1. SET THEORY

1. Which of the following is true?
   (a) $0 \in \{\}$ (b) $0 \subset \{\}$
   (c) $0 \in \{0\}$ (d) $0 \subset \{0\}$

2. If $n(A) = n(B)$, A and B are
   (a) Equal set   (b) Equivalent set
   (c) A subset of B (d) B subset of A

3. The collection of all subsets of a set is called..............?

4. There are ....quadrats in a xy graphical plane?

5. $(A \cup B)^c = (A \cap B)^c$, say true or false

6. The distance of a point P(-3,4) from the origine is
   (a) 3   (b) 4   (c) 5   (d) 7

7. A= { x:x is a natural number satisfy
         $1 < x \le 6$ }
   B = { x:x is a natural number satisfy
         $6 < x \le 10$ }
   Find $(A \cup B)$ and $(A \cap B)$**?**

8. Write down any one form of De Morgan's formula?

9. If A ={1,2,3,4,5,6} B={2,4,6,8}
   Find A-B and B-A ?

10. Define universal set?

11. Write down all subset the set
        A ={ 1,2,3}

12. Define disjoint set?

13. Use the union rule to answer the question. If $n(A) = 24$, $n(B) = 69$ and $n(A \cup B) = 81$. What is $n(A \cap B)$?

14. If A= {1,2,3}, B= { 3,4,5}
        C= {1,3,5}
    Prove that A-(B $\cup$ C)=(A-B) $\cap$ (A-C)

15. Using Set A={1,2,3,4} B={2,4,6,8}
    C={ 3,4,5,6}. verify that
    A $\cap$ (B $\cap$ C)= (A $\cap$ B) $\cap$ C

16. . If A={0,2,3,5} B={ -1,2,3,7,9}
    Find (a) $A \cup B$ (b) $A \cap B$
         (c) A-B   (d) (A-B) $\cup$ (B-A) ?

17. . In a school of fine arts, 150 students are dancers and 98 students are singers. If 63 students are both dancers and singers,find out total number of students in the school?

18. Find the value of x such that PQ=QR where P,Q and R are (6,-1),

19. . Prove that the points (6,2), (3,1) and (-2, 4) represents the vetrics of a right angled triagle

20. . If A= {1,2,3}, B= { 3,4,5}
        C= {1,3,5}
    Prove that A-(B $\cup$ C)=(A-B) $\cap$ (A-C)

21. . Using the set A={2,3,4,5,6,7,8}
    B={ 2,4,5,6,7} C={ 5,6,7,8}
    Verify that (A-B) $\cup$ C=(A-B) $\cap$ (A-C)?

22. Using Set A={1,2,3,4} B={2,4,6,8}
        C={ 3,4,5,6}. verify that
    A $\cap$ (B $\cap$ C)= (A $\cap$ B) $\cap$ C

23. Use the union rule to answer the question. If $n(A) = 24$, $n(B) = 69$ and $n(A \cup B) = 81$. What is $n(A \cap B)$?

24. Using the set A={2,3,4,5,6,7,8}
    B={ 2,4,5,6,7} C={ 5,6,7,8}
    Verify that (A-B) $\cup$ C=(A-B) $\cap$ (A-C)?

2. MATRICES

1. Write a 3×3 identity matrix?
2. Value of matrix (determinant)

$$A = \begin{pmatrix} a & 0 & 0 \\ 0 & b & 0 \\ 0 & 0 & c \end{pmatrix} \text{ is } \ldots\ldots\ldots?$$

3. The transponse of A is B. Its transponse is
   (a) B itself   (b) A
   (c) A+B   (d) AB^T
4. Write the condition for a matrix x to be symmetic?
5. Define zero matrix?
6. Find all the minor of the matrix

$$A = \begin{pmatrix} 2 & 4 \\ -5 & -10 \end{pmatrix}?$$

7. Define matrices?
8. Give an example of scalar matrix?
9. If A= [1 2 3], B= [a b] Find $A \times B$ and $B \times A$?
10. Define square matrix?
11. Define column matrix?

12. Find $(A+B)^T$, if A= $\begin{pmatrix} 3 & 6 \\ 4 & -9 \end{pmatrix}$

$$B = \begin{pmatrix} -3 & 6 \\ -8 & 9 \end{pmatrix}?$$

13. Find BA, if A= $\begin{pmatrix} 1 & 2 & 3 \\ 3 & 4 & 2 \\ 1 & 0 & 1 \end{pmatrix}$

$$B = \begin{pmatrix} 2 & 1 & 2 \\ 1 & 6 & 1 \\ 2 & 3 & 4 \end{pmatrix}$$

14. . Find AB, if

$$A = \begin{pmatrix} 4 & 2 & 3 \\ 5 & 1 & 2 \end{pmatrix} B = \begin{pmatrix} 4 & 6 \\ 2 & 1 \\ 1 & 2 \end{pmatrix}$$

15. What you mean by submatrix?
16. Let A= $\begin{pmatrix} 2 & 5 \\ -3 & 1 \end{pmatrix}$ and B= $\begin{pmatrix} 4 & -5 \\ 3 & k \end{pmatrix}$

   Find the value of k, if AB=BA ?
17. Is the inverse of the matrix

$$A = \begin{pmatrix} 2 & -4 \\ -2 & 4 \end{pmatrix} \text{ exists. Justify your answer?}$$

18. Compute the product AB where

$$A = \begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix} \quad B = [2 \quad 3 \quad 4 \quad 5]$$

19. A= $\begin{pmatrix} 0 & -1 & 5 \\ 2 & 8 & 9 \\ 1 & 0 & 8 \end{pmatrix}$ Find 5A ?

20. If A= $\begin{pmatrix} 1 & 2 \\ 3 & 4 \\ 5 & 6 \end{pmatrix}$ B= $\begin{pmatrix} -1 & -2 \\ 0 & 4 \\ 3 & 1 \end{pmatrix}$

   Find the x matrix such that A+B =X
21. Solve the equation using matrix
   $5x + 2y = 4$, $7x + 3y = 5$
22. Solve the following equations by using matrices
   $2x -3y = 3$, $4x -y = 11$

23. Find the inverse matrix of $\begin{pmatrix} 2 & 6 & 7 \\ 0 & 2 & 1 \\ 2 & 3 & 4 \end{pmatrix}$?

3. THEORY OF EQUATIONS

1. If discriminant = 0, the roots are
   (a) Real and unequal   (b) Real and equal
   (c) Imaginery and unequal (d) None of these
2. The equation y = 2x+5 has
   (a) No solution   (b) One solution
   (c) Three solution (d) Indefinitely
                                 many solution

3. The quadratic equation
   ax²+bx+c=0has equal roots if
   (a) b²-4ac<0   (b) b²-4ac>0
   (c) b²-4ac=0   (d) b²-4ac=1
4. If the sum of two numbers are 8 and their
   product is 15, the numbers are
   (a) -5,-3   (b) 5,3   (c) 5,-3   (d) 2,6
5. Sum of roots of ax²+bx+c=0 is

   (a) $\dfrac{b}{a}$ (b) $\dfrac{a}{b}$ (c) $\dfrac{-b}{a}$ (d) $\dfrac{c}{a}$

6. Solve 2a+b=10, a+2b =11

2. Solve 7(x-2)+ 8(x-3) - 22= x +10
3. Solve $(x-2)+3(x+3)-16 = x+12$
4. What do you mean by roots of quadratic
   equation?

5. Solve $\dfrac{7x+4}{x+2} = \dfrac{-41}{3}$

6. Solve the equation $2x^2 + 2\sqrt{3}x + 1 = 0$

7. Solve $(2-x)+4(3+x)-12 = x+13$

1. The age of Hari and Hani are in the ratio of 4:5.
   8 years from now, the ratio of their age will be
   5:6. Find the oresent age?
2. Find the break even point if, total costs
   C(x) = 90x +500 and total revenue R(x)
   -x² +150x ?
3. Solve 2x+4y =14, 3x+6y =21
4. Solve x²+10x+21=0 by factorisation method?
5. Solve the equation by elimination method
6. Solve the system of equation by elimination
   method
      13x +17y = 91 and 13x +3y = 49

5. SIMPLE INTEREST AND COMPOUND INTEREST

1. What is the simple interest for Rs. 10000 at the rate of 15% per annum for 2 years?

2. Find the amount to be paid at the end of 2 years on Rs. 2400 at 5% per annum compounded annually?

3. Find the total interest amount at the end of 8th year for Rs. 11300 at 9% per annum, simple interest?

4. Govind borrowed Rs. 26400 from a bank to buy a scootter at the rate of 15% per annum compounded yearly. What amount will be paid at the end of 2 years and 4 months to clean the loan?

5. On what sum will the compound interest at 5% per annum for two years compounded annually be Rs. 1640?

6. In how many years a sum of Rs.600 would amount to 757.48 at 6% compounded annually?

7. Find the total interest amount at the end of 5th year for Rs. 8500 at 12% per annum, simple interest?

8. Find the total interest and amount at the end of 5th year for Rs. 5000 at 10% per annum, simple interest?

ANSWERS	
1. 3000	5. 16000
2. 2646	6. 4 YEARS
3. 8136	7. 5100
4. 36561	8. 2500

6. INTRODUCTION TO STATISTICS

1. What is statistics or define statistics?
2. What are statistical methods?
3. What is a variable?
4. What are primary data?
5. What do you mean by secondary data?
6. What are the differences between inclusive and exclusive method of classification?
7. What do you mean by sampling techniques?
8. Distinquish sample and population?
9. What do you mean by census method?
9. Differentiate a variable from an attribute?
10. What are the functions of statistics?
11. Explain the limitations of statistics?
12. Discuss scope and limitations of statistics?
13. What are secondary data? What precautions must be taken before using such data?
14. Dintinquish primary and secondary data
15. Define classification? State the main charecteristics of classification?

16. Briefly explain sampling error?
17. Prepare a questionnaire for under standing consumer preference to evolve better ways of providing shopping facilities to the consumer visiting maals?
18. What do you mean by sampling and population?
19. Distinquish between quantitative and qualitative data?
20. Write a short note on lottery method?
21. What do you mean by random number table?
22. Explain probability(random) sampling?
23. Explain method of collecting primary data and their merits and demerits?
24. Explain the purpose of classification and tabulation? Mention the requesits of good statistical table?
25. What are the steps in conducting a sample survey?
26. Distinquish between classification and tabulation?
27. Explain the advantages and limitations of sampling

22. Draw a blank table to present the data relating to the college students according to faculty (Arts, commerce, science), class (degree, pg), sex (male , female) and year (2001, 2002)

23. The dividend given by Agro mills Ltd. from 1990 to 1995 is given below

Year	1990	1991	1992	1993	1994	1995
Dividend	20	30	32	42	50	60

Represent the data by a bar diagram?

24. Draw multiple bar diagram for the following data

Year	Sales	Gross profit	Net profit
1993	100	30	10
1994	120	40	15
1995	130	45	25
1996	150	50	25

25. Construct histogram and frequency polygon

Class	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69
F	9	11	10	44	45	54	37	26	8	8	1

26. Following table gived data related to profit retained

Profit retained	No. of firms	Profit retained	No. of firms
below 10%	5	below 50%	90
below 20%	17	below 60%	110
below 30%	35	below 70%	112
below 40%	60	below 80%	130

7. DIAGRAMS AND GRAPHS

1. What is pie diagram?
2. What is histogram?
3. Define ogive?
4. Explain ogive curve?
5. State the differences between less than ogive and more than ogive?
6. What is false base line?
7. What is line of best fit?
8. What is frequency curve?
9. What are the uses of diagrams and graphs?

10. Explain the construction of ;
    (a) pie diagram (b) bar diagram
11. State the important types of diagram in common use?
12. Describe any two types of bar diagram?
13. Distinquish between diagram and graph?
14. Draw histogram and frequency polygon to present the following data

15. Draw a histogram and frequency polygon to present the following data

Income	0-5	5-10	10-15	15-20	20-25	25-30	30-35
No. of students	10	20	35	45	40	25	15

16. Draw less than ogive for the following data

Marks	0-20	20-40	40-60	60-80	80-100
No. of students	5	10	18	12	5

17. During 2004- 2008, the number of students in a university is as follows. Represent the data by subdivided bar diagram?

Year	Arts	Science	Law	Total
2004-2005	18000	9000	4000	31000
2005-2006	20000	10000	5000	35000
2006-2007	26000	9000	7000	42000
2007-2008	31000	9500	7500	48000

18. Construct pie diagram to represent the following data

Cost of items	Labour	Bricks	Cement	Steel
Cost in %	40	20	30	10

19. Of the 1125 students studying in a college during a year, 720 were Hindus 628 were boys and 440 were science students. The number of Hindu boys was 392, that of boys studying science 205 and Hindu students studying science 262. The number of science students among Hindu boys was 148. Enter these frequencies in a three way table.

20. Draw a frequency polygon to the following frequency distribution

Marks	10-20	20-30	30-40	40-50	50-60	60-70
No. of students	5	8	15	20	12	7

21. Draw a line diagram for the following data

Class	0-10	10-20	20-30	30-40	40-50	50-60
Frequency	3	6	12	8	5	2

8. MEASURES OF CENTRAL TENDENCY

1. .... is the empirical relation between mean, median, mode?
2. The mean annual salary paid to all employees of a company was Rs. 5000. The mean annual salary paid to male and female employees were Rs. 5200 and Rs. 4200 respectively. Determine the personatge of males and females employed in the company?
3. The average monthly wage of all workers in a factory is Rs. 144. If the average wages paid to male and female workers are Rs. 480 and Rs. 360 respectively. Find the persontage of male and female workers employed by the factory?
4. Briefly describe what is central tendency?
5. The point of intersection of the less than and more than ogive corresponds to
    (a) mean   (b) median   (c) geometric mean   (d) harmonic mean
6. In a symmetric distribution, the relation between the mean, median and mode is given by
    ....?
7. Define arithmetic mean of a set of numbers?
8. Which of the following is true for unimodel asymmetrical sets of data?
    (a) Mean - mode = 3 (mean - median)   (b) mean - median = 3(mean - mode)
    (c) mean -median = 2 (mean - mode)   (d) None of the above
9. Write any two measures of central tendancy?
10. Calculate median

Marks	0-10	10-30	30-60	60-80	80-90
No. of students	5	10	35	8	2

11. What are the benefits of weighted arithmetic mean?

9. MEASURES OF VARIATION

1. Compute mean deviation and its co-efficient for the following data

X	0	1	2	3	4	5	6
Frequency	171	82	50	25	13	7	2

2. The square of standard deviation is an important measure of deviation. Name it.?

3. Note the differences between (basic concepts alone) central tendancy and dispersion?

4. Find the variance of

Class	2	4	5	6	7
f	10	20	25	15	15

5. Define standard deviation?

6. Compute standard deviation of the following data

X	2	7	11	15	18	20	25
F	2	6	10	12	10	8	2

7. Calculate variance if median = 23 , mode = 29, and co-efficient of variation = 50%

−8. Write the formula for finding range.

9. Define co-efficient of variation. Write its use.

10. Find the standard deviation of

Class	0-10	10-20	20-30	30-40	40-50
f	5	10	15	10	5

11. Write down the important method of studying dispersion?

12. What do you mean co-efficient of variation?

13. Define mean deviation of a set of numbers?

10. MEASURES OF SKEWNESS AND KURTOSIS

1. Define kurtosis?
2. Distinguish between skewness and kutosis. Write pearson measures.
3. Define skewness?
4. If mean < median < mode the distribution is ....?
5. Lorenz curve is used to study
   (a) skewness   (b) Kurtosis   (c) correlation   (d) dispersion
6. Define karl pearson co-efficient of skewness?
7. What do you understand by skewness? Using figures distinguish between positive and negative skewness ? Also show the relative position of mean, median and mode in the figures?
8. What do you mean by kurtosis?

11. INDEX NUMBERS AND TIME SERIES ANALYSIS

1. What is an index number? What are its charecteristics?
2. Which is the ideal weighted index number?
3. Write a short note on moving average nethod of trend analysis?
4. Define index number?
5. Define time series? Write its uses?
6. Describe secular trend and seasonal variation in a time series?
7. Explain weighted index numbers? (essay)

4. PROGRESSION

1. The sum of first 'n' terms of an AP is:
   (a) $a+(n-1)d$ (b) ar^{n-1}

   (c) $\frac{n}{2}[2a+(n-1)d]$ (d) $\frac{a(r^{n-1}}{r-1}$

2. Amount of deviation present in the data 8,8,8,8,8, is
   (a) 8   (b) 40   (c) 0   (d) 5

3. What is the common difference of the AP 4, -8 , -20, ...

4. The common difference of the AP is 1, -1, -3, -5

5. What is the common difference of AP

   $-1, \dfrac{1}{4}, \dfrac{3}{2}$,.................

6. The common ratio of GP

   $1, \dfrac{1}{3}, \dfrac{1}{9}, \dfrac{1}{27}$,.....................

7. Find 18th term of the AP -12, 0 , 12,.........

8. Define geometric mean?

9. Find 10th term of the AP: -1, 0, 1,..........

10. Define arithmetic progression?

11. Find the number of terms in the AP 7, 13, 19, ..., 205

12. Find the sum of first 20 terms of the sequence 4, 6, 8, 10, ...

13. Find the sum of first 10 terms of the GP 9, -3 , 1, ...

14. Find the 8th term of GP $1, \dfrac{1}{2}, \dfrac{1}{4}, \dfrac{1}{8}$

15. Find 26th term of AP whose 10th term is 38 and 18th term is 94

16. Three numbers are in GP. Their sum is 21 and product is 216. Find the numbers?

17. (a) If a, b, c are in AP show that

   $$b = \frac{a+c}{2}$$

   (b) If x, y, z are in GP show that

   $$y = \sqrt{xz}$$

18. Find the 20th term of the AP whose first term is 5 and common difference is 2 ?

19. Insert three aithmetic mean between 3 and 19

20. Find the sum of the first 18 terms of the AP 9, -3, -15, ... and also find the sum of the first 2n terms?

21. Insert four arithmetic means between 4 and 324?

22. Which term of the series -2, 0,2,4,.......... is 102?

23. A manufactures of radio sets produced 600 units in the third year and 700 units in the seventh year. Assuming that the production uniformly increases by a fixed number every year,find
    (i) The production in the first year
    (ii) The production in the 10th year
    (iii) The total production in 7th year

24. Insert 3 geometric means between the numbers 1 and 254?

25. Find three numbers in GP whose sum is 26 and products is 216?

26. Find the three consecutive numbers in the AP whose sum is 27 and their product is 720?

27. From the formula $s_n = \dfrac{a(1-r^n)}{1-r}$: r<1

   deduce a formula for finding the sum of infinite terms?

28. Mr. Aravind borrowed from a bank Rs.10000 and agreed to pay back the loan with an interest of Rs. 1400 in 12 installments. Each installment is Rs. 100 less than the previous one. Find the first five installments?

29. If the sum of first 14 terms of an AP is 1050 and its first term is 10. Find the 20th term.

30. State the meaning of Arithmetic progression?

31. Find the 31th term of an AP whose 11th term is 38 and the 16th term is 73

32. The third term of a geometric progression is 12 and the sixth term is 96 . find the first term and the common ratio of the progression?