scores**/Academic students have improved their mean (basic skills) **score**.	Must mention scores (o.e).	A1
			(2)
4(f)	The course was **effective** (o.e.)	Dep on a significant result in (b) and a non-significant result in (e)	B1
			(1)
			Total 16