Using information in the following attached file to answer all questions in Part 1. What is the estimate for the main effect *τ*2 of speed ?

|  |  |  |
| --- | --- | --- |
| |  |  | | --- | --- | | [MAT458Exam2Par1-2020S.pdf](https://reggienet.illinoisstate.edu/access/content/attachment/9594d4ba-f299-490e-ae34-df3db93c5257/Tests%20_%20Quizzes/72fc1a20-96d3-4431-9af0-9a582be082c3/MAT458Exam2Par1-2020S.pdf) | 64 KB | |

* A. 0.129
* B. 0.096
* C. 0.078
* D. 0.068

Question 2 of 15 4.0 Points

What is the estimate for the main effect *β*3 of rate ?

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|  |

* A. 0.0025
* B. -0.0035
* C. 0.0035
* D. -0.0025

Question 3 of 15 4.0 Points

What is the estimate for the interaction (*τβ*)22 ?

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|  |

* A. -0.067
* B. 0.073
* C. 0.095
* D. 0.081

Question 4 of 15 4.0 Points

What is the test Statistic *F* value for testing if interaction is significant ?

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|  |

* A. 4.85
* B. 5.37
* C. 6.89
* D. 3.51
* Question 5 of 15 4.0 Points
* The interaction is significant at level *α* =0.05. F-table is attached here.

|  |  |  |
| --- | --- | --- |
| |  |  | | --- | --- | | [F-table.pdf](https://reggienet.illinoisstate.edu/access/content/attachment/9594d4ba-f299-490e-ae34-df3db93c5257/Tests%20_%20Quizzes/de4f1345-aa85-4a1c-a78d-63a371ec9b0f/F-table.pdf) | 100 KB | |

|  |  |  |
| --- | --- | --- |
| |  | | --- | | True | | False | |

**Part 2 of 3 - BIBD / 20.0 Points**

**Please use information in the following attached file to answer all questions in Part 2.**

Attachments

|  |  |  |
| --- | --- | --- |
| |  |  | | --- | --- | | [MAT458Exam2Part2.pdf](https://reggienet.illinoisstate.edu/access/content/attachment/9594d4ba-f299-490e-ae34-df3db93c5257/Tests%20_%20Quizzes/283eeee1-1770-43ca-b981-076fef30e79c/MAT458Exam2Part2.pdf) | 43 KB | |
| Question 6 of 15 4.0 Points  What is the number of degrees of freedom of *SSE* in this BIBD?   |  | | --- | |  |  * A. 1 * B. 4 * C. 3 * D. 2 | |

Question 7 of 15 4.0 Points

what is the value of *λ* in this BIBD?

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|  |

* A. 4
* B. 1
* C. 2
* D. 6

Question 8 of 15 4.0 Points

What is the block sum of squares *SSBl* ?

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| --- |
|  |

* A. 18.94
* B. 16.33
* C. 17.53
* D. 15.67

Question 9 of 15 4.0 Points

what is *Q*1 (the adjusted total for the first treatment) ?

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| --- |
|  |

* A. -0.5
* B. 0.5
* C. -1
* D. 1

Question 10 of 15 4.0 Points

What is the adjusted treatment sum of squares *SSTr*(*ad*)?

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| --- |
|  |

* A. 10.33
* B. 14.52
* C. 12.23
* D. 11.43

**Part 3 of 3 - Block Design / 20.0 Points**

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| --- | --- | --- | --- |
| Question 11 of 15 4.0 Points  Consider  the following attached information for one Latin Square design.  What is the estimate for  *τ*1 ?   |  |  |  | | --- | --- | --- | | |  |  | | --- | --- | | [LatinSq.pdf](https://reggienet.illinoisstate.edu/access/content/attachment/9594d4ba-f299-490e-ae34-df3db93c5257/Tests%20_%20Quizzes/b521cf27-4482-4714-907c-48d650150b58/LatinSq.pdf) | 71 KB | |  * A. 2.25 * B. -2.75 * C. -1.75 * D. 3.25   Rationale: |
| Question 12 of 15 4.0 Points  For the Latin square design in the above question , what is the value of the residual *e*243?   |  | | --- | |  |  * A. 0.25 * B. -0.25 * C. -0.75 * D. 0.75   Rationale: |
| Question 13 of 15 4.0 Points  For the Latin square design ( without replication), assume *p*=3. What is the degrees of freedom for *SSE* ?   |  | | --- | |  |  * A. 3 * B. 1 * C. 4 * D. 2   Rationale: |
| Question 14 of 15 4.0 Points  A consumer products company relies on direct mail marketing pieces as a major component of its advertising campaigns. The company has three different designs for a new brochure and want to evaluate their effectiveness, as there are substantial differences in costs between the three designs. The company decides to test the three designs by mailing 5,000 samples of each to potential customers in four different regions of the country. Since there are known regional differences in the customer base, regions are considered as blocks. The number of responses to each mailing is in the attachment. For the above experiment, what is degrees of freedom of *SSE* ?   |  |  |  | | --- | --- | --- | | |  |  | | --- | --- | | [Part3.4.pdf](https://reggienet.illinoisstate.edu/access/content/attachment/9594d4ba-f299-490e-ae34-df3db93c5257/Tests%20_%20Quizzes/389d60e3-796d-4b95-a08b-d28790d0ade9/Part3.4.pdf) | 26 KB | |  * A. 6 * B. 12 * C. 8 * D. 4   Rationale: |
| Question 15 of 15 4.0 Points  Using the information in the above Question 14, we can obtain that *SSblock*=49035.667,*SSA*=90755.167 and *SST*=145219.667. What is the value of the *F* test for testing if there is a difference between the mean number of responses for the three designs.   |  | | --- | |  |  * A. 50.15 * B. 40.35 * C. 60.25 * D. 80.55   Rationale: |