D.K.M COLLEGE FOR WOMEN (AUTONOMOUS), VELLORE-1
DEPARTMENT OF MATHEMATICS
ALLIED: STATISTICAL METHODS AND THEIR APPLICATIONS I – 15CAMA3B
II B.SC., COMPUTER SCIENCE (I& II BATCH)

UNIT I   SECTION-A   2 MARKS

1. Define statistics.

2. Define primary data.

3. Distinguish between Primary and Secondary data.

4. What are the uses of diagrammatic representation?

5. What is meant by classification?

6. What is pie diagram?

7. Write any two limitations of statistics

8. Write the methods of collecting the primary data

9. State any two applications of statistics

10. What is known as secondary data?

SECTION-B   5 MARKS

1. Explain the parts of the table

2. State the limitations of statistics

3. Draw the Histogram from the following data:

Mid value:	15	25	35	45	55	65	75
Frequency:	10	24	40	32	20	14	4

4. Draw a Less than and More than Ogive from the data given below:

Profit: (in Lakhs)	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
No. of: Companies	6	8	12	18	25	16	8	5	2

5. Represent the following data by a pie diagram

Item:	Food	Clothing	Rent	Education	Fuel
Expenditure(Rs.)	6040	30	20	10

6. Form a Frequency distribution from the following data: 10, 17, 15, 22, 11, 16, 19, 24, 29, 18, 25, 26, 32, 14, 17, 20, 23, 27, 30, 12, 15, 18, 24, 36, 18, 15, 21, 28, 33, 38, 34, 13, 10, 16, 20, 22, 29, 19, 23, 31

7. Explain the graphical representation of statistical data

8. Explain in detail the scope of statistical methods

9. Explain the methods of collecting the primary data

10. Explain the types of classification

11. Explain the difference between diagrams and graphs

12. Write the limitations of diagrams and graphs

SECTION-C   10 MARKS

1. Draw a Pie-Diagram (circular) Diagram for the following data:

Expenditure in Rupees

Commodity	Family A	Family B
Food	300	500
Rent	200	350
Clothes	125	250
Education	110	225
Miscellaneous	75	125
Savings	90	150

2. From a survey of sample size 50 the following scores were obtained.

40	45	41	45	45	30	39	8	48	25
26	9	23	24	26	29	8	40	41	42
39	35	18	25	35	40	42	43	44	36
27	32	28	27	25	26	38	37	36	35
32	28	40	41	43	44	45	40	39	41

Prepare a frequency table and present the same in a histogram.

3. Explain the different types of diagrams

<p align="center">**UNIT II   SECTION-A   2 MARKS**</p>

1. Calculate mean for the following data 40, 50, 55, 78, 58, 60, 73, 35, 43, 48.

2. In a moderately asymmetrical distribution the values of mode and arithmetic mean are 60 & 78. Estimate the value of median.

3. Calculate Geometric mean: 50, 72, 54, 82, and 93.

4. Find the mean of first 10 Natural numbers
5. Write the formula for standard deviation
6. Define average

7. Define median, Harmonic mean

8. What is Geometric mean?

9. Write any two merits of Geometric mean and Harmonic mean

10. Find the Harmonic mean for the following data 10, 15, 9, 25, 19

<p align="center">**SECTION-B   5 MARKS**</p>

1. Calculate the median from the following data:

Marks:	10-25	25-40	40-45	55-70	70-85	85-100
Frequency:	6	20	44	26	3	1

2. Find the harmonic mean.

Class interval:	15-25	25-35	35-45	45-55	55-65	65-75
Frequency:	4	11	19	14	10	2

3. Find the standard deviation for the following data: 77, 33, 75, 70, 72, 76, 75, 72, 74, and 76.

4. Find the median for the following data:

Marks:	10-25	25-40	40-55	55-70	70-85	85-100
Frequency:	6	20	44	26	3	1

5. Find the standard deviation for the following data
   77, 33, 75, 70, 72, 76, 75, 72, 74, 76

6. Find the median for the following data:

Wages: 20-30   30-40 40-50 50-60 60-70

No. of: 3   5   20   10   5

Labours

7. Calculate the mode of the following distribution

X: 5-10   10-15 15-20 20-25 25-30 30-35 35-40 40-45

F: 3   6   10   20   15   5   4   2

8. In a moderately asymmetrical distribution, the mode and mean 32.1, 35.4

respectively. Calculate the median

SECTION-C   10 MARKS

1. Calculate the mode from the following series:

Size of items: 0-5   5-10   10-15 15-20 20-25 25-30 30-35 35-40 40-45

Frequency: 20   24   32   28   20   16   34   10   8

2. Calculate standard deviation.

Age: 10 20   30   40   50   60   70   80

No. of Persons: 15   30   53   75   100   110   115   125

3. Calculate the Mean, Median and the Mode for the following data:

Class Interval: 0-10   10-20 20-30 30-40 40-50 50-60

Frequency   :   12   18   27   20   17   6

4. The price of shares X and Y are given below, state which share is more stable
   in value

 X: 55   54   52   53   56   58   52   50   51   49

Y: 108   107   105   105   106   107   104   103   104   101

5. Calculate Geometric mean

X: 10 20   25   40   50

F: 20 30   50   15   5

UNIT III   SECTION-A   2 MARKS

1. Write the demerits of method of least squares
2. Write the normal equation of second degree parabolic curve
3. Define a fitting straight line.

4. Write the fitting a curve of the form $y = ae^{bx}$.

5. Write any two merits of the methods of least square.

6. What are normal equations of fitting of a straight line?

7. Explain the method of fitting a curve of the form $y = ax^b$

SECTION-B   5 MARKS

1. Fit a straight line trend to the following time series

   Year: 2007   2008   2009 2010 2011 2012

   Production: 72   75   74   78   83   82

2. Explain the limitations of the method of Least squares.

3. Find trend values by using the equation $y = ax^b$ and estimate the value for 2008.

Year	1961	1962	1963	1964	1965	1966	1967	1968
Sales	80	90	92	83	94	99	92	104

4. Fit a straight line to the following data:

   X: 1   2   3   4   6   8

   Y: 2.4 3   3.6   4   5   6

5. The following table gives the profits of a concern for 5 years ending 2007

   Year: 2003   2004 2005 2006 2007

   Profits: 1.6   4.5   13.8   40.2   125.0

   (inRs. Thousands)

   Fit an equation of the type $y = ae^{bx}$

SECTION-C   10 MARKS

1. Fit the parabola of the second degree to the data given below.

   Year: 2004 2005 2006 2007 2008

   Sales ('000):   16   18   19   20   24

2. Below are given the figures of production(in thousand quintals) of a sugar factory

Year	1985	1987	1988	1989	1990	1991	1994
Production	77	88	94	85	91	98	90

   Fit a straight line by the method of Least squares.

3. Fit a parabola curve for the following data

X:	1	2	3	4	5	6	7	8	9
Y:	2	6	7	8	10	11	11	10	9

UNIT IV   SECTION-A   2 MARKS

1. Define probability
2. What is the chance of getting a king in a draw from a pack of 52 cards?
3. Define sample space.
4. One card is drawn at random from a standard pack of 52. What is the probability that it is either a king or a queen?
5. Define Mutually Exclusive events and Independent events
6. State Addition theorem on probability
7. State multiplication theorem on probability
8. State Baye's theorem
9. Define Conditional Probability
10. Define Trial and Event

SECTON-B   5 MARKS

1. State and prove Addition theorem on probability.
2. A problem in Statistics is given to 3 students A, B and C whose chances of solving it are $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}$ respectively. What is the probability that the problem will be solved?
3. From a bag containing 4 white & 6 black balls two balls are drawn at random. If the balls are drawn one after the other without replacement, find the probability that (i) both balls are white (ii) both balls are black.
4. State and prove the Multiplication theorem.
5. State and prove Baye's theorem.
6. What is the chance that a leap year can be selected from 53 Sundays?
7. Find the probability of drawing a queen, a king, and a knave in that order from a pack of cards in 3 consecutive draws, the card drawn not being replaced?

SECTION-C   10 MARKS

1. A bag contains 6 white and 9 black balls. Two drawings of 4 balls are made such that the
   balls are replaced before the second trial. Find the probability that the first drawing will give 4 white and the second 4 black balls.

2. A company has 3 machines M_1, M_2, M_3 which produces 20%, 30%, 50% of the products respectively. Their respective defective percentages are 7, 3 and 5. From those products one is chosen and inspected. If it is defective what is the probability that it has been made by machine M_1, M_2, M_3?

3. Three coins are tossed. Find the probability of the following events. (i) No head (ii) At least one head (iii) One head (iv) At most one head (v) 4 heads (vi) At most 4 heads.

4. Two boxes contain 12 White and 18 Black balls, 15 White and 25 Black balls respectively. One box was taken at random and one ball was taken from it. It is a Black ball. What is the probability that it from the first box?

UNIT V   SECTION-A   2 MARKS

1. Calculate coefficient of correlation from the following data: N= 10,

$$\sum X^2 = 290, \sum X = 50, \sum Y = -30, \sum Y^2 = 300, \sum XY = -115$$

2. If the two regression coefficient of X on Y and Y on X are -0.4 and -0.9 respectively. Find the correlation coefficient between X and Y

3. What is correlation?

4. Define negative correlation with an example

5. Define linear regression

6. Write the merits of rank correlation

7. State the regression lines

8. What is regression analysis?

9. Write the formula of correlation coefficient & rank correlation

10. Define rank correlation

SECTION-B   5 MARKS

1. Following are the ranks obtained by 10 students in two subjects. To what extend the knowledge of the students in the two subjects are related?

   Subject I: 1   2   3   4   5   6   7   8   9   10

   Subject II: 2   4   1   5   3   9   7   10 6   8

2. Calculate the regression line X on Y from the given information

$$\sum X^2 = 240,\ \sum X = 20,\ \sum Y = 40,\ \sum Y^2 = 410,\ \sum XY = 200,\ N = 10$$

3. Compute the coefficient of concurrent Deviations for the following data in X and Y

   X: 60 55   50   56   30   70   40   35   80   80   75

   Y: 65 40   35   75   63   80   35   20   80   60   60

4. You are given the following data:

	X	Y
Mean:	36	85
S.D :	11	8, r = 0.66. Find two regression equations.

8. Calculate rank correlation between the ranks given for X and Y series

   X: 10   8   1   2   6   9   3   5   4   7

   Y: 6   10   5   4   3   1   2   9   8   7

SECTION-C   10 MARKS

1. Compute the Co-efficient of Correlation between X and Y

   X: 10   12   18   8   13   20   22   15   5   17

   Y: 88   90   94   86   87   92   96   94   88   85

2. The Lines of Regression of a bivariate population are: $5X - Y = 22$ and $64X - 45Y = 24$.

   (i) Find Mean values of X and Y (ii) Coefficient of correlation between X and Y
   (iii) Standard deviation of Y

3. Calculate the regression equation Y on X from the following data

   X: 42 44   58   55   89   98   66

   Y: 56 49   53   58   65   76   58

4. You are given below the following information about advertising & sales

	Adv. Exp (x) (Rs. In Lakhs)	Sales (y) (Rs. In Lakhs)
Mean	10	96
S.D	3	12

Correlation coefficient = 0.8

(i) Obtain the two regression lines

(ii) Find the likely sales when advertisement expenditure is Rs. 15 lakhs

(iii) What should be the advertisement expenditure if the company wants to attain sales target of Rs. 120 lakhs?

5. Calculate the correlation coefficient for the following heights(in inches) of fathers (X) and their sons (Y)

X: 65 66 67 67 68 69 70 72

Y: 67 68 65 68 72 72 69 71