

Question Paper

Exam Date & Time: 14-May-2024 (10:00 AM - 01:00 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION

Biostatistics and Research Methodology [PHA-BP801T -S1]

Marks: 75

Duration: 180 mins.

I Multiple Choice Questions (MCQs)

Answer all the questions.

Section Duration: 30 mins

1) Which one of the following is a good database for literature search in biomedical sciences? (1)

- [Google](#)
- [PubMed](#)
- [Google Scholar](#)
- [Journal Citation Report](#)

2) FINER abbreviation is used to describe (1)

- [Research Objectives](#)
- [Research question](#)
- [Materials and methods](#)
- [Literature search](#)

3) Who is the publisher among the following? (1)

- [Scopus](#)
- [Elsevier](#)
- [Dimensions](#)
- [PubMed](#)

4) Which is the primary source of literature among the following? (1)

- [Lab book](#)
- [Textbooks](#)
- [Book Chapters](#)
- [Encyclopedia](#)

5) The SMART abbreviation is used to describe (1)

- [Research question](#)
- [Research Objectives](#)
- [Graphical Abstract](#)
- [Structured Abstract](#)

6) What is the median of 8, 10, 13, 14, 15, 17, 20, 21? (1)

- [13](#)
- [14.5](#)
- [15.5](#)
- [14](#)

- 7) Low standard deviation indicates that the data tends to be (1)
- [far away from the mean](#)
 - [close to the median](#)
 - [close to the mean](#)
 - [far away from the median](#)
- 8) Coefficient of correlation is a statistical measure that defines the (1)
- [strength and direction of the relationship between two variables](#)
 - [time and velocity of the relationship between two variables](#)
 - [magnitude and time of the relationship between two variables](#)
 - [strength and affinity of the relationship between two variables](#)
- 9) If we reject H_0 at 0.05 significance level, we can be 95% confident that the observed result (1)
- [is due to random variation alone](#)
 - [is not due to random variation alone](#)
 - [is not due to discrete variation alone](#)
 - [is due to discrete variation alone](#)
- 10) The common assumption required for a parametric test is (1)
- [Multiple correlation](#)
 - [Association](#)
 - [Randomization](#)
 - [Normal distribution](#)
- 11) Which among the following is not a feature of a non-parametric test? (1)
- [Ranking data](#)
 - [Distribution free](#)
 - [Analysis of Variance](#)
 - [Permutation data](#)
- 12) Wilcoxon signed rank test is used to compare the medians of (1)
- [two paired samples](#)
 - [two unpaired samples](#)
 - [two observed frequencies](#)
 - [two expected frequencies](#)
- 13) Which is NOT a non-parametric test? (1)
- [Cochran's Q Test](#)
 - [Student's t test](#)
 - [Kruskal-Wallis Test](#)
 - [Friedman Test](#)
- 14) Which type of graph is best suited for displaying categorical data? (1)
- [Histogram](#)
 - [Bar graph](#)

[Scatter plot](#)

[Line graph](#)

15) What does a box plot primarily display? (1)

[Mean and standard deviation](#)

[Median and interquartile range](#)

[Range of the data](#)

[Frequency distribution](#)

16) What does the width of each bar in a histogram represent? (1)

[Mean of the data](#)

[Standard deviation of the data](#)

[Range of the data](#)

[Interval of the data](#)

17) What is the purpose of constructing an ogive plot? (1)

[To display the frequency distribution of data](#)

[To show the cumulative frequency distribution of data](#)

[To calculate the mean and median of the data](#)

[To identify outliers in the data](#)

18) What is the primary advantage of using statistical software over manual calculations? (1)

[Statistical software is cheaper](#)

[Statistical software ensures accuracy and efficiency](#)

[Manual calculations are faster](#)

[Statistical software requires less training](#)

19) What does SPSS stand for? (1)

[Statistical Package for Scientific Software](#)

[Statistical Program for Social Sciences](#)

[Software for Statistical Procedures and Solutions](#)

[Statistical Protocol for Survey Sampling](#)

20) What is the purpose of conducting bivariate analysis in statistical software? (1)

[To summarize and describe the characteristics of a dataset](#)

[To compare two variables](#)

[To clean the dataset](#)

[To make predictions about future events](#)

II Long Answers

Answer all the questions.

1) With a schematic diagram, explain how a manuscript can be prepared and communicated to a journal (5+5) (10)

2) a) Describe simple linear regression. (10)
b) Enumerate the applications of correlation.
c) Five tablets were weighed and then assayed as given below. Calculate the slope and intercept. Predict the potency for a 200 mg tablet
Weight (mg): 205, 200, 202, 198, 197

Potency (mg): 103, 100, 101, 98, 98

III Short Answers

Answer all the questions.

- 1) Write a short note on the source of variability in the data set. (5)
- 2) Compare Normal versus Binomial distribution (5)
- 3) In a clinical trial, investigators concluded that a new drug is effective, when it had NO effect. What type of error is this? Explain. How to overcome such errors? (5)
- 4) Blood pressure recordings of the following subjects are shown below. Apply a suitable statistical tool to tell whether the new chemical entity [NCE] has antihypertensive effect. Table t value at $p < 0.05$ is 2.306 and at $p < 0.01$ is 3.355
BP (mmHg) before NCE: 122, 121, 120, 115, 126, 130, 120, 125, 128
BP (mmHg) after NCE: 120, 118, 115, 110, 122, 130, 116, 124, 125 (5)
- 5) Describe observational study designs within the context of clinical trials. (5)
- 6) In the context of clinical trials, list the circumstances under which informed consent may be waived. (5)
- 7) What are the limitations of using Microsoft Excel for statistical analysis? (5)

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