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[43]

SARDAR PATEL UNIVERSITY

External Examination

M.Sc. (Microbiology) Semester -II

Subject: PS02EMIC21- Biostatistics

Saturday, 21th April, 2018

Time: 02:00 p.m. to 05:00 p.m. **Total marks: 70**

Note: *Figures to right side indicate marks.*

Q.1 Choose the most appropriate answer for the following questions: [8]

1. Qualitative classification is classification based on:
   A) Area B) Time
   C) Magnitude D) Attributes
   E) None of Above

2. Analysis of variance is a statistical method of comparing the _____ of several populations.
   A) Standard Deviation B) Mean
   C) Variances D) Median
   E) None of Above

3. Binomial probability distribution is suitable for handling probability of _____ random variable.
   A) Individual B) Discrete
   C) Continuous D) All of Above
   E) None of Above

4. Probability of getting face with number 2 up, when a fair dice is thrown is_____.
   A) 1 B) 1/2
   C) 1/4 D) 1/6
   E) None of Above

5. Grouping table method is used to ascertain mode of the data series, grouping table has ____ number of columns in it.
   A) IV B) V
   C) VII D) VI
   E) None of Above

6. The shape of percentile curve is similar to the shape of _____
   A) Less than Ogive B) More than Ogive
   C) Frequency Polygon D) Frequency Curve
   E) None of Above

[P.T.O.]

7. According to Karl Pearson relationships Median = _____.

A) Mode + 2/3 (Mode - Mean) B) Mode + 3/2 (Mean - Mode)
C) Mode - 2/3 (Mean + Mode) D) Mode + 2/3 (Mean - Mode)
E) None of Above

8. For positively skewed distribution which of the following condition is true?

A) Mean > Median > Mode B) Mean < Median < Mode
C) Median > Mean > Mode D) All of Above
E) None of Above

Q.2 Attempt any seven from the following questions: **[14]**

1. Define statistics and explain various sequential stages of statistical investigation.
2. Give the relationship between A.M., H.M. and G.M. and prove it.
3. Enlist the various measures of central tendency. Define anyone of them with its advantages and disadvantages.
4. Explain various types of ogives used in statistics.
5. Define sample. Write down the merits and demerits of sample survey.
6. Explain perfect positive and perfect negative correlation and give the values of "r" for both.
7. What do you mean by Skewness? Explain its types.
8. State the addition theorem and prove it.
9. What are Type I and Type II errors in probability?

Q.3 A. Compute Kurtosis and comment on the peakness of the curve. **[6]**

No. of leaves	4	14	24	34	44	54	64	74	84	94
No. of Plants	1	5	12	22	17	9	4	3	1	1

B. Draw (i) Histogram (ii) Frequency polygon and (iii) Percentile curve using following data: **[6]**

Molecular weight in Mole	10-15	15-20	20-25	25-30	30-35	35-40	40-45
No. of Protein	12	24	32	20	17	17	13

OR

B. Give equations for computing Q_2, D_6 and P_{75} for grouped data (continuous series) with the meaning of each symbol in equation. **[6]**

Q.4 A. From the following data obtain the regression equations of X on Y and Y on X. [6]

Sr. No.	1	2	3	4	5
No. of Proteins	6	2	10	4	8
No. of Active sites	9	11	5	8	7

B. Calculate value of mode for following data. [6]

No. of leaves	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90
No. of flowers	5	9	13	21	20	17	7	3

OR

B. Find the missing frequency "x" from the given data table. If the mean of given data is 19.9. [6]

No. of leaves	4-8	8-12	12-16	16-20	20-24	24-28	28-32	32-36
No. of Plants	11	13	16	14	"x"	9	17	6

Q.5 A. Define and describe statistical inference? Discuss various steps of hypothesis testing; also discuss about four possibilities of results when hypothesis is tested in statistic. [6]

B. The manufacturer of certain makes drug claims that his drugs have a mean dissolution time of 25 minutes with standard deviation of 5 minutes. A random 6 sample of such drug were taken to test dissolution time and it gave the following dissolution time : [6]

Dissolution time of six drugs in minutes	24	26	30	20	20	18

Carry out "**t – test**" for the data and comment on the claim of the manufacturer is valid or not at 1% level of significance. (Value of "**t**" at 1% level of significance is 4.032)

OR

B. Sperm sample was analyzed for having normal or abnormal morphological features. 400 sperms were analyzed and found that 216 sperms were abnormal. Test the hypothesis that the sperm sample has 50% of normal and 50% of abnormal sperms in it by using the standard error for testing the number of successes at 5% level of significance. (at 5% level of significance value of S.E. = 1.96SE) [6]

[P.T.O.]

Q.6 A. Find value of value of Karl Pearson's coefficient of correlation for the following data. [6]

No. of leaves (X)	48	35	17	23	47
No. of flowers (Y)	45	20	40	25	45

B. In an experiment to study the dependence of hypertension on smoking habits, the following data were taken on 180 individuals. [6]

	nonsmokers	*Heavy smokers*
Hypertension	21	66
No hypertension	74	19

Test the hypothesis that the presence or absence of hypertension is independent of smoking habits at 5% level of significance using χ^2 test. (For $\upsilon = 1$, value of χ^2 at 5% level of significance is 3.84)

OR

B. Two random samples were drawn from two normal population and their values are as follows: [6]

Sample 1	66	67	75	76	82	84	88	90	92	--	--
Sample 2	64	66	74	78	82	85	87	92	93	95	97

Test whether the two populations have the same variance at the 5% level of significance using "F" test. (For $\upsilon = 10$ and $\upsilon = 8$, value of F at 5% level of significance is 3.36)

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