**Problem #1 (Problem 4.26)**

This is a Complete Randomized Block Design

Hypothesis Test:

vs. at least one .

, df =

, df =

, df =

, df =

,

, , -value

Because the -value , we reject . Thus, we conclude that there is a difference in the effect of the distance of the object from the eye on focus time.

**Problem #2 (Problem 4.28)**

This is a Latin Square Design.

Hypothesis Test:

vs. at least one

, df =

, df =

, df =

, df =

, df =

,

, , -value =

Because the -value , we reject . Thus, we conclude that there is a difference in the time of the four assembly components.

**Problem #3**

Determining whether BIBD may be possible given different parameters.

We are given and .

Part 1) :

, .

This cannot be a BIB design. The parameter must be a whole number because it represents the total number of blocks.

Part 2) :

, .

This cannot be a BIB design. (the number of times each treatment pair appears) must be a whole number.

Part 3) :

, .

This cannot be a BIB design. The parameter must be a whole number.

Part 4) :

, .

This cannot be a BIB design. The parameter must be a whole number.

Part 5) :

, .

This can possibly be a BIB design. However, it may be difficult to put six replicates and three treatment pair replicates into this design.

Part 6) :

, .

This cannot be a BIB design. The parameter must to be a whole number.

**Problem #4 (Problem 4.45)**

This is a Balanced Incomplete Block Design (BIBD).

Hypothesis Test:

vs at least one

Part 1)

.

Part 2)

, df =

, df =

, df =

Where,

, df =

, .

, , -value =

Because the -value , we reject . Thus, we conclude that there is a difference in the mileage performance of gasoline additives.