

HW7 KEY

1.

(a) $I=3, J=4, K=3$

ANOVA ⊗

Source	df	SS	MS	F
A	2	30763.0	15381.50	3.79
B	3	34185.6	11395.20	2.81
AB	6	43581.2	7263.53	1.79
Error	24	97436.8	4059.87	
Total	35	205966.6		

(b) $H_0: \gamma_{ij} = 0$ for all i, j vs. H_a : not H_0

F=1.79 ⊗

RR = $\{F \geq F_{.05,6,24} = 2.51\}$ ⊗

Retain H_0 . ⊗

Interactions are not significant.

(c) $H_0: \alpha_1 = \alpha_2 = \alpha_3 = 0$ vs. H_a : not H_0

F=3.79 ⊗

RR = $\{F \geq F_{.05,2,24} = 3.40\}$ ⊗

Reject H_0 . ⊗

Factor A is significant.

(e)

$Q_{.05,3,24} = 3.53$, $MSE=4059.87$, $JK=12$

$w_A = 3.53 * \sqrt{4059.87/12} = 64.93$

⊗ **T Method for A level:**

	3	1	2
	3960.02	4010.88	4029.10

Levels 1 and 3 are similar.

Levels 1 and 2 are similar.

Levels 2 and 3 are different.

2.

(a) **Significant Factors:**

☐ **Formulation with P-value=1.99e-10** ☐

☐ **Speed with P-value<.000179** ☐

$$\text{ii. } \bar{x}_{..} = 175.84, \bar{x}_{1.} = 187.03, \bar{x}_{.3} = 178.88, \bar{x}_{13.} = 191.03$$

Formula 11M

$$\hat{\mu} = 175.84$$

⊗

$$\hat{\alpha}_1 = 187.03 - 175.84 = 11.19$$

$$\hat{\beta}_3 = 178.88 - 175.84 = 3.04$$

$$\hat{\gamma}_{13} = 191.03 - 187.03 - 178.88 + 175.84 = 0.96$$

$$\hat{x}_{13} = 175.84 + 11.19 + 3.04 + 0.96 = 191.03$$