(i) Printed Pages: 4 Roll No. .....

(ii) Questions : 9 Sub. Code : 0 9 1 2

Exam. Code : 0 0 2 7

**Bachelor of Computer Applications 1st Semester**

**(1129)**

**FUNDAMENTALS OF MATHEMATICAL STATISTICS**

**Paper—BCA-16-102**

**Time Allowed : Three Hours]** **[Maximum Marks : 65**

**Note :**—Attempt any **ONE** question from each section. Section E is compulsory.

## SECTION—A

1. (a) Define Statistics. Explain the various stages involved in statistical investigation. 6

(b) Define Weighted Arithmetic Mean. Calculate Weighted Arithmetic Mean of marks obtained by the students in different subjects :

| Subject | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| Marks | 81 | 76 | 74 | 58 | 70 | 73 |
| Weights | 2 | 3 | 6 | 7 | 3 | 7 |

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2. (a) Define Secondary Data. Discuss the criteria for evaluating secondary data. 6

(b) Explain the use of Geometric Mean as an average. Given the following frequency distribution, calculate the Geometric Mean :

| Class | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 | 60-70 |
|---|---|---|---|---|---|---|---|
| Frequency | 30 | 26 | 14 | 8 | 7 | 6 | 5 |

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## SECTION—B

3. What do you mean by partition value ? Define Quartiles, Quintiles, Octiles, Deciles and Percentiles. Calculate $Q_3$, $Qu_2$, $O_5$, $D_9$, $P_{81}$ from the following information concerning marks obtained by 10 students.

| Marks | 44 | 47 | 55 | 15 | 73 | 13 | 51 | 88 | 21 | 39 |
|---|---|---|---|---|---|---|---|---|---|---|

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4. Define variance, standard deviation and coefficient of variation as measure of dispersion. The following data gives the mean and variance of the height of boys and girls studying in the college. Find :

(i) The standard deviation of the height of boys and girls taken together, and

(ii) Which group has more variability in heights ?

| | **Boys** | **Girls** |
|---|---|---|
| Number | 400 | 100 |
| Average Height | 68 inches | 65 inches |
| Variance | 9 $(\text{inches})^2$ | 4 $(\text{inches})^2$ |

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## SECTION—C

5. (a) Define correlation and its types on the basis of direction of change, changes in proportion and number of variables. 6

(b) Calculate rank correlation between marks in Computers and Statistics, as given below :

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Computer : | 15 | 10 | 20 | 28 | 12 | 10 | 16 | 18 |
| Statistics : | 16 | 14 | 10 | 12 | 11 | 15 | 18 | 12 |

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6. Define Karl Pearson Coefficient of correlation. State its characteristics. Find out Karl Pearson Coefficient of correlation between given data :

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X | 23 | 27 | 28 | 29 | 30 | 31 | 33 | 35 | 36 | 39 |
| Y | 18 | 22 | 23 | 24 | 25 | 26 | 28 | 29 | 20 | 32 |

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## SECTION—D

7. (a) Equations of two lines of regression are $3X + 2Y = 21$, $4X + Y = 23$. Find out coefficient of correlation. 6

(b) Define Regression. Why are there in general, two lines of regression ? Explain its usage and limitations. 7

8. (a) Define regression coefficients and prove that the coefficient of correlation is the geometric mean between regression coefficients. 6

(b) From the following data, find out regression equation of y on x. Hence predict the value of Y for X = 3.5 :

| X | 1 | 2 | 4 | 5 | 7 | 6 | 10 | 13 |
|---|---|---|---|---|---|---|---|---|
| Y | 10 | 12 | 14 | 15 | 20 | 25 | 30 | 26 |

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## SECTION—E

9. Answer the following question :—

(i) Define frequency polygon. 2

(ii) Distinguish between geometric mean and harmonic mean. 2

(iii) Define Scatter diagram. Mention its uses. 2

(iv) What do you understand by dispersion ? List two characteristics of a good measure of dispersion. 2

(v) Define range. Write merits and limitations of range. 2

(vi) A student calculates the coefficient of correlation (r) as 0.7 when the size of sample (n) is 5 and concludes that coefficient of correlation (r) is highly significant. Is he correct ? Justify your answer. 3