REV-01
BPT/55/28/33

2023/06

SET B

BACHELOR OF PHYSIOTHERAPY
FOURTH SEMESTER
BIOSTATISTICS
BPT – 404
[USE OMR SHEET FOR OBJECTIVE PART]

Duration: 3 hrs.

Full Marks: 70

Objective

Time: 30 min.

Marks: 20

Choose the correct answer from the following: ***1×20=20***

1. Which of the following is a continuous probability distribution?
   a. Normal distribution
   b. Poisson distribution
   c. Binomial distribution
   d. None of the above

2. Rank correlation was established by
   a. Karl Pearson
   b. Edward Spearman
   c. Fisher
   d. None of the above

3. The test statistic _____is used in Analysis of Variance.
   a. Z
   b. t
   c. F
   d. χ^2

4. Population characteristics are called:
   a. statistics
   b. parameters
   c. sampling
   d. None of the above

5. In a contingency table of order m × n, the degrees of freedom for chi-square test is:
   a. m / n
   b. m × n
   c. (m – 1) / (n -1)
   d. (m -1) × (n -1)

6. The MS Excel function _____is used to find the arithmetic mean of statistical data
   a. =ARITHMETICMEAN()
   b. =MEAN()
   c. =AVERAGE()
   d. None of the above

7. If the correlation between two variables X and Y is ±1, then
   a. X and Y are perfectly linearly related
   b. X and Y are independent
   c. X and Y are uncorrelated
   d. none of the above

8. When two attributes are present or absent together in the data, they are said to be
   a. Negatively associate
   b. Positively associated
   c. Independent
   d. none of the above.

9. ANOVA is used
   a. to test the equality of several population variances
   b. to test the equality of several population means.
   c. both a and b
   d. neither a nor b

10. ANCOVA procedure is a combination of
    a. analysis of variance and regression analysis
    b. analysis of variance and correlation
    c. analysis of variance and Fisher's F-test
    d. none of the above

11. Regression is a
    a. relationship between two variables
    b. functional relationship between two variables
    c. average relationship between two variables
    d. none of the above
    mathematical function expressing the

12. In a binomial distribution with parameters n = 10 and p = 0.3, variance is
    a. 1.45
    b. 3
    c. 2.1
    d. None of the above

13. Which of the following statement is true for a Poisson distribution?
    a. Mean > variance
    b. Mean = variance
    c. Mean < variance
    d. None of the above

14. _____ is effected by the extreme values.
    a. Mean
    b. Median
    c. Mode
    d. None of the above

15. In a certain distribution Median = 30, Mode = 28, then Mean = ?
    a. 33
    b. 32
    c. 29
    d. 31

16. Which of the following is not statistical data?
    a. Blood pressure recorded in equal interval of time.
    b. Number of people died due to a certain disease in every one month in a certain year.
    c. Good students in a class
    d. None of the above.

17. Type-II error is
    a. Rejecting the null hypothesis when it is not true.
    b. Rejecting the null hypothesis when it is true
    c. Accepting the null hypothesis when it is not true
    d. Accepting the null hypothesis when it is true.

18. If $X \sim N(\mu = 10, \sigma = 4)$, then the value of standard normal variate Z for X = 6, is
    a. -1
    b. 1
    c. -2
    d. 2

19. _____ deals with sampling method
    a. Descriptive statistics
    b. Inferential statistics
    c. Both (a) and (b)
    d. Neither (a) nor (b)

20. Which of the following measures is the best measure of dispersion?
    a. Standard deviation
    b. Mean deviation
    c. Quartile deviation
    d. None of the above

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(Descriptive)

Time : 2 hrs. 30 min. Marks : 50

[Answer question no.1 & any four (4) from the rest]

1. Calculate mean, median, mode, standard deviation and coefficient of variation of the following data **10**

Age (years):	0 – 10, 10 – 20, 20 – 30, 30 – 40, 40 – 50, 50 – 60, 60 – 70, 70 - 80
Number of persons :	2 8 11 14 9 6 4 3

2. Explain the importance of Statistical methods in Allied medical Science. Write some important characteristics of Statistics **5+5=10**

3. Write the expression of a binomial distribution. Mention its assumptions. **5+5=10**
   If the heights of 500 students are normally distributed with mean 68.0 inches and standard deviation 3.0 inches, how many students have height between 65 and 71 inches.

4. The average height of 35 students of BPT is 168 cms. Estimate the average height of all the students of BPT department. Determine 95% confidence interval of the average height of the students in the department, if the standard deviation of the heights of the students is 23.5 cms. Also determine 90% confidence interval of the average height of the students and interpret the results. **10**

   [$for\ \alpha = 0.05, 0.10, Z_\alpha = 1.96, 1.645\ respectively$]

5. To test the efficiency of a new drug a controlled experiment was conducted wherein 300 patients were administered the new drug and 200 other patients were not given the drug. The patients were monitored and results were obtained as follows: **10**

	Cured	Condition worsened	No effect
Given the drug	200	40	60
Not given the drug	120	30	50

[Given, $\chi^2_{0.05}$ = 3.84 5.99 7.8
d.f. = 1 2 3]

6. The following data give the yield on 12 plots of land of three samples under the three varieties of fertilizers A, B and C. **10**

A: 25, 22, 24, 21, 20

B: 17, 16, 16, 18

C: 24, 26, 30

Test at 5% level of significance whether there is any significant difference in the average yields of land under three varieties of fertilizers. [Given, the critical value of the test statistic at 5% level of significance for (2, 9) df and (9, 2) df are respectively 4.26 and 19.38)

7. The following results were obtained in the analysis of data on yield of dry bark in ounces (Y) and age in years (X) of 200 cinchona plants: **10**

	X	Y
Average	9.2	16.5
Standard deviation	2.1	4.2

Correlation coefficient = 0.84

Construct the two lines of regression and estimate the yield of dry bark of a plant of age 8 years.

8. Explain the kinds of association. **5+5=10**
Write short note on Analysis of covariance (ANCOVA)

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