SECOND NAME (CAPITALS), First Name:

Faculty: Year of Study: Group:

1) Information science is an interdisciplinary science primarily concerned with the _____, collection, _____, manipulation, _____, retrieval and _____ of information.
a) Analysis
b) Classification
c) Dissemination
d) Updating
e) Storage

2) * Statistics is a mathematical science pertaining to the collection, analysis, interpretation or explanation, and _____ of data.
a) Optimization
b) Preparation
c) Presentation
d) Dissemination
e) Storage

3) * The following statements are true, EXCEPT:
a) Digital image is a representation of a two-dimensional image using ones and zeros
b) Pixel is the smallest item of information in an image
c) Pixel is the largest item of information in an image
d) The pixels in an image are normally arranged in a 2-dimensional grid
e) Pixels are often represented using dots or squares

4) The following statements are true, EXCEPT:
a) Accuracy refers to how well the data-gathering intent is satisfied
b) Precision refers to consistency of measurement
c) Effectiveness is a measure of the benefit resulting from an intervention for a given health problem under usual conditions of clinical care for a particular group
d) Variable refers to the value that is taken by a variable for a given patient
e) Data refers to an entity that can take different values

5) * A _____ is a subset of a _____.
a) Sample, population
b) Population, sample
c) Statistic, parameter
d) Parameter, statistic
e) Statistic, data

6) * It is seeks to estimate the prevalence of smoking among students from "Iuliu Haţieganu" University of Medicine and Pharmacy Cluj-Napoca. A random sample of students was selected and each student was asking to complete an anonymous questionnaire. Students selected for this study are:
a) Target population
b) Available population
c) Statistic
d) Parameter
e) Sample

7) * It is seeks to estimate the prevalence of smoking among students from "Iuliu Haţieganu" University of Medicine and Pharmacy Cluj-Napoca. A random sample of students was selected and each student was asking to complete an anonymous questionnaire. If the obtained results are generalized it is say that we done an inference at the level of:
a) Data
b) Variables
c) Statistics
d) Population
e) Sample

8) The following statements about median are TRUE:
a) It is a useful parameter for nominal data
b) It is not affected by extreme values
c) It is not useful for quantitative discrete data
d) It is affected by the skewed distribution of data
e) Has a poor sample stability

9) The following statements about arithmetic mean are FALSE:
a) Is the parameter most preferred as a measure of centrality
b) To had significance the variables of interest must be on ratio scale
c) To had significance the variables of interest must be interval scale
d) The changing of a single data in the series will not affect its value
e) It is computed as sum of all data in the series divided to the sample size

10) * The standard deviation is:
a) The square root of the variance
b) A measure of variability
c) An approximate indicator of how numbers vary from the mean
d) The square root of the variance, a measure of variability and an approximate indicator of how numbers vary from the mean
e) None is correct

11) The following are compatible events (can be achieved simultaneously):
a) A = {Systolic blood pressure < 140 mmHg}, B = {Diastolic blood pressure < 90 mmHg}
b) A = {Systolic blood pressure < 140 mmHg}, B = {140 ≤ Systolic blood pressure < 200 mmHg}
c) A = {Diastolic blood pressure < 95 mmHg}, B = {95 ≤ Diastolic blood pressure < 120 mmHg}
d) A = {Systolic blood pressure < 130 mmHg}, B = {95 ≤ Diastolic blood pressure < 120 mmHg}
e) A = {Systolic blood pressure < 160 mmHg}, B = {135 ≤ Systolic blood pressure < 180 mmHg}

12) The events A and B are mutually exclusive (they cannot occur at the same time), so:
a) Pr(A or B) = Pr(A) + Pr(B)
b) Pr(A and B) = 0
c) Pr(A or B) = Pr(A) * Pr(B)
d) Pr(A) = Pr(B)
e) Pr(A)+Pr(B) =1

13) * The X random variable represents the number of episodes of influenza in the first year of community (nursery or kindergarten). The distribution of probability is: the likelihood of one episode of influenza is 0.11, the likelihood of three episodes of flu is equal to 0.07, the likelihood of 4 episodes of flu is equal to 0.13, the probability of occurrence of 7 episodes of flu is equal to 0.28, the likelihood of 9 episodes of flu is equal to 0.18, the likelihood of 10 episodes of flu is equal to 0.05, the likelihood of 14 episodes flu is equal to 0.12, and the likelihood of 18 episodes of flu is equal to 0.06. The variance of this random variable is equal to:
a) 10
b) 15
c) 20
d) 25
e) 30

14) * The X random variable represents the number of episodes of influenza in the first year of community (nursery or kindergarten). The distribution of probability is: the likelihood of one episode of influenza is 0.11, the likelihood of three episodes of flu is equal to 0.07, the likelihood of 4 episodes of flu is equal to 0.13, the probability of occurrence of 7 episodes of flu is equal to 0.28, the likelihood of 9 episodes of flu is equal to 0.18, the likelihood of 10 episodes of flu is equal to 0.05, the likelihood of 14 episodes flu is equal to 0.12, and the likelihood of 18 episodes of flu is equal to 0.06. The expected number of flue episodes in the first year of community is equal to:
a) 7
b) 8
c) 6
d) 9
e) None is correct

15) Let be a statistical series with the following data: 40, 60, 20, 20, 60, 80, 80, 40, 60, and 80. The relative frequency of 0.3 corresponds to:
a) 20
b) 40
c) 60
d) 80
e) None is correct

16) * The statistical series of incubation (expressed in days) for a infecto-contagious disease contains the following data: 7; 3; 4; 7; 6; 6; 4; 5; 3; 7; 5; 4; 7; 6; 2; 3; 5; and 6. The relative frequency of 0.06 corresponds to:
a) 2 days
b) 3 days
c) 4 days
d) 6 days
e) 7 days

17) * Let be a statistical series with the following data: 40, 60, 20, 20, 60, 80, 80, 40, 60, and 80. The ascending cumulative relative frequency of 0.4 corresponds to:
a) 20
b) 40
c) 60
d) 80
e) None is correct

18) * The statistical series of incubation (expressed in days) for a infecto-contagious disease contains the following data: 7; 3; 4; 7; 6; 6; 4; 5; 3; 7; 5; 4; 7; 6; 2; 3; 5; and 6. The ascending cumulative absolute frequency of 7 corresponds to:
a) 2 days
b) 3 days
c) 4 days
d) 6 days
e) 7 days

19) * The mean plasma potassium level for 25 adult men with primary hyperaldosteroism was found to be 3.35 mEq/L, with a standard deviation of 0.50 mEq/L. Based on this sample, the 95% confidence interval estimated of the mean plasma potassium level for the population of men with primary hyperaldosteroism is:
a) 3.250 - 3.450 mEq/L
b) 3.154-3.546 mEq/L
c) 2.318-4.382 mEq/L
d) 3.144-3.556 mEq/L
e) 3.179-3.521 mEq/L

20) * As sample size goes up, to 95% confidence

interval become _____

a) More precise
b) More narrow
c) Wider
d) Less precise
e) More precise and more narrow

21) * A child psychiatrist conducts a study to compare anxiety levels in hospitalized children whose parents participate in their routine care (e.g. bathing and feeding) and those whose parents are prohibited by hospital regulations from participating in such care. Anxiety levels were determined for five children in each of the two comparison groups, using a standardized psychiatrist rating scale. At a research conference, the psychiatrist reports that "the difference in average anxiety scores for the two groups was not statistically significant at the 5% level of significance". All of the following factors influence the probability that a statistical test will detect a difference of a specified magnitude (effect size) given that the difference actually, EXCEPT:
a) The false positive rate selected by the investigator
b) The level of significance
c) The sample size
d) The degree of subject-to-subject variation in the response variable
e) The magnitude of the population parameters being compared

22) * A pharmaceutical company wishes to evaluate the effectiveness of a novel antihypertensive agent. The project leader responsible for the drug decides that it will be submitted for regulatory approval only if it can be shown to lower average systolic blood pressure by at least 10 mmHg compared to a standard drug. She determines that by administering the new drug and the standard drug to two groups of 100 subjects and choosing a level of significance of 0.01. At a management conference to decide the fate of the new drug, the project leader reports that "the new drug significantly lowers systolic blood pressure compared to the standard drug (p < 0.01)". This p-value indicates which of the following?
a) The mean systolic blood pressure of individuals receiving the new drug differs from that of individuals receiving the standard drug by at least 10 mmHg
b) The observed difference in sample means is likely to be due to random chance (sampling error)
c) H0 should be rejected
d) The probability of obtaining the observed difference in the sample means (or a more extreme difference) by random chance from two populations whose means are equal is less than 1%
e) The probability of obtaining the observed difference in the sample means (or a more extreme difference) by random chance from two populations whose means are equal is less than 5%

23) * A researcher wishing to demonstrate the efficacy of a new treatment for hypertension. He compares the effect of the new treatment versus a placebo. This study provides a test of the null hypothesis that the new treatment has no effect on hypertension. In this case, the null hypothesis should be considered as:
a) Positive proof that the stated premise is correct
b) The assertion of a statistical significant relationship
c) The assumption that the study design is adequate
d) The probability that the relationship being studied is the result of random factors
e) The result the experimenter hopes to achieve

24) A child psychiatrist conducts a study to compare anxiety levels in hospitalized children whose parents participate in their routine care (e.g. bathing and feeding) and those whose parents are prohibited by hospital regulations from participating in such care. Anxiety levels were determined for five children in each of the two comparison groups, using a standardized psychiatrist rating scale. At a research conference, the psychiatrist reports that "the difference in average anxiety scores for the two groups was not statistically significant at the 5% level of significance". Which of the following factors may explain the failure of a statistical test to detect a significant difference of a specified magnitude (effect size) between two comparison groups?
a) Low power of the statistical test
b) Small sample size
c) Such a difference actually does not exists
d) High false negative rate for the statistical test
e) Little subject-to-subject variation in the response variable

25) * A pharmaceutical company has developed a new test for identifying pregnancy. The company tested the new product on 150 pregnant women; in 130 of these cases the tests were positive. The same test was applied on 150 women who were not pregnant; 145 of them had negative test. The accuracy of the test is equal to:
a) 0.97
b) 0.87
c) 0.92
d) 0.91
e) None is correct

26) * The following statements regarding the good figure practices are correct, EXCEPT:
a) Titles and detailed explanations belong in the legends-not on the illustrations themselves Explain all non-standard abbreviations in footnotes
b) Specify units of measurements for presented variables
c) Figures should be made as self-explanatory as possible
d) Number tables consecutively in the order of their first citation in the text and supply a brief title for each
e) Explain clearly in the legend each symbols, arrows, numbers, or letters used in a figure

27) * Relative risk measures which of the following?
a) The probability that a person who is exposed to a certain risk factor will develop the disease in question
b) How much more likely it is that a patient who has the disease has been exposed to particular risk factor compared to a healthy individual
c) The incidence of disease
d) The magnitude of the association between a disease (or other health-related outcome) and a suspected risk factor
e) The probability that a healthy individual will develop the disease during a specified period of time

28) * For a sample size of 940, the _____ normality test will be applied if a less conservative test is preferred.
a) T test
b) Z test
c) Chi-square goodness-of-fit
d) Kolmogorov-Smirnov
e) Shapiro-Wilks

29) * The following are true in interpretation of normality tests, EXCEPT:
a) If the p-value is less than the chosen alpha level, then the null hypothesis is rejected
b) If the p-value is less than the chosen alpha level, then could concludes the data are not from a normally distributed population
c) If the p-value is greater than the chosen alpha level, then null hypothesis could not be rejected
d) If the p-value is greater than the chosen alpha level, then could concludes the data are from a normally distributed population
e) If the p-value is greater than the chosen alpha level, then could not concludes the data are from a normally distributed population

30) The comparison of arithmetic means of two samples could be made using the following characteristics:
a) Mode
b) Median
c) Mean
d) Variance
e) None is correct

31) * Twenty rats are coated with margarine and 20 with butter as part of a study to explore the carcinogenic effect of oleo. Which statistical test will most likely be used to analyze this?
a) T-test for independent sample
b) Chi-square test
c) ANOVA
d) Pearson correlation
e) Matched pairs t-test

32) * A report of a clinical trial of a new drug for herpes simplex II versus a placebo noted the new drug gave a higher proportion of success than the placebo. The report ended the statement: $chi^2 = 4.72$, $p<0.05$. Using this information, we may conclude that:
a) Fewer than one in 20 fail to benefit from the drug
b) The chance that an individual patient will fail to benefit is less than 0.05
c) If the drug were effective, the probability of the reported finding is less than one
d) If the drug were ineffective, the probability of the reported finding is less than 0.05
e) The null hypothesis is false

33) The following statements about Z test for comparing means are true:
a) It is used in analysis of qualitative data
b) It is used in analysis of quantitative data
c) It is used if the sample size is small (less than or equal to 30)
d) It is used if the sample size is big enough (highest than 30)
e) It is correctly used if the data are normally distributed

34) The following are conditions of application of Z test for comparison of a sample mean with a population mean:
a) The population variation is known and it is equal with the sample variation
b) The population variation is unknown and it is equal with the sample variation
c) The test is correctly applied if the population is normal distributed
d) Sample size less than or equal to 30
e) Sample size higher than or equal to 30

35) * A researcher believes that boys with same-sex siblings are more likely to have higher testosterone level. Which statistical test will most likely be used to analyze this?
a) T-test
b) Chi-square test
c) ANOVA
d) Pearson correlation
e) Matched pairs t-test