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.***

Q1) Attempt the following :

A) Choose the correct alternative of the following: (any five)[5 × 1 = 5]

i) If $Z \sim N(0, 1)$, then $P(Z < 0) = P(Z > 0) = ?$

a) 1 b) 0

c) 0.5 d) 0.75

ii) The hypothesis of the no difference is called as

a) Null Hypothesis b) Alternative Hypothesis

c) Two-sided d) One sided

iii) Let $X \rightarrow N(8, 25)$ then variance of X is

a) 8 b) 25

c) 0 d) 1

iv) We want to test H0 : Two attributes A and B are independent and both the attributes are at three levels. Then under H_0, the statistic used is

a) χ^2_2 b) χ^2_4

c) χ^2_3 d) χ^2_1

v) Paired t-test was applied to 13 observations $\{(x_i, y_i) ; i = 1, 2, 3, ...,13\}$. In this case the distribution of test statistic under null hypothesis $H_0 : \mu_d = 0$ is t-distribution with _____ degrees of freedom.

a) 13 b) 12

c) 26 d) 24

P.T.O.

vi) Stratified sample is _____ within and _____ Between the strata.

a) Homogeneous, Heterogeneous

b) Homogeneous, Independent

c) Heterogeneous, Homogeneous

d) Heterogeneous, Independent

vii) Analysis of variance is a statistical method of comparing the _____ of several populations.

a) Standard deviations b) Variances

c) Means d) Proportions

B) State whether the following statements are True or False. [each one]

i) Level of significance cannot be made zero.

ii) In simple random sampling without replacement, drawn unit after recording is replaced in population before next draw.

iii) Normal Distribution is positively skewed distribution.

iv) ANOVA is the preferred method for finding differences among several population proportions.

v) Statistic is constant and parameter is random variable.

***Q2)* Write short note (any two) : [5 each]**

a) Simple Random Sampling Without Replacement (SRSWOR).

b) Stratified Sampling with one real life situation.

c) Analysis of Variance (ANOVA).

d) Give the test procedure of Z-test for testing the significance of equality of two population mean.

Q3) a) i) If $X \sim N(0, 1)$ then find : **[4]**

I) $P(X \geq 1.3)$ II) $P(0 \leq X \leq 1.3)$

III) $P(X \leq 1.3)$ IV) Mean and Variance

ii) A random sample of 90 adults is classified according to gender and the number of hours they watch television during a week : **[4]**

Hours spent in watching TV	Gender	
	Male	Female
Over 15 hours	15	29
Below 15 hours	27	19

Examine whether the time spent watching television is independent of whether the viewer is male or female. Use 5% level of significance.

b) i) Four types of fertilizers were applied to seven types of seeds and the ANOVA table constructed is given below, fill in the blanks of the following tables marked "–". **[4]**

Sources of variation	Degrees of freedom	Sum of squares	Mean Sum of squares	Variance Ratio
Between Fertilizers	3	26.4	8.8	-
Between seeds	-	30	5	-
Error	18	77.9	-	
Total	27	134.3		

Test whether production across fertilizers equal or not? Use 5% level of significance.

ii) A standardized placement test in mathematics was given to 11 boys and 9 girls. The boys made score with sample mean square $S_1^2 = 129.8$, while the girls made score with sample mean square $S_2^2 = 91.75$. Use F- test to test whether the populations from which the two samples are drawn have same variances or not at 10 % level of significance. [Given : $F_{10,8,0.05} = 3.36$]. **[3]**

Q4) a) i) A quality control manager of an electronic plant thinks that handicapped people do same work as that of normal people. A sample of 400 items produced by the handicapped found to have 20 defectives. On the other hand, a sample of 500 items produced by the normal people contained 32 defectives' the data support the managers claim? Justify the answer, Use 5% level of significance.**[4]**

ii) The hours of sleep for 10 patients before and after giving a new drug are recorded. Test whether there is a significant difference in the average hours of sleep at 5 % level of significance. **[4]**

Hours of sleep (before)	6	5	7	7	8	9	9	6	6	8
Hours of sleep (after)	7	6.5	8	8.5	9	9.5	9.5	7	6.5	9

b) i) In a population of size 5 the values are 4, 3, 5, 7, 10. Draw all possible sample of size 2 using SRSWOR. Verify that sample mean is an unbiased estimator of population mean. **[4]**

ii) Define Standard Normal distribution, also state any two properties of normal distribution. **[3]**

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