



BRAINWARE UNIVERSITY

Term End Examination 2023-2024

Programme – B.Pharm-2019/B.Pharm-2020

Course Name – Biostatistics and Research Methodology - Theory

Course Code - BP801T

(Semester VIII)

Full Marks : 75

Time : 3:0 Hours

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A

(Multiple Choice Type Question)

1 x 20=20

1. Choose the correct alternative from the following :

(i)

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Identify the appropriate graph to display marital status (Married, Unmarried, Divorced, widow) is

- a) Frequency polygon
 - b) Pie chart
 - c) Scatter plot
 - d) Histogram
- (ii) Identify which of the following is not a disadvantage of using mean.
- a) It is affected by extreme values
 - b) It cannot be computed in grouped data with open-ended class intervals
 - c) It does not possess the desired algebraic property
 - d) None of these
- (iii) The number of observations smaller than _____ is the same as the number of observations larger than it. Select the correct answer:
- a) Mean
 - b) Mode
 - c) Median
 - d) None of these
- (iv) Identify from the following that is not a measure of dispersion.
- a) Variance
 - b) Standard deviation
 - c) Mode
 - d) Range
- (v) Identify the median of the dataset: 4,4,5,6,5,6,5,4,4,11
- a) 5
 - b) 5.5
 - c) 6
 - d) 4
- (vi) The value of the correlation coefficient (r) should be labelled as _____.
Select the correct answer.
- a) Greater than 1
 - b) Less than 1
 - c) 0 to 1
 - d) -1 to 1

- (vii) which of the following is type II error? Choose the correct option.
- a) The error of accepting H_0 when H_0 is true
 b) The error of rejecting H_0 when H_0 is false
 c) The error of accepting H_0 when H_0 is false
 d) The error of rejecting H_0 when H_0 is true
- (viii) The _____ sum of squares measures the variability of the sample treatment means around the overall mean. Choose the correct answer:
- a) treatment
 b) error
 c) interaction
 d) total
- (ix) In a study, subjects are randomly assigned to one of three groups: control, experimental A, or experimental B. After treatment, the mean scores for the three groups are compared. Choose the appropriate statistical test for comparing these means.
- a) the correlation coefficient
 b) chi square
 c) the t-test
 d) the analysis of variance
- (x) When conducting a one-way ANOVA, the _____ between-treatment variability is when compared to the within-treatment variability, the _____ value of F-DATA will be tending to be. Choose the correct answer.
- a) smaller, larger
 b) smaller, smaller
 c) larger, larger
 d) smaller, more random
- (xi) F test in most cases will reject the hypothesis that the partial slope coefficients are simultaneously equal to zero. This happens when _____. Select the correct option.
- a) Multicollinearity is present
 b) Multicollinearity is absent
 c) Multicollinearity may be present OR may not be present
 d) Depends on the F-value
- (xii) Even if heteroscedasticity is suspected and detected, it is not easy to correct the problem. This statement is _____. Select the correct option.
- a) True
 b) False
 c) Sometimes true
 d) Depends on test statistics
- (xiii) Heteroscedasticity may arise due to various reasons. Which one of these is NOT a reason. Select the correct option.
- a) Extremely low or high values of X and Y coordinates in the dataset
 b) Correlation of variables over time
 c) Incorrect specification of the functional form of the model
 d) Incorrect transformation of variables
- (xiv) When supply of a commodity, for example agricultural commodities, react to price with a lag of one time period due to gestation period in production, such a phenomenon is referred to as _____. Select the correct option.
- a) Lag phenomenon
 b) Cobweb phenomenon
 c) Inertia
 d) Business cycle
- (xv) By autocorrelation we mean _____. Select the correct option.
- a) That the residuals of a regression model are not independent
 b) That the residuals of a regression model are related with one or more of the regressors
 c) That the squared residuals of a regression model are not equally spread
 d) That the variance of the residuals of a regression model is not constant for all observations
- (xvi) Locus of the conditional mean of the dependent variable for the fixed values of the explanatory variable _____. Identify the correct option.
- a) Indifference curve
 b) Population regression curve
 c) Production Possibility curve
 d) None of these

- (xvii) Student 't' test was formulated by _____. Select the correct option.
- a) William Sealy Gosset
 b) Carl Friedrich Gauss
 c) Durbin Watson
 d) None of these
- (xviii) The term regression was coined by _____. Choose the correct option.
- a) Francis Galton
 b) Karl Pearson
 c) Carl Friedrich Gauss
 d) William Sealy Goss
- (xix) Given the sample, each estimator will provide only a single point value of the relevant population parameter is _____. Choose the correct option.
- a) Point estimator
 b) Interval estimator
 c) Least square estimator
 d) None of these
- (xx) The statement that-There can be more than one SRF representing a population regression function is _____. Select the correct option.
- a) Always true
 b) Always false
 c) Sometimes true, sometimes false
 d) Nonsense statement

Group-B

(Short Answer Type Questions)

5 x 7=35

2. At a checkout counter, customers arrive at an average rate of 1.5 per minute. Calculate the probability that: (5)
- a. at most four will arrive in any given minute.
 b. at least three will arrive during an interval of 2 minutes.
 c. at most 15 will arrive during an interval of 6 minutes.
3. Explain the advantages and disadvantages of non-parametric methods. (5)
4. Explain experimental studies with example. (5)
5. Explain the concept of qualitative and quantitative research.. (5)
6. The following frequency table shows the pulse rate (in bpm) of 120 patients in a hospital: (5)

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Pulse rate	50-60	60-70	70-80	80-90	90-100
Frequency	11	36	28	?	22

Calculate the unknown frequency and evaluate the mean pulse rate of the patients.

7. The probability that the noise level of a wide band amplifier will exceed 2 dB is 0.05. for a group of 12 amplifiers, calculate: (5)

- a. one will exceed 2 dB
- b. at most two will exceed 2 dB
- c. two or more will exceed 2 dB

OR

Given that the switch board of a consultant's office receives on the average 0.6 calls per minute, calculate the probability that: (5)

- a. in a given minute, there will be at least one call
- b. in a 4-minute interval, there will be at least three calls

8. The following frequency table shows the pulse rate (in bpm) of 120 patients in a hospital: (5)

Pulse rate	50-60	60-70	70-80	80-90	90-100
Frequency	24	36	28	?	2

Calculate the unknown frequency and the suitable diagram to represent the data.

OR

The following frequency table shows the pulse rate (in bpm) of 120 patients in a hospital: (5)

Pulse rate	50-60	60-70	70-80	80-90	90-100
Frequency	?	36	28	?	2

Average pulse rate of the patients is 70 bpm. Calculate the unknown frequencies.

Group-C

(Long Answer Type Questions)

10 x 2=20

- 9. Describe the limitation of simple linear regression with proper example. (10)
- 10. Illustrate the merits and demerits of mode. (10)

OR

The following data for blood protein (g/100 mL) were observed for the comparison of two drugs. Both drugs were tested on each person in random order. (10)

Patient Drug A Drug B

1	8.1	9.0
2	9.4	9.9
3	7.2	8.0
4	6.3	6.0
5	6.6	7.9
6	9.3	9.0
7	7.6	7.9
8	8.1	8.3
9	8.6	8.2
10	8.3	8.9
11	7.0	8.3
12	7.7	8.8

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Evaluate a suitable diagram for the data and analyze it.
