PARUL UNIVERSITY
FACULTY OF PHARMACY
B.Pharm., Summer 2017-18 Examination

Semester: 2   **Date: 02/06/2018**
Subject Code: 08101155   **Time: 10:00 am to 1:00 pm**
Subject Name: Applied Biostatistics   **Total Marks: 75**

Instructions:
1. Figures to the right indicate full marks.
2. Make suitable assumptions wherever necessary.

Q.1   Essay type Questions. (Any 2 out of 3) (10 marks each)   **(20)**

1.   Calculate mean, median and mode for the following given data.

Age	0-10	10-20	20-30	30-40	40-50	50-60	60-70
No. of Patients	23	57	138	277	105	74	21

2.   Competitors in a beauty contest are ranked by three judges in following order.

1st Judge	1	5	4	8	9	6	10	7	3	2
2nd Judge	4	8	7	6	5	9	10	3	2	1
3rd Judge	6	7	8	1	5	10	9	2	3	4

Use rank correlation co-efficient to discuss which pair if judge has the nearest approach to beauty.

3.   An I.Q. test was administered to 5 medical representatives before and after they were trained. The results are given below.

Candidate No.	1	2	3	4	5
I.Q before training	110	120	123	132	125
I.Q before training	120	118	125	136	127

Test whether there is any change in I.Q after the training program. (Table value:2.776)

Q.2   Short Essay type Questions. (Any 7 out of 9) (5 marks each)   **(35)**

1.   Find the Standard deviation of the following

Age	20-25	25-30	30-35	35-40	40-45	45-50
No. of Persons	170	110	80	45	40	35

2.   A teacher wishes to test three different teaching methods I, II, III. To do this, three groups of 5 students are chosen at random and each group is taught by a different method. A common examination was later given to all the students and marks out of 100 scored by them are tabulated.

Method – I	75	62	71	58	73
Method – II	81	85	68	92	90
Method - III	73	79	60	75	81

Determine whether there is significant difference in teaching methods in (a) 5% , given that F=3.89 for (2,12) d.f (b) 1% level given that F=6.93 for (2,12) d.f

3. Suppose that 15 tablets are available for the comparison of three assay (Analysis test) methods, five tables for each assay. Five replicate tables are analyzed in each of three assay method groups, one assay per tablet, as shown on table.

Method – A	Method – B	Method – C
102	99	103
101	100	100
101	99	99
100	101	104
102	98	102
$\overline{X} = 101.2$	99.4	101.6
s.d = 0.84	1.14	2.07

By applying one-way ANOVA , test whether the mean assay is the same for the three different groups.(Table value: 3.88)

4. Conducting an H-test to compare three methods An experiment designed to compare three preventive methods against corrosion yielded the following maximum depths of pots in thousandth of an rich in pieces of wire subjected to the respective treatments.

Method -A	77	54	67	74	71	66	--
Method –B	60	41	59	65	62	64	52
Method –C	49	52	69	47	56	--	--

Use the 0.05 level of significance to test the null hypothesis that the three samples come from identical populations.(Table value:5.991)

5. Compute the correlation co-efficient between X & Y using the following data.

X	2	4	5	6	8	11
Y	18	12	10	8	7	5

6. Eight items of a sample have the following values : 47,50,52,48,47,49,53,51.Does the mean of the 8 observations differ significantly from the assumed population mean of 48? Use 5% level of significance.(Table value: 2.36)

7. Two types of chemical solutions A & B were tested for their pH (degree of acidity of the solution), Analysis of 6 samples of A showed a mean pH of 7.52 with a standard deviation of 0.024.Analysis of 5 samples of B showed a mean pH of 7.49 with a standard deviation of 0.032. Using a 0.05significance level, Determine whether the two types of solutions have different pH values.(Table value:2.262)

8. The following table shows the observed and expected frequencies in tossing a die 120 times. Test the hypothesis that the die is fair, using a significance level of 0.05. (Table value:11.07)

Die face value	1	2	3	4	5	6
Observed Frequency	25	17	15	23	24	16
Expected Frequency	20	20	20	20	20	20

9. Compute the coefficient of variation using the following data

Marks	0-10	10-20	20-30	30-40	40-50
No.	3	8	15	16	6

Q.3 **Answer in short. (2 marks each)** **(20)**

1. What is Sampling method? How many types of Sampling methods?

2. What is systematic sampling?

3. Find r_{xy} from the following data , $n = 10, \sum (x - \overline{x})(y - \overline{y}) = 1650, \sigma_x^2 = 196 \ \sigma_y^2 = 225$

4. A random sample of 18 pairs of observations from a bivariate normal population gave a correlation coefficient of 0.63. Is it likely that the variables in the population are uncorrelated? (Table value:2.12)

5. Point out the advantage of non parametric test.

6. A population consists of 500 units. Suppose a systematic sample of 10 items is to be selected from this population. Explain the procedure of selecting the sample.

7. A random sample of 20 tablets from a batch gives a mean active ingredient content 42 mg and standard deviation of 6 mg. Test the hypothesis that the population means is 44 mg.(Table value:2.09)

8. The following are the marks obtained by 10 students in pharmacology. Find the average marks.

Roll No.	1	2	3	4	5	6	7	8	9	10
Marks	48	65	43	31	57	37	60	59	49	77

9. Find the median 10, 23, 18 ,38 ,65 ,92 ,40 ,58.

10. The following frequency distribution shows the no. of days of confinement of patients after delivery. Find the mean days of confinement.

Days.	6	7	8	9	10
No.	7	6	6	4	2