

IAT-2 AM4.

Saurabh Pandey · SE Comps B
Roll No 80

Q1, $n_1 = 9$ and $n_2 = 7$

$$\bar{x}_1 = 196.42 \text{ and } \bar{x}_2 = 198.82$$

$$\sum (x_{1i} - \bar{x}_1)^2 = 26.940$$

$$\sum (x_{2i} - \bar{x}_2)^2 = 18.73$$

Step 1 Null Hypothesis (H_0): $\mu_1 = \mu_2$
Alternative Hypothesis (H_a): $\mu_1 \neq \mu_2$

Step 2: LOS = 5% [two tailed test]
Degree of freedom = $n_1 + n_2 - 2 = 9 + 7 - 2 = 14$
Critical Value (t_c) = 2.145.

Step 3 since sample are small.

$$s_p = \sqrt{\frac{\sum (x_{1i} - \bar{x}_1)^2 + \sum (x_{2i} - \bar{x}_2)^2}{n_1 + n_2 - 2}}$$

$$= \sqrt{\frac{(26.94) + (18.73)}{14}}$$

$$= 1.8061$$

$$SE = s_p \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}$$

$$= 1.8061 \sqrt{\frac{1}{9} + \frac{1}{7}}$$

$$= 0.9102$$

Step 4 Test statistic.

$$t_{cal} = \frac{\bar{x}_1 - \bar{x}_2}{s.e.}$$

$$= \frac{196.42 - 198.82}{0.9102}$$

$$= -2.6368$$

Step 5 Decision

since $|t_{cal}| > t_{c}$; H_0 is rejected.
Sample cannot be considered to have
been drawn from same population

Q.2

$$\max Z = 4x_1 + 10x_2$$

$$2x_1 + x_2 \leq 10$$

$$2x_1 + 5x_2 \leq 20$$

$$2x_1 + 3x_2 \leq 18$$

$$x_1, x_2 \geq 0$$

$$Z = 4x_1 - 10x_2 + 0s_1 + 0s_2 + 0s_3$$

$$2x_1 + x_2 + s_1 = 10$$

$$2x_1 + 5x_2 + s_2 = 20$$

$$2x_1 + 3x_2 + s_3 = 18$$

$$x_1, x_2, s_1, s_2, s_3 \geq 0$$

Iteration	B.V	coefficient of						RHS	Ratio
0	Z	x_1	x_2	s_1	s_2	s_3			
		-4	-10	0	0	0		0	
s_2 leave	s_1	2	1	1	0	0		10	10
s_2 enters	s_2	2	5	0	1	0		20	4 ←
	s_3	2	3	0	0	1		18	6
1	Z	0	0	0	2	0		40	
	s_1	8/5	0	1	-1/5	0		6	
	x_2	2/5	1	0	1/5	0		4	
	s_3	4/5	0	0	-3/5	1		6	
		$x_1 = 0$		$x_2 = 4$		$Z_{max} = 40$			