Self Test 1

Question 1: Consider the following statements about Anova:

s1: conducting a post-hoc test is always useful also when the test statistic is not significant (the null hypothesis is accepted)
s2: equality of variances between groups is a condition for the test

What do you know?

a. s1 is true and s2 is true
b. s1 is true and s2 is false
c. s1 is false and s2 is true
d. s1 is false and s2 is false

Question 2: In one of the cells of a cross-table we find a frequency of o = 24. For this cell the row total is 122 and the column total is 58. The overall total across all cells in the cross table is 272. What can you tell about the expected frequency in this cell in a Chi-square test?

a. It is equal to the observed value
b. It is bigger than the observed value
c. It is smaller than the observed value
d. Cannot tell, because the number of degrees of freedom is not known

Question 3: For testing whether a relation exists between two variables, in what case can we use the Chi-square test?

a. Both variables are nominal or ordinal variables
b. One variable is nominal or ordinal and the other is interval or rational
c. Both variables are interval or rational
d. No restrictions as long as both variables are of the same measurement level

Question 4: In a sample of $n = 150$ we find a standard deviation of s = 5.6. What can we say about the standard deviation of *sample* averages in that case?

a. We expect that it is equal to 5.6
b. We expect that it is larger than 5.6
c. We expect that it is smaller than 5.6
d. We expect that it is somewhere in a 95% confidence interval around 5.6

Question 5: A general idea is that women on average spent more time on household activities than men do. A researcher wants to test this. Which test is appropriate for this test?

a. One sample t-test
b. Independent samples t-test
c. Paired samples t-test
d. Anova

Question 6: In a cross-table the number of rows is 4 and the number of columns is 6. What is the number of degrees of freedom in a Chi-square test?

a. df = 8
b. df = 10
c. df = 15
d. df = 24

Question 7: What do you know about the p-value in a t-test?

a. is the same in a one-sided and a two-sided test
b. is twice as big in a one-sided test compared to a two-sided test
c. is twice as small in a one-sided test compared to a two-sided test
d. depends on which side of the distribution it is tested

Question 8: For a sample of drivers the driving speed is measured twice: before a navigation system is installed in the car and later after a navigation system has been installed. The null hypothesis is that there is no influence of the navigation system on driving speed; the alternative hypothesis is that drivers with a navigation system drive faster.

Which test should be used?

a. One-sample t-test
b. Independent samples t-test
c. Paired samples t-test
d. Anova

Question 9: Someone states that the average age of a university student is 21.3 years. To us this seems rather old – the expectation is that the actual average is lower.

What type of test do we use?

a. Independent two-sample t-test
b. Paired samples t-test
c. One-sample t-test
d. A t-test is not suitable for this test

Question 10: To test whether there is a relation between education level and income level, a researcher finds for a sample a Chi-square value of $X2 = 16.343$. The number of degrees of freedom for the Chi-square test equals $df = 15$. The corresponding p-value is $p = 0.360$. What do you conclude?

a. Education level and income level are dependent
b. Education level and income level are independent
c. Higher education leads to higher income
d. None of the above conclusions can be drawn

Question 11: Which test should be used to test for equal variances of groups in an independent samples t-test?

a. Anova
b. Post-hoc test
c. Chi-square test
d. Levene's test

Question 12: Why should we use the t-distribution instead of the normal distribution for testing hypotheses about the mean based on a sample?

a. The student-t distribution has more degrees of freedom
b. Sampling distributions always follow a student-t distribution
c. The conditions for the normal distribution are not met
d. The population variance is unknown

Question 13: For a sample that we have the Levene's test shows that the variances of two groups are not equal. What does that mean for an independent-samples t-test?

a. Cannot be used because a condition for the test is not met
b. The t-value should be calculated for the unequal variances case
c. A paired-samples t-test should be used
d. There is less confidence in the test

Question 14: To test whether a new office lay-out has an influence on the job satisfaction of office workers, a researcher has measured the job satisfaction of a sample of workers in the new office. For each worker she found another worker that has the same age, gender and function but works in a conventional office and has measured the job satisfaction of these workers as well. She could use an independent samples t-test or a paired-samples t-test. What would you recommend her to use?

a. Paired-samples t-test because that test has more power for this data
b. Independent-samples t-test because that test has more power for this data
c. Both tests can be used – there is no preference
d. None of the tests can be used because for both tests the conditions are not met