



# UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Eighth Semester – 2019

Paper: Statistics (Advanced)

Course Code: BBA-410 Part – I (Compulsory)

Time: 15 Min. Marks: 10

Roll No. in Fig. ....

Roll No. in Words. ....

Signature of Supdt.: .....

**ATTEMPT THIS PAPER ON THIS QUESTION SHEET ONLY.**

**Division of marks is given in front of each question.**

**This Paper will be collected back after expiry of time limit mentioned above.**

**Q.1. Encircle the correct option.**

**(10x1=10)**

- I. **Coefficient of correlation** communicates that;
  - a. How much is strength of linear relationship between the variables?
  - b. How much proportion of total variation in independent variable is due to variation in dependent variable?
  - c. How much proportion of total variation in dependent variable is due to variation in independent variable?
  - d. None of the above.
- II. What is true from the following for **regression coefficient X on Y as to be positive?**
  - a. The correlation coefficient will be either positive or negative.
  - b. The regression coefficient y on x will be positive.
  - c. The coefficient of determination will also be negative.
  - d. Both coefficient of correlation and other regression coefficient will also be negative.
- III.  $\beta$  indicates the chances of committing:
  - a. Type-I Error.
  - b. Type-II Error.
  - c. Error either Type-I or Type-II.
  - d. Sampling Error.
- IV. What will be the **Z-value** for level of significance as to be 10%:
  - a) 1.28
  - b) 1.65
  - c) 1.96
  - d) 2.33
- V. The **confidence limits**  $(\bar{X} \pm t_{(\alpha; n-1)} \times \frac{s}{\sqrt{n}})$  used to estimate:
  - a) Sample mean.
  - b) Population mean.
  - c) Population variance.
  - d) Population mean for sample of small size only.
- Vi. **Test of independence of Attributes** carried out with the use of test statistic:
  - a) Z
  - b) t
  - c) F
  - d) Chi – square

**P.T.O.**

- VI.** To test **Y is not independent from X** through t-test, the alternative hypothesis you prefer to use is:
- a)  $H_A: \alpha = 0$
  - b)  $H_A: \alpha \neq 0$
  - c)  $H_A: \beta = 0$
  - d)  $H_A: \beta \neq 0$
- VII.** The **degree of freedom** for a contingency table of size  $5 \times 4$  will be:
- a) 20
  - b) 12
  - c) 9
  - d) 0
- VIII.** A **cross classification table** is same as:
- a) Contingency Table
  - b) ANOVA Table
  - c) Working Table
  - d) None of the above
- IX.** The F-ratio contains:
- a) Two estimates of population variances
  - b) Two estimates of the population mean
  - c) One estimate of population mean and one estimate of population variance
  - d) None of these
- X.** If in linear regression model  $Y = \alpha \pm \beta X$ ,  $\alpha = 0$  then the model suggest that
- a) Y is independent from X.
  - b) Y is free from X.
  - c) Both b & c.
  - d) The fitted line passes through origin.



**ATTEMPT THIS (SUBJECTIVE) ON THE SEPARATE ANSWER SHEET PROVIDED**

**Q2:** Write short answers of following: (02× 10 = 20)

- i. Simple and composite hypothesis.
- ii. Boots trap method.
- iii. Critical region.
- iv. Assumptions carried out in testing trough f-statistics.
- v. Give two formulae to estimate population variance.
- vi. What is test of independence of attribute?
- vii. Design ANOVA Table for two way classified table.
- viii. Find the value coefficient of determination if possible from  $b_{xy}= 0.35$  and  $b_{yx}= -0.85$ .
- ix. Write two confidence limits formulae for population mean.
- x. Write two normal equations obtained through least-square method for the model  $Y = \alpha + \beta X$ .

**Q3 (a):** To estimate mean average time of producing an item and average variation in producing an item following data is collected from an ongoing producing plant.

**Minutes:** 15, 11, 19, 22, 25, 14, 16, 13, 21, and 14.

Compute:

a) 90% Confidence Interval for population mean ( $\mu$ ). (03+02=05)

b) Test the Hypothesis  $\mu = 15$  using confidence interval develop in part (a).

**(b):** Given a sample mean of 8, a population standard of 2.6, and a sample size of 32, finds the Confidence level ( $\alpha$ ) associated with the Confidence Interval for population mean ( $\mu$ ): 6.85 to 9.15. (05)

**Q4 (a):** Fit least-square regression line to estimate future demand against given price from following data.. (05)

<b>Price (Rs./unit)</b>	5	10	15	20	25	30
<b>Demand (units in thousands)</b>	100	90	85	75	60	50

**(b):** Prepare ANOVA Table from the following data: (05)

<b>A</b>	<b>B</b>	<b>C</b>
12	13	20
14	15	22
15	12	25
18	20	28
11	20	30

**Q5:** A brand manger is concerned that her brand's share may be evenly distributed throughout the country. In a survey in which the country was divided into four geographic regions, a random sampling of 100 consumers in each region was served, with the following results:

<b>Customers</b>	<b>REGIONS</b>			
	<b>North-East</b>	<b>North-West</b>	<b>South-East</b>	<b>South-West</b>
<b>Purchase the brand</b>	40	55	45	50
<b>Do not purchase the brand</b>	60	45	55	50

**Required:**

(02×5 = 10)

- a) Expected Table
- b) Value of chi-square
- c) State Null and Alternative hypothesis
- d) Degree of freedom
- e) Conclude whether brand share is the same across the four regions using  $\alpha = 0.05$ .