

**DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE**

**End Semester Examination – Summer 2022**

**Course: B. Pharmacy**

**Sem: VIII**

**Subject Name: Biostatistics and Research Methodology**

**Subject Code: BP801T**

**Max. Marks: 75**

**Date: 12/07/2022**

**Duration: 3.45 Hrs.**

**Instructions –**

- 1. All questions are compulsory**
- 2. Answers to MCQs should be written in full sentences**
- 3. Draw diagrams / figures wherever necessary**
- 4. Figures to right indicate full marks**

**Q. 1. Multiple Choice Questions (MCQs) = 20 x 1 = 20 (All the questions are compulsory)**

- i) The coefficient of correlation is independent of \_\_\_\_\_
- a) change of scale  
b) change of origin  
c) change of scale and origin  
d) neither change of scale nor origin
- ii) While calculating the standard deviation, the deviations are only taken from the \_\_\_\_\_
- a) mode value of a series  
b) median value of a series  
c) quartile value of a series  
d) mean value of a series
- iii) The numerical value of a standard deviation can never be \_\_\_\_\_.
- a) negative  
b) Zero  
c) larger than the variance  
d) larger than the deviation
- iv) One of the followings measures of central tendency includes the magnitude of scores
- a) Mean  
b) Mode  
c) Median  
d) Range
- v) In the least square method, we use \_\_\_\_\_ to find the value of unknowns.
- a) Regression equations  
b) Normal equations  
c) General equations  
d) Auxiliary equations
- vi) In regression, the equation that describes how the response variable (y) is related to the explanatory variable (x) is the \_\_\_\_\_
- a) correlation model  
b) regression model  
c) correlation coefficient  
d) factorial model

vii) In regression analysis, the variable that is being predicted is the

- a) response, or dependent, variable
- b) independent variable
- c) Intervening variable
- d) is usually x

viii) In a Binomial Distribution, if 'n' is the number of trials and 'p' is the probability of success, then the mean value is given by \_\_\_\_\_

- a) np
- b) n
- c) p
- d) np(1-p)

ix) The Wilcoxon rank-sum test is a

- a) parametric
- b) nonparametric
- c) regression
- d) Correlation

x) A popular nonparametric test to compare outcomes between two independent groups is

- a) Wilcoxon Rank Sum Test
- b) Kruskal-Wallis
- c) Mann Whitney U test
- d) ANOVA

xi) Wilcoxon signed-rank test can be used as an alternative to

- a) the paired Student's t-test
- b) the paired Student's p-test
- c) Chi sq test
- d) t or p test

xii) Research is

- a) Repeated Search
- b) Finding solution to problem
- c) Working in a scientific way to search for truth of any problem
- d) Doing literature review

xiii) Action research means

- a) longitudinal research
- b) an analytical research
- c) a research initiated to solve an immediate problem
- d) non analytical research

xiv) Last stage of research process is

- a) Literature review
- b) Report preparation
- c) Publication
- d) Presentation

xv) Blocking is the arranging of experimental units in \_\_\_\_\_ that are similar to one another.

- a) pairing
- b) groups
- c) blocks
- d) groups and blocks

xvi) Blocking reduces unexplained

- a) similarity
- b) variability
- c) problems
- d) errors

xvii) Two level factorial experiments are factorial experiments in which each factor is investigated at \_\_\_\_\_ levels

- a) single
- b) two
- c) multiple
- d) three

xviii) The term Optimization is defined as to make experiment

- a) error free
- b) reliable
- c) perfect , effective , and functional as possible
- d) authentic

xix) Fractional factorial designs are used

- a) for small set of factors
- b) to examine multiple factors efficiently with fewer runs than corresponding full factorial design
- c) for single factor efficiently with fewer runs
- d) to examine variable

xx) In the Central Composite design arrays, the levels of the factors are on the

- a) center and circumscribed at the center of side
- b) edges, center and circumscribed at the center of side.
- c) edges and center of side.
- d) edges only

**Q. 2. Long Answers) = 2 x 10 = 20 (Answer 2 out of 3)**

- i) Explain QbD. DoE is essential in application of QbD in product development process, explain.
- ii) Elaborate different phases of clinical trial.
- iii) Explain the Measures of Dispersion.

Calculate Mean, Variance and Standard Deviation for the given data.

Height (cm)	135-140	141-150	146-150	151-155	156-160	161-165	166-170
Frequency	08	12	18	22	20	14	10

**Q. 3. Short Answers = 7 x 5 = 35 (Answer 7 out of 9)**

- i) Explain ANOVA and its applications.
- ii) Write about Standard error of mean and its significance.
- iii) Discuss different types of Probability distribution.
- iv) Elaborate any Pharmaceutical example for Data analysis using SPSS.
- v) Discuss Null hypothesis, type I and type II Errors.
- vi) Explain Regression analysis.
- vii) Define and explain Experimental Study designs.
- viii) Explain Karl Pearsons Coefficient of correlation with examples.
- ix) Explain applications of Factorial designs in Pharmaceutical Product Development.

-----END OF THE PAPER-----