Port- Said University Date; 14/8/2022

Faculty of nursing Time allowed: three hours

**Biostatistics final exam 2022 (90 Marks)**

**Question 1: Give short account on: (20 marks)**

1. **Importance of sample size calculation**
2. **Factors determining the sample size**
3. **Characteristics of normal distribution**
4. **Mention three of Good Table Characteristics**

**Question 2: ( 6 marks)**

**A study was conducted for the comparison of mean systolic blood pressures in two independent samples of pregnant and non-pregnant women.**

**State the research question, null H0 and alternative HA hypotheses.**

**Question 3 : Match (10 marks)**

|  |  |
| --- | --- |
| **Group A** | **Group B** |
| 1. Sex, smoking and disease status 2. Nationality 3. Celsius temperature scale 4. number of accidents in a city 5. Social class 6. Number of children in the family 7. occupation 8. Serum cholesterol 9. Weight 10. Eye color | 1. Discrete variable 2. Ordinal variable 3. Binary variable 4. Continuous variable 5. Nominal variable |

**Question 4 ( 7 marks)**

**From the following parity data (the number of deliveries) of 19 females:**

0, 3, 0, 7, 2, 1, 0, 1, 5, 2, 4, 2, 8, 1, 3, 0, 1, 2, 1

* + 1. Calculate mean, median and mode
    2. Construct frequency distribution table
    3. Create graphs as appropriate

**Question 5: Match (5 marks)**

|  |  |
| --- | --- |
| **Group A** | **Group B** |
| 1. The risk of cardiac diseases among patients treated with hypo cholesterolemic agent “A” is lower than the risk among controls not treated with hypo cholesterolemic agents 2. Frequency of change in position of incontinent patients is related to the development of decubitus ulcers 3. no difference in mortalitybetween patients using drug A and patients not using drug A. 4. Individuals that smoke cigarettes and live in cities are more likely than others to have respiratory problems and increased cancer. 5. Smoking cigarettes daily leads to lung cancer. | 1. Simple hypothesis 2. complex hypothesis 3. Directional hypothesis 4. non-directional hypothesis 5. Null hypothesis |

**Question 6 : Choose the correct answer ( one mark each) 42 marks**

**1. The following are true about the histogram - Except one :**

a) Used for nominal variables

b) The bars are placed side by side

c) The total area is 100%

d) The population pyramid is an example of the histogram

**2. A result is called “statistically significant” whenever**

1. The null hypothesis is true.
2. The alternative hypothesis is true.
3. The p-value is less than the significance level.
4. The p-value is larger than the significance level.

**3. Chi-square test is used to test:**

1. Difference in proportions
2. Difference in means of two independent variables
3. Relationship between two bivariate variables
4. Difference in means of three or more set of variables
5. **Type I error or level of α means**
6. Probability of rejecting a false Null Hypothesis
7. Probability of rejecting a correct Null Hypothesis
8. Probability of not rejecting a correct Null Hypothesis
9. Probability of not rejecting a false Null Hypothesis
10. **Which of the following can have more than one value?**
11. The mean
12. The range
13. The mode
14. The median
15. **Typhoid fever cases were reported throughout the world during the year 2000 – 2020 excluding African region. These cases can be best represented by:**
16. Frequency polygon
17. Histogram
18. Line graph
19. Pictogram
20. **Cholesterol value are obtained in a group of people before and after giving drug A. the appropriate statistical test used to analyze the data is:**
21. Paired t-test
22. Unpaired t-test
23. Chi-square test
24. Analysis of variance
25. **A hypothesis test is done in which the alternative hypothesis is that more than 10% of a population is left-handed. The p-value for the test is calculated to be 0.25. Which statement is correct?**
    1. We can conclude that more than 10% of the population is left-handed.
    2. We cannot conclude that more than 10% of the population is left-handed.
    3. We can conclude that more than 25% of the population is left-handed.
    4. We can conclude that exactly 25% of the population is left-handed.

**9.** **Which of the following is a nonparametric "Analysis of Variance"?**

1. Mann-Whitney U test
2. Wilcoxon Rank test
3. Kruskal-Wallis test
4. Friedman's test

10.**Which of the following p-values will lead us to reject the null hypothesis if the significance level of the test if 5%?**

* 1. 0.15
  2. 0.10
  3. 0.20
  4. 0.025

1. **The degree of flatness or peakedness of a graph of a frequency distribution is termed as:**
2. standard deviation
3. kurtosis
4. skewness
5. mode

**12. In a negatively skewed distribution, the mean generally falls to:**

1. the left of the median and the median usually lies to the left of the mode.
2. the right of the median and the median usually lies to the right of the mode.
3. the middle of median and mode.
4. the centre of the distribution.

**13. negatively skewed distribution causes:**

1. Median is more than mean
2. S.D. is more than variance
3. "Tail" to the left
4. "Tail" to the right
   * 1. **study was conducted for the comparison of mean systolic blood pressures in independent samples of pregnant and non-pregnant women. Choose the most appropriate statistical test**
5. Chi-square analysis
6. Student t test
7. Paired t test
8. Analysis of variance
   * 1. **The median of a series of 20 observations is 10, mean is 11.5 and mode is 11, which of the following measures can be subjected to statistical manipulation:**
9. Mean
10. Median
11. Mode
12. Range
    * 1. **A study was conducted to assess the height of students of 4th year in 10 Medical colleges. The values of heights ranged between 5.5 – 5.10 feet. Which graph should be used by the researcher to present the obtained data?**
13. Bar chart
14. Histogram
15. Pie chart
16. Line graph
    * 1. **A measure of central tendency which is calculated by numbers arranging in numerical order is:**
17. Standard deviation
18. Range
19. Median
20. Mode
    * 1. **Skewness is a measure:**
21. of the asymmetry of the probability distribution
22. decides the distribution may have high or low variance
23. of central tendency
24. None of the above
    * 1. **What is *TRUE* about research hypothesis?**
25. States there is no relationship between the variables.
26. Statement about the expected relationship of the variables.
27. States a negative relationship between the variables
28. Research hypothesis should always be directional.
    * 1. **A graph that uses vertical bars to represent data is called a \_\_\_\_.**
    1. Line graph
    2. Bar graph
    3. Scatterplot
    4. Vertical graph
       1. **Bar charts may be distinguished from histograms at a glance because:**
    5. bar charts are not used for time series data
    6. histograms are used to display discrete data
    7. bar charts are based on area under the curve
    8. histograms do not have spaces between consecutive columns
       1. **Systolic blood pressure is normally distributed in a population with a mean of 120 mmHg and standard deviation of 5 mmHg. The middle 95% of that population have a systolic blood pressure between**
29. 110 mmHg and 140 mmHg
30. 110 mmHg and 120 mmHg
31. 110 mmHg and 130 mmHg
32. 110 mmHg and 140 mmHg
    * 1. **The** **algebraic relationship between the variance and standard deviation is that:**
33. The variance is the square root of the standard deviation
34. The standard deviation is the square root of the variance
35. The standard deviation is the variance divided by the square root of n
36. The variance is the standard deviation divided by the square root of n
    * 1. **What is not true about range?**
37. Range equals to the difference between highest and lowest scores
38. Range is inclusive of the two extreme scores
39. Range is a measure of dispersion
40. Range equals to the standard error of mean
    * 1. **……. is a line chart presenting the cumulative frequency of a continuous variable**
41. line graph
42. frequency polygon
43. ogive
44. histogram
45. scatter plot
    * 1. **In a positively skewed distribution the mean is usually near the tail and is the largest value among the measures of central tendency**

a) true b) false

* + 1. **Bar chart and Pie chart are used to represent qualitative data graphically**

a) true b) false

**28. The following are true about the median in data analysis - Except one:**

a) It takes all values into consideration

b) Its value is not affected by the extremes of values

c) it is used to compare between groups

d) It presents value of the observation located in the middle of the arranged

data

**29. Measures of central tendency include the following - Except one :**

a) Mid-range

b) Mode

c) Range

d) Median

**30. The measures of central tendency for a quantitative (e.g. weight/kg)**

**are the following:**

* 1. The arithmetic mean, median and range.
  2. The arithmetic mean, mode and range.
  3. The arithmetic mean, median and mode.
  4. The Median, mode and standard deviation
     1. **When the number of educated females is expressed as a percentage of total females present in a village It is known as:**

a. Rate b. Ratio c. Proportion d.Cumulative frequency

**32. A household survey of 10 families was conducted by students of 4th year Medical College In the data they collected, the ages of heads of families were: 32, 34, 35, 36, 36, 42, 44, 46, 48, and 52. The mean age of heads of families is**

a. 38.5 b. 40 c. 40.5 c. 42

**33. Values are arranged in ascending and descending order to calculate:**

a. Mean b. Mode c. Standard Deviation d. Median

34. **A study was conducted for comparison of the prevalence of hepatitis B surface antigen (HBsAg) in medical and dental students. The most appropriate statistical test to analyze the data is**

1. Chi-square analysis
2. Student *t* test
3. Paired *t* test
4. Analysis of variance

**35. A study was conducted for Comparison of the level of blood glucose in male and female rats following administration of three different drugs. The most appropriate statistical test to analyze the data is**

1. Chi-square analysis
2. Student *t* test
3. Paired *t* test
4. Analysis of variance

**36. If null hypothesis is rejected even if it is true is**

1. type I error
2. type II error
3. β error
4. µ error

**37. Normal curve is**

1. Linear
2. Symmetrical
3. Curvilinear
4. Parabolic

**38. Normal distribution curve depends upon**

1. Mean and sample
2. Mean and median
3. Mean and standard deviation
4. Median and standard error
5. **All the following are measures of central tendency, except:**
6. Mean
7. Median
8. Mode
9. Variance
10. **What is *TRUE* about research hypothesis?**
11. States there is no relationship between the variables.
12. Statement about the expected relationship of the variables.
13. States a negative relationship between the variables
14. Research hypothesis should always be directional.
15. **Among the following which is most significant P value?**
16. 0.005
17. 0.05
18. 0.01
19. 0.1
20. **A Chi-squared is used to assess**
21. The degree of association between two categorical variables
22. The degree of association between two continuous variables
23. The role of chance as a cause of the association between two categorical variables
24. The role of chance as a cause of the association between two continuous variables