2021

STATISTICS

Full Marks : 100

Pass Marks : 33

Time: Three hours

Attempt all Questions.

The figures in the right margin indicate full marks for the questions.

*For Question Nos. **3, 8, 11** and **14**, choose the correct answer and rewrite.*

1. Define empty Set. 1

2. Find the value of ${}^{b}C_{2}$. 1

3. ${}^{n}P_{r}$ is equal to – 1

   (A) $\frac{n!}{r!}$

   (B) $\frac{n!}{(n-r)!}$

   (C) $\frac{n!}{r!(n-r)!}$

   (D) $\frac{n!}{(r-n)!}$

4. A and B are any two joint sets which are subsets of the Sample Space S. Draw the Venn-diagram of $A \cap B$. 1

P.T.O.

5. Define Skewness. 1

6. The Coefficient of vaciation of two series A and B are 6·5 and 9·8. State which series has more uniformity. 1

7. Define median. 1

8. The sum of the deviations of a set of values from their arithmetic mean is 1

   (A) 0

   (B) +1

   (C) −1

   (D) mean deviation

9. Define Correlation. 1

10. The correlation between height and weights is negative correlation. Is the above statement true ? If not, write the correct statement. 1

11. If one of the regression Coefficient is lesser than unity, then the other must be 1

    (A) equal to zero

    (B) equal to unity

    (C) greater than unity

    (D) lesser than unity

12. Define Laspeyre's price index. 1

13. Calculate the puchasing power of money, if the Cost of living index number is 150. 1

14. Component of a time series measured by moving average method is 1

(A) Irregular variation

(B) Seasonal variation

(C) Cyclical fluctuation

(D) Trend

15. Define the intersection of two sets A andn B by giving an example. 2

16. Distinguish between $\lim_{x \to a} f(x)$ and $f(a)$. 2

17. If $A=\{1,2,4,5,6,7\}$

$B=\{2,3,4,6,8,9\}$, then

find (i) $A \cup B$ and (ii) $A-B$. 2

18. Draw a rough sketch of 2

(i) Positively Skewel Curve and

(ii) Negatively Skewed Curve.

19. Define bivaciate distribution under what condition the variables are said to be positively correlated. 2

20. Write two uses of index nubmers. 2

21. Calculate Paascke's price index, if Laspeyre's and Fisher's price index numbers are 120 and 110 respectively. 2

22. Define the principle of least squares in fitting a straight line by the method of least squares. 2

23. Calculate the three-yearly moving average of profits of a Company from the data given below : 2

Year :	1991	1992	1993	1994	1995
Profit : (Rs. in crores)	42	47	52	45	13

24. Find $\frac{dy}{dx}$ for the following:

(i) $y = e^x$ Cosec, and

(ii) $y = \frac{\text{Sin } x}{\text{Cos } x}$. 4

25. What is meant by the measure of dispension ? State any two characteristics for an ideal meausre of dispersion. 4

26. The first four moments of a distribution are 1, 4, 16 and 82. Calculate the 1st four central moments of the distribution. 4

27. If $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ are the equations of the lines of regression of y on x and x and y respectively, then prove that $a_1b_2 \leq a_2b_1$. 4

28. Construct Laspeyre's price index number from the following data : 4

	Price		Quantity	
Commodity	1990	1992	1990	1992
A	4	10	50	40
B	3	8	10	8
C	2	4	5	4

29. Write the main septs in the construction of cost of livng index number. 4

30. Write the four components of a time series. 4

31. Define the following : 4

(i) Sample

(ii) Population

(iii) Parameter and

(iv) Statistic.

32. Investigate, for what values of x,

$f(x) - x^3 - 3x^2 - 9$

will be (i) maximum and (ii) minimum. 6

33. Calculate the mean deviation from the mean from the following data: 6

Marks :	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50
No. of Students :	15	10	15	20	40

34. Obtain the two regression lines from the following data : 6

	Chennai	Mumbai
Average Price	66	68
Standrard deviation	2·5	3·4

and $r_{xy} = 0 \cdot 8$

35. An enquiry into the budgets of middle class families in Mumbai gave the following information : 6

Expenses on	Food 30%	Rent 20%	Clothing 20%	Fuel 10%	Misc. 20%
Price in 1988 (Rs.) :	150	50	100	20	60
Price in 1989 (Rs.) :	180	60	125	25	90

What changes in the cost of living figure of 1989 have taken place as compared to 1988 ?

36. Determine the equation of a straight line by the method of least squares from the following data : 6

Year :	1992	1993	1994	1995	1996
Sales (in Rs.)'000 :	32	50	75	80	60

37. State briefly the advantages of Sample Survey over Complete enumeration survey. 6