Objective Assignment 7

The due date for submitting this assignment has passed. Due on 2021-04-07, 23:59 IST.

As per our records you have not submitted this assignment.

1) In a factorial experiment
   - Testing one factor at a time
   - Cannot estimate interactions
   - All possible combination of factor levels are tested
   - A subset of possible combination of factor levels are tested

   No, the answer is incorrect.
   Score: 0
   Accepted Answers:
   All possible combination of factor levels are tested

2) A measuring system is generally unacceptable if
   - % linearity or % Bias > 30%
   - % linearity or % Bias <= 30%
   - Slope of Bias is insignificant
   - None of the above

   No, the answer is incorrect.
   Score: 0
   Accepted Answers:
   % linearity or % Bias > 30%

3) Considered a two factors A and B factorial experimentation. Each factor is of two levels. In case, there is 'no interaction' between these two factors, the difference in the response values at two levels (e.g. High and Low) of factor A would be _________ (of/with/to) the difference between the response values for two levels (e.g. High and Low) of factor B.

   1 point
What term refers to a situation where two Factors in a factorial experiment have an **1 point** effect when they are in combination?

- Contrast
- Confounding
- Interaction
- Dependency

No, the answer is incorrect.
Score: 0
Accepted Answers: 
*Interaction*

A measuring system is acceptable (considering only location and number of distinct category) when **1 point**

- Bias < 10 % and number of distinct category ≤ 3
- Bias > 30% and number of distinct category ≥ 5
- Bias < 10% and number of distinct category ≥ 5
- Bias < 10% and number of distinct category ≥ 2

No, the answer is incorrect.
Score: 0
Accepted Answers: 
*Bias < 10% and number of distinct category ≥ 5*

What information one can extract from a asymmetric factorial design with notation 2**1 point** x 3 x 2?

- Minimum Interactions effects will be 12.
- The design has two factors, one at two levels, and another one at three levels.
- The design has three factors, two at two levels, and another one at three levels.
- The design has two independent factor, three noise factor, and two covariates.

No, the answer is incorrect.
Score: 0
Accepted Answers: 
The design has three factors, two at two levels, and another one at three levels.

7. Which of the following statements are not correct? **1 point**

(I) When interactions are significant in a factorial experimentation, main effects plot of factors may not reveal optimal factor level combination for the process.

(II) Lesser replicates are recommended to precisely estimate factor effects & interaction.

(III) In factorial design-based experiment, the selected response variable need to be continuous.

(IV) The appropriate statistical test for factorial experiment data analysis is t-test.

- (II),(IV)
8) In factorial experiment, $2^k$ design means,  

- 2 factors, each at k level  
- k factors, each at 2 level  
- 3 factor, and k levels  
- k factors, each at 3 levels  

No, the answer is incorrect.  
Score: 0  
Accepted Answers:  
(k factors, each at 2 level)

9) The ‘null’ hypothesis in a randomized factorial design is  

- All treatment means are equal.  
- Not all treatment means are equal.  
- Addition of all treatment means will be equal to 1.  
- Subtraction of all treatment means will be equal to 1.

No, the answer is incorrect.  
Score: 0  
Accepted Answers:  
All treatment means are equal.

10) A partial experimental design matrix is shown below with all possible factors and levels.  

<table>
<thead>
<tr>
<th>Run Order</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
<td>-1</td>
<td>-1</td>
</tr>
<tr>
<td>2</td>
<td>-1</td>
<td>-1</td>
<td>-1</td>
<td>-1</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>-1</td>
<td>1</td>
<td>-1</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>-1</td>
<td>1</td>
<td>1</td>
<td>-1</td>
</tr>
<tr>
<td>6</td>
<td>-1</td>
<td>-1</td>
<td>1</td>
<td>1</td>
</tr>
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<td>7</td>
<td>1</td>
<td>-1</td>
<td>-1</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>-1</td>
<td>1</td>
<td>-1</td>
<td>1</td>
</tr>
</tbody>
</table>

How many minimum experiments will be required for full factorial experimentation, considering the given factors and levels?  

- 8  
- 16  
- 32  
- 64
11) A process engineer at POC Electronics is trying to determine relationships between two chemicals and a certain material used in the cleaning of a manufactured resistor. Specifically, the resistor can be cleaned using two levels of Chemical A, two levels of Chemical B, and either Type A or B of a cleaning material. Below are the outcomes of the experiment run by the process engineer. Determine specific main effect and interaction for this experiment.

<table>
<thead>
<tr>
<th>Chemical A</th>
<th>Material</th>
<th>Chemical B</th>
<th>Output Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Type B</td>
<td>Low</td>
<td>6.0</td>
</tr>
<tr>
<td>High</td>
<td>Type B</td>
<td>High</td>
<td>4.0</td>
</tr>
<tr>
<td>High</td>
<td>Type A</td>
<td>Low</td>
<td>5.3</td>
</tr>
<tr>
<td>High</td>
<td>Type A</td>
<td>High</td>
<td>3.3</td>
</tr>
<tr>
<td>Low</td>
<td>Type B</td>
<td>Low</td>
<td>2.7</td>
</tr>
<tr>
<td>Low</td>
<td>Type B</td>
<td>High</td>
<td>3.7</td>
</tr>
<tr>
<td>Low</td>
<td>Type A</td>
<td>Low</td>
<td>2.3</td>
</tr>
<tr>
<td>Low</td>
<td>Type A</td>
<td>High</td>
<td>4.7</td>
</tr>
</tbody>
</table>

The main effects of Chemical A, and the interaction effects of (Chemical A * Chemical B) are

- 1.3 & -1.85
- -1.3 & 1.85
- 0.15 & 1.85
- -0.15 & -1.85

No, the answer is incorrect.
Score: 0
Accepted Answers:
1.3 & -1.85