

# Unit 9 - Week 7

**Course outline**

How does an NPTEL online course work?

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## Assignment 7

The due date for submitting this assignment has passed. **Due on 2020-03-18, 23:59 IST.**  
 As per our records you have not submitted this assignment.

- 1) ANOVA is advantageous over multiple t-tests because 1 point
- a. ANOVA decreases the likelihood of Type I error
  - b. ANOVA decreases the likelihood of Type II error
  - c. ANOVA decreases the complexity of analysis
  - d. None of these
- a.  
 b.  
 c.  
 d.
- No, the answer is incorrect.  
 Score: 0  
 Accepted Answers:  
 a.
- 2) While investigating the process of filling the cold drink bottles, the management took the sample of 10 bottles (200ml) from the same shift and identified the volume of the cold drink to be, 198ml, 200ml, 202ml, 203ml, 199ml, 197ml, 204ml, 205ml, 196ml, and 208ml respectively. The variance observed in the volumes is the example of 1 point
- a. Cyclical variation
  - b. Temporal variation
  - c. Both of these
  - d. None of these
- a.  
 b.  
 c.  
 d.
- No, the answer is incorrect.  
 Score: 0  
 Accepted Answers:  
 a.
- 3) Which of the following is not the source of time to time variation? 1 point
- a. Machine fixturing
  - b. Tool wear
  - c. Calibration drift
  - d. Operator influence
- a.  
 b.  
 c.  
 d.
- No, the answer is incorrect.  
 Score: 0  
 Accepted Answers:  
 a.
- 4) In an Engineering College, the department of Mechanical Engineering has three different sections (Section A, Section B, Section C) and three different faculties (Prof X, Prof Y, and Prof Z) for Physics. For last five years, Prof X, Prof Y and Prof Z teach in Section A, Section B, and Section C respectively. The management want to see if there is a difference in the performance of the faculties. They have the data of average marks obtained by the students in all the sections for last five years. 1 point
- | Section A | Section B | Section C |
|-----------|-----------|-----------|
| 81        | 80        | 81        |
| 76        | 73        | 82        |
| 74        | 79        | 75        |
| 77        | 76        | 78        |
| 72        | 77        | 74        |
- Calculate the Mean Squares among the groups.
- a. 5
  - b. 10
  - c. 20
  - d. 2.5
- a.  
 b.  
 c.  
 d.
- No, the answer is incorrect.  
 Score: 0  
 Accepted Answers:  
 a.
- 5) Using the data of question 4, calculate the Mean Squares within the groups. Choose the closest option. 1 point
- a. 126
  - b. 10.5
  - c. 8.4
  - d. 9
- a.  
 b.  
 c.  
 d.
- No, the answer is incorrect.  
 Score: 0  
 Accepted Answers:  
 b.
- 6) Using the data of question 4, and 5, compute the F<sub>STAT</sub> value. Choose the closest value 1 point
- a. 0.081
  - b. 0.476
  - c. 0.952
  - d. 2.1
- a.  
 b.  
 c.  
 d.
- No, the answer is incorrect.  
 Score: 0  
 Accepted Answers:  
 b.
- 7) If critical value of F<sub>STAT</sub> is 4.10 for the last question. The conclusion drawn here is 1 point
- a. Reject the null hypothesis (H<sub>0</sub>)
  - b. Failed to reject the null hypothesis (H<sub>0</sub>)
- a.  
 b.
- No, the answer is incorrect.  
 Score: 0  
 Accepted Answers:  
 b.
- 8) When the sample size for two samples is same, the formula used in for Tukey-Kramer test is 1 point
- a.  $Critical\ Range = Q_\alpha \sqrt{\frac{MSW}{n}}$
  - b.  $Critical\ Range = Q_\alpha \sqrt{\frac{MSW}{n-1}}$
  - c.  $Critical\ Range = Q_\alpha \sqrt{\frac{MSW}{n-c}}$
  - d. None of these
- HINT:**  
 Where,  
 Q<sub>α</sub> = Uper tail critical value  
 MSW = Mean Square Within  
 n = Sample Size
- a.  
 b.  
 c.  
 d.
- No, the answer is incorrect.  
 Score: 0  
 Accepted Answers:  
 a.
- 9) Using the data in question 4 and 5, compute the critical range. Select the closest option. 1 point
- Hint Q<sub>α</sub> = 3.77
- a. 2.81
  - b. 5.46
  - c. 3.86
  - d. 3.00
- a.  
 b.  
 c.  
 d.
- No, the answer is incorrect.  
 Score: 0  
 Accepted Answers:  
 b.
- 10) Based on the data in Question 4 and the critical range computed in in Question 9, We may draw the conclusion 1 point
- a. All the absolute mean differences are lower than critical range. Therefore, there is a significant difference between each pair of means
  - b. All the absolute mean differences are greater than critical range. Therefore, there is a significant difference between each pair of means
  - c. All the absolute mean differences are greater than critical range. Therefore, there is no significant difference between each pair of means
  - d. All the absolute mean differences are lower than critical range. Therefore, there is no significant difference between each pair of means
- a.  
 b.  
 c.  
 d.
- No, the answer is incorrect.  
 Score: 0  
 Accepted Answers:  
 d.
- 11) For the manufacturing company, the Two-way ANOVA table has obtained the following values 1 point
- | Source of variation         | Sum of squares (SS) | Degree of freedom (DF) | Mean square (MS) | F |
|-----------------------------|---------------------|------------------------|------------------|---|
| Row (race)                  | 2328.2              | 2                      |                  |   |
| Column (gender)             | 907.5               | 1                      |                  |   |
| Interaction (race × gender) | 452.6               | 2                      |                  |   |
| Error                       | 1589.2              | 24                     |                  |   |
| Total                       | 5277.5              | 29                     |                  |   |
- Values of MS<sub>race</sub> and F<sub>race</sub> are \_\_\_\_\_
- a. MS<sub>race</sub> = 835.30 and F<sub>race</sub> = 19.69
  - b. MS<sub>race</sub> = 907.50 and F<sub>race</sub> = 13.71
  - c. MS<sub>race</sub> = 1164.10 and F<sub>race</sub> = 17.58
  - d. MS<sub>race</sub> = 226.30 and F<sub>race</sub> = 3.42
- a.  
 b.  
 c.  
 d.
- No, the answer is incorrect.  
 Score: 0  
 Accepted Answers:  
 c.
- 12) In a two-way ANOVA, how many degrees of freedom exist for the interaction term? 1 point
- a. (r - 1) (c - 1)
  - b. rc - 1
  - c. rc(n - 1)
  - d. rcn - 1
- a.  
 b.  
 c.  
 d.
- No, the answer is incorrect.  
 Score: 0  
 Accepted Answers:  
 a.
- 13) Match the following 1 point
- | Type of Variation     | Definition  |
|-----------------------|---|
| A. Cyclical variation | 1. Defined by the magnitude of variation that occurs between consecutive units drawn from the process.                            |
| B. Cyclical Variation | 2. Characterized by large variation in readings taken of the same single sample, often from different positions within the sample |
| C. Temporal Variation | 3. Variation is present upon measurements collected with a significant amount of time between samples.                            |
- a. A-3, B-1, C-3
  - b. A-2, B-1, C-3
  - c. A-3, B-1, C-2
  - d. A-2, B-3, C-1
- a.  
 b.  
 c.  
 d.
- No, the answer is incorrect.  
 Score: 0  
 Accepted Answers:  
 b.
- 14) In a case study, the calculated risk priority number for a factor is 210. If the severity rating (s) is 10 and the occurrence rating is 3. The detection capability is 1 point
- a. 6300
  - b. 630
  - c. 63
  - d. 7
- a.  
 b.  
 c.  
 d.
- No, the answer is incorrect.  
 Score: 0  
 Accepted Answers:  
 d.
- 15) Analysis of Variance (ANOVA) is a hypothesis-testing technique used to 1 point
- a. Test the equality of the mean of two or more populations (or treatment)
  - b. Test the equality of the variance of two or more populations (or treatment)
- a.  
 b.
- No, the answer is incorrect.  
 Score: 0  
 Accepted Answers:  
 a.