

Seat No. : _____

AA-102

April-2019

BBA, Sem.-IV

CC-210 : Business Statistics

Time : 2:30 Hours]

[Max. Marks : 70

Instructions : (1) Use of simple calculator is permitted.
(2) Statistical table values are given at last.

1. (A) (1) Give the mathematical form of normal distribution. State its properties.
(2) For studying some characteristics of population observations of the population are 6, 10, 12, 20. Taking all possible sample of size 2 without replacement from this population, verify the following results : 7

(i) $E(\bar{y}) = \bar{Y}$

(ii) $V(\bar{y}) = \frac{N - n}{N} \frac{S^2}{n}$

OR

- (1) State the difference between sample study and population study.
(2) For a set of 1000 observations known to be normally distributed, the mean is 534 cm and S.D. is 13.5 cm. How many observations are likely to exceed 561 cm ? How many will be between 520.5 cm and 547.5 cm ? 7
- (B) Answer the following : (any four) 4
- (i) The total area under the normal curve is _____.
(ii) What is the aim of sample survey ?
(iii) In normal distribution if mean is 5, then mode is _____.
(iv) In sampling with replacement the total number of sample of size n from a population of size N is $n \cdot N$. (True / False)
(v) Find $P[-1.2 \leq Z \leq 1.2]$
(vi) If x is a normal variate with mean 50 and variance 9, find its quartile deviation.

2. (A) (1) Define the following terms : 7
- (i) Parameter
(ii) Null hypothesis
(iii) Critical region
(iv) Two-tailed and one-tailed test
(v) Type-I and Type-II errors.

- (2) A sample of 400 individuals is found to have mean height of 67.47 inches. Can it be reasonably regarded as a sample from a larger population mean height of 67.39 inches and standard deviation 1.30 inches? ($\alpha = 5\%$)

OR

- (1) A dice was thrown 9,000 times and of these 3,220 yielded a 3 or 4. Is this consistent with the hypothesis that the die was unbiased? 7
- (2) The information regarding two groups is given below: 7

	Mean	S.D.	Number
Group-I	1260	35	40
Group-II	1240	40	60

Examine whether the variabilities of the two groups differ significantly.

- (B) Answer the following : (any four) 4

- (i) If the computed value of Z falls in the critical region, the null hypothesis may be ____.
- (ii) When a sample is called large sample?
- (iii) Type-I and Type-II errors are related to non-parametric test only. (True/False)
- (iv) If the population is finite with N units, the S.E. should be multiplied by the factor ____.
- (v) Aasha wants to determine on the basis of sample study the man time required to complete a certain job so that she may be 95% confident that the mean may remain within ± 3 days of the true mean. As per the available record the population S.D. is 8 days. How large should be the sample for this study?
- (vi) Define Level of Significance.

3. (A) (1) Give properties and uses of t-distribution. 7
- (2) From the following information find the value of F-statistic and test the hypothesis the population variances are equal. 7

Sample	Size	S.D.
I	20	3.9
II	15	2.8

OR

- (1) Is the difference between the mean scores of the two groups with 8 and 7 members respectively significant from the following data? 7

Group I	19	14	13	16	19	18	16	17
Group II	21	19	16	22	18	20	19	

- (2) A random sample is selected from each of three makes of ropes and their breaking strength (in kg) are measured with the following results :

I	35	36	38	40	42		
II	50	55	54	56	57	60	54
III	30	33	29	42	44	37	

Test whether the breaking strength of the ropes differs significantly.

- (B) Answer the following : (any three) 3
- For ANOVA table, number of rows = number of columns is must. (True / False)
 - Give one difference between large sample test and small sample test.
 - Write formula for paired t-test for difference of mean.
 - Define degree of freedom.
 - A sample is said to be small sample if the size of sample is _____
4. (A) (1) Give advantages and dis-advantages of non-parametric test. 7
- (2) In an experiment to study the dependence of hypertension on smoking habits, the following data were taken from 180 individuals : 7

	Non-Smokers	Moderate Somkers	Heavy Smokers	Total
Hypertension	21	36	30	87
No-hypertension	48	26	19	93
Total	69	62	49	180

Test the hypothesis at 5% level of significance that the presence or absence of hypertension is independent of smoking habits.

OR

- Define \bar{P} and give its uses. 7
 - Test the randomness of the following sample : 7
 XY XXX YY X YY XX Y XY XX YYYY X
 YY XXX Y X Y XX YY X YY XXX YY XX
 Y XXX
- (B) Answer the following : (any three) 3
- RUN test is used to check the randomness of the given dataset. (True/False)
 - Which test is to be used to find relation between two attributes ?
 - Can we apply non-parametric test for ANOVA ?
 - Write down different methods of non-parametric test.
 - A sample of size 20 drawn from a normal population gave mean and S.D. as 40 and 6 respectively. Test the hypothesis that population S.D. is 8.

STATISTICAL VALUES

Area under SNC between

$$Z = 0 \text{ to } Z = 2 = 0.4772$$

$$Z = 0 \text{ to } Z = 1 = 0.3413$$

$$Z = 0 \text{ to } Z = 2.4 = 0.4918$$

$$Z = 0 \text{ to } Z = 1.2 = 0.3849$$

$$F_{(19, 14|0.05)} = 2.42$$

$$F_{(2, 15)} = 3.68$$

$$F_{(14, 19|0.05)} = 2.26$$

$$\chi^2_{2, 0.05} = 5.99$$

$$t_{13, 0.05} = 2.16$$

$$\chi^2_{19, 0.05} = 30.14$$

$$\chi^2_{1, 0.05} = 3.841$$

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