

Total No. of Questions : 4]

SEAT No. :

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T.Y. B.Com.

STATISTICS

365 (f) : Business Statistics - II

(2019 Pattern) (Semester - VI)

Time : 2½ Hours]

[Max. Marks : 50

Instructions to the candidates :

- 1) All questions are compulsory.
- 2) Figures to the right indicate full marks.
- 3) Use of scientific calculators and statistical tables is allowed.
- 4) Symbols and abbreviations have their usual meaning.
- 5) Graph paper will be provide on request.

Q1) Attempt the following :

A) Choose the correct alternative of the following (Any Five) :

[1 Mark Each]

a) Lottery method is an example of _____ sampling.

i) SRS

ii) Stratified

iii) Systematic

iv) Two Stage

b) The complementary hypothesis to the null hypothesis is called as

i) Null Hypothesis

ii) Alternative Hypothesis

iii) Two-sided

iv) One-sided

c) Let $X \rightarrow N(6, 0.5)$ then mean of X is

i) 4

ii) 6

iii) 0

iv) 1

P.T.O.

- d) We want to test H_0 : Two attributes A and B are independent and both the attributes are at two levels. Then under H_0 , the statistic used is
- | | |
|-----------------|----------------|
| i) χ_2^2 | ii) χ_4^2 |
| iii) χ_3^2 | iv) χ_1^2 |
- e) Testing $H_0 : P = 50$ against $H_1 : P \neq 50$ is a
- one sided left tailed test
 - one sided right tailed test
 - two sided test
 - both i) and ii)
- f) Stratified sampling is used when the population is :
- Homogeneous
 - Heterogeneous
 - Very Large
 - Too small
- g) The _____ sum of squares measures the variability of the observed values around their respective treatment means.
- Error
 - Total
 - Treatment
 - Interaction

B) State whether the following statements are TRUE or FALSE :

[1 Mark Each]

- Type I error is rejecting H_1 when it is true.
- In simple random sampling method, each unit of the population has an equal chance of being included in the sample.
- Total area under the normal curve remains 1 and it is true for all continuous probability distributions.
- ANOVA is used to compare 2 or more qualitative variables.
- Large sample tests are used when n is greater than 30.

Q2) Write short note (Any Two) :

[5 Marks Each]

- a) Type I and Type - II error.
- b) Stratified Sampling.
- c) Two Way Classification.
- d) Chi-square test of goodness of fit for population.

Q3) A) Attempt the following :

- a) The length of a human pregnancy is normally distributed with a mean of 272 days with a standard deviation of 9 days. **[4]**
 - i) Find the probability of a pregnancy lasting more than 280 days.
 - ii) Find the probability of a pregnancy lasting less than 250 days.
- b) In a department examination, the candidates of both sexes yielded as presented in following table : **[4]**

Sex	Pass	Fail
Male	1	6
Female	7	6

Can it have inferred that the result of the test is related to the sex of the candidates? Use 5% level of significance.

(Given : $\chi^2_{1, 0.05} = 3.841$)

B) Attempt the following :

- a) Fill in the blanks of the following ANOVA tables marked “-” **[4]**

Source of variation	Degrees of freedom	Sum of squares	Mean Sum of squares	Variance Ratio
Between Salesman	4	45	-	-
Between Months	3	91	-	-
Error	8	80	-	
Total	15	216		

Test the homogeneity of machine types and workers. Use 5% level of significance.

- b) A population has mean 75 and standard deviation 12. [3]
- i) Random samples of size 121 are taken. Find the mean and standard deviation of the sample mean.
- ii) How would the answers to part (i) change if the size of the samples were 400 instead of 121?

Q4) A) Attempt the following :

- a) The gain in weights (in lbs) of pigs fed on two diets A and B are given below : [4]

Diet	Gain in weight
A	25, 32, 30, 34, 24, 14, 32, 24, 30, 31, 35, 25
B	44, 34, 22, 10, 47, 31, 40, 30, 32, 35, 18, 21, 35, 29, 22

Test whether the two diets differ significantly regarding their effect on increase in weights. [Given $t_{25,0.05} = 2.0595$]

- b) In a random sample of 800 persons from rural area 200 were found to be smokers. In a sample of 1000 persons from urban area 350 were found to be smokers. Test whether proportion of smokers is same for both populations. (Use 5% level of significance) [4]

B) Attempt the following :

- a) The mean mathematics SAT score in 2012 was 514 with a standard deviation of 1 ("Total group profile," 2012). Assume the mathematics SAT score is normally distributed. [4]
- i) Find the probability that a person has a mathematics SAT score over 700.
- ii) Find the probability that a person has a mathematics SAT score between a 500 and a 650.
- b) Write any two Properties of Normal Distribution. [3]

