Seat No. : _____

AK-105

April-2023

B.B.A., 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. Answer the following questions :

(A) State difference between population study and sample study. **7**

(B) The probability density function of a normal variant is **7**

$$f(x) = \frac{1}{5\sqrt{2\pi}} e^{-\frac{1}{2}\left(\frac{x-75}{5}\right)^2}$$

find the values of the followings :

(i) $P(68 \leq x \leq 82)$

(ii) $P(x \leq 69)$

(iii) $P(x \geq 81)$

OR

(A) For studying some characteristics of population, observations of the Population are 6, 10, 12, and 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) $V(\bar{y}) = \left(\frac{N-n}{N}\right) \cdot \frac{s^2}{n}$.

(B) The customer accounts at a certain departmental store have an average balance of ₹ 120 and a standard deviation of ₹ 40. Assuming that account balance are normally distributed, find. **7**

(i) What percentage of the account are over ₹ 150 ?

(ii) What percentage of the accounts are between ₹ 100 and ₹ 150 ?

2. Answer the following questions : **7**

(A) Define the following terms :

(i) Null hypothesis

(ii) Critical Region

(iii) Two-tailed and one-tailed test

(B) In a sample of 1000 men from one city 750 were found to be smokers. In another sample of 1200 men from another city 1000 men were found to be smokers. Do the data indicate that the two cities are significantly different with respect to the prevalence of smoking habit among men ? (Take $\alpha = 5\%$). **7**

OR

(A) The mean of a sample of size 400 is 82 and S.D. is 18. Find 95% Confidence limits for population mean. **7**

(B) The mean of a random sample of 1000 units is 17.6 and the mean of another random sample of 800 units is 18. Can it be concluded that both the samples come from the same population with S.D. = 2.6. (Take $\alpha = 5\%$) **7**

3. Answer the following questions :

(A) Give Properties and uses of t - distribution. **7**

(B) For two independent samples the following information is available. **7**

Sample	Size	Mean	S.D.
I	10	15	3.5
II	15	16.5	4.5

Test the hypothesis that the population variance are equal.

OR

(A) The population of Nicotine in milligrams in two samples of tobacco are given below. **7**

Sample – I	24	27	26	21	25	
Sample – II	27	30	28	31	32	36

Can it be said that the means of the two samples different significantly ?

(B) Perform a two- way ANOVA on the data given below : **7**

	I	II	III	IV
A	35	42	28	54
B	44	50	38	46
C	48	52	42	40
D	36	45	55	50

Use coding method subtracting 45 from given numbers.

4. Answer the following questions :

(A) Define Non-parametric tests. And give few advantages of it. **7**

(B) From the following data use χ^2-test and conclude whether inoculation is effective in preventing tuberculosis. **7**

	Attacked	**Not attacked**	**Total**
Inoculated	31	469	500
Not Inoculated	185	1315	1500
Total	216	1784	2000

OR

(A) Define χ^2 and give its uses. **7**

(B) Test the randomness of the following sample : **7**

SP SSS PP S PP SS P SP SS PPPP S PP. (Take $\alpha = 5\%$)

5. Attempt any **seven** out of **twelve** : **14**

(1) The total area under the normal curve is _____.

(A) 0.5 (B) –0.5

(C) 2 (D) 1

(2) For a normal distribution $\sigma = 5$, what is the value of Q.D. ?

(A) 2.22 (B) 1.11

(C) 3.33 (D) 4.44

(3) A sample is said to be large if the size of sample is _____.

(A) < 30 (B) ≥ 30

(C) < 25 (D) ≥ 25

(4) The degree of freedom to test the independence of two attribute in a $r \times c$ table is _____.

(A) $(r + 2) \times (c + 2)$ (B) $(r - 1)(c - 1)$

(C) $(r + 1) \times (c + 1)$ (D) $(r - 2)(c - 2)$

(5) Define Type – I errors.

(6) Define Type – II errors.

(7) Define Degree of freedom.

(8) Give one use of t-distribution.

(9) F-Test is used to test difference between variances of two large samples. (True /False)

(10) Type – I and Type – II errors are related to non-parametric test only. (True /False)

(11) Yate's correction is applicable in χ^2 test. (True /False)

(12) χ^2- Distribution was given by Karl Pearson in 1900. (True /False)

STATISTICAL VALUES

Area under SNC between :

$Z = 0$ to $Z = 1.4 = 0.4192$

$Z = 0$ to $Z = 1.2 = 0.3849$

$Z = 0$ to $Z = 0.75 = 0.2734$

$Z = 0$ to $Z = 0.5 = 0.1915$

$F_{(14, 9)(0.05)} = 3.07$

$t_{(9, 0.05)} = 2.262$

$F_{(9,3)(0.05)} = 8.84$

$\chi^2_{(1, 0.05)} = 3.84$