Total No. of Questions : 4]

SEAT No. :

PB-1386

[Total No. of Pages : 4

[6224]-611

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:** **[5 × 1 = 5]**

A) Choose the correct alternative of the following (any Five).

i) If Z ~ N (0, 1), then P(Z < 0) = P(Z > 0) =?

a) 1 b) 0

c) 0.5 d) 0.75

ii) Testing $H_0 : \mu = 50$ against HI : $\mu \neq 50$ is a

a) one sided left tailed test b) one sided right tailed test

c) two sided test d) both a and b

iii) Let $X \rightarrow N(300,25)$ then standard deviation is

a) 300 b) 12

c) 25 d) 5

iv) We want to test H_0: 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_4^2

c) χ_3^2 d) χ_1^2

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) The _____ sum of squares measures the variability of the observed values around their respective block means.

a) Error b) Total

c) Treatment d) block

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** **[5 × 1 = 5]**

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) Type I error is rejecting H_0 when it is true

iv) Long form of ANOVA Analysis of variance.

v) Large sample tests are used when n less than 30

Q2) Write short note (any two) **[10]**

a) Systematic Sampling

b) One Way Classification

c) Type I error and Type II error

d) Chi-square test of goodness of fit for population.

Q3) A) a) **If X ~ 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

b) 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) a) Fill in the blanks of the following ANOVA tables marked "–"

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 **[4]**

b) In a sample of 10 observation, the sample mean square is s12 = 94.5, In another sample of 8 observation, the sample mean square is s22 = 101.7. 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: F7,9,0.05 = 3.29) **[3]**

Q4) A) a) Derive the Properties of Normal Distribution. **[4]**

b) The price of a popular tennis racket at a national chain store is $179. Portia bought five of the same racket at an online auction site for the following prices:

155, 179, 175, 175, 161 .Assuming that the auction prices of rackets are normally distributed, determine whether there is sufficient evidence in the sample, at the 5% level of significance, to conclude that the average price of the racket is less than $179 if purchased at an online auction. **[4]**

B) a) 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]**

b) Define Standard Normal distribution, also state any two properties of normal distribution Solve the following: **[3]**

i) The mean mathematics SAT score in 2012 was 514 with a standard deviation of 117 ('Total group profile," 2012). Assume the mathematics SAT score is normally distributed.

   a) Find the probability that a person has a mathematics SAT score over 700.

   b) Find the probability that a person has a mathematics SAT score between a 500 - 650 a.

ii) Random samples of size 225 are drawn from a population with mean 100 and standard deviation 20. Find the mean and standard deviation of the sample mean.

☺☺☺