INSTRUCTIONS TO CANDIDATES

1. Please do not open this Booklet till you are said to do so.
2. **Duration of Test – 2 Hours**
3. Before commencement of the exam, please fill up necessary information in the space provided below and also in the answer sheet.
4. Use HB Pencil only to darken the circle for answer in the question.
5. For each correct answer, one mark will be awarded. For each wrong answer $^1/_4{}^{th}$ of the earmarked for each question will be deducted. If more than one circle is darkened for a question, it will be treated as wrong answer for questions not answered i.e., blanks, a zero will be given
6. Rough Work, if any must be done on the pages, specified as SPACE FOR ROUGH WORK only and nowhere else in the question paper booklet or in the answer sheet.

Marking the Answers
Example:
For Question No. 12, if the candidate Considers, the correct answer to be C, he is to mark as shown below
(Correct Method) 12. (A) (B) ● (D)

Paper	
Topics *(Maximum Marks-75)*	
1.Measure of Central Tendency **2.**Measure of Dispersion **3.**Correlation Analysis **4.**Regression Analysis **5.**Probability	
To be Filled by Students	
Name of Candidate	
Roll No. **(Mobile No)**	
Question Paper Booklet Code	**KGF**

Signature of the Candidate

Space for Rough Work

1. The mean of four observations is 10 and when a constant a is added to each observation, the mean becomes 13. The value of a is

(a) 2 (b) -3
(c) 3 (d) none of these

2. The average salary of a group of unskilled workers is Rs.10,000 and that of a group of skilled workers is Rs.15,000. If the combined salary is Rs.12,000, then what is the percentage of skilled workers?

(a) 40% (b) 50%
(c) 60% (d) none of these

3. The average of $(p + q)$ consecutive numbers starting from 1 is 'r'. If 's' is added to each of the numbers then the new average will be?

(a) r+s (b) r+(s/2)
(c) $\{r + (p + q + s)\}/(p + q)$ (d) None of these

4. The students of a class X^{th} have an average weight of 50 kg. The strength of the class is 49 students. On including the weight of the principal, the average weight shoots up by 0.8 kg. Find the weight of the principal?

(a) 75 (b) 90
(c) 85 (d) None of these

5. The median following numbers, which are given in ascending order is 25. Find the value of x 11,13,15,19, $(x + 2)$, $(x + 4)$,30,35,39,46

(a) 22 (b) 20
(c) 15 (d) 30

6. A man travels from Delhi to Agra at an average speed of 30 km per hour and back at an average speed of 60 km per hour. What's the average Speed.

(a) 48 km/hr (b) 40 km/hr
(c) 45 km/hr (d) 35 km/hr

7. If the relationship between two variables u and v are given by $2u + v + 7 = 0$ and if the AM of u is 10, then the AM of v is

(a) 17 (b) -17
(c) -27 (d) 27

8. Which of the following is the correct relation between mean, median and mode

(a) Median = mode + $\frac{2}{3}$(mean – mode) (b) 2Mean = Mode - 3Median
(c) 2Mean = Mode + 3Median (d) Mode = 3Median + 2Mean

9. The AM of 15 observations is 9 and the AM of first 9 observations is 11 and then AM of remaining observations is

(a) 11 (b) 6
(c) 5 (d) 9

10. The mean of 1, 2, 3,…… n is $\frac{6x}{11}$; then the value of x is

(a) 14 (b) 13
(c) 126 (d) 11

11. For moderately skewed distribution of marks in commerce for a group of 200 students the mean marks and mode marks were found to be 55.60 and 46. What is the median marks?

(a) 55.5 (b) 60.5

(c) 52.4 (d) None of these

12. For 899, 999, 391, 384, 390, 480, 485, 760, 111, 240 Rank of median is

(a) 2.75 (b) 5.5

(c) 8.25 (d) none

13. The mean height of girls in class in 162 cm while for boys is 182 cm. The ratio of number of girls: boys is 1: 2. Find the mean height of the whole class

(a) 170 cm (b) 180 cm

(c) 154 cm (d) 175.33

14. If the mean of the following distribution is 6 then the value of P is;

x	2	4	6	10	P+5
f	3	2	3	1	2

(a) 7 (b) 5

(c) 8 (d) 11

15. Find the median of the following:

Class Interval	**Frequency**
0-10	5
10-20	15
20-30	28
30-40	10
40-50	2

(a) 10.57 (b) 23.57

(c) 25 (d) None

16. Given the weights for the numbers 1,2,3....n are respectively 1^2,2^2 3^2...n^2 then weighted HM is _____.

(a) $\frac{2n+1}{4}$ (b) $\frac{2n+1}{6}$

(c) $\frac{2n+1}{3}$ (d) $\frac{2n+1}{2}$

17. If $y = 3 + (4.5)x$ and the mode for x- value is 20, then the mode for y- value is

(a) 3.225 (b) 12

(c) 24.5 (d) 93

18. A fire engine rushes to a place of fire accident with a speed of 110 kmph and after the completion of operation returned to the base at a speed of 35 kmph. The average speed per hour in per-direction is obtained as _____ speeds.

(a) Average of (b) H M of

(c) G M of (d) Half of HM

19. If there are two groups with n_1 and n_2 observations and H_1 and H_2 are respective harmonic means, then the harmonic mean of combined observation is

(a) $\frac{n_1H_1+n_2H_2}{n_1+n_2}$ (b) $\frac{n_1H_1+n_2H_2}{H_1+H_2}$

(c) $\frac{n_1+n_2}{n_1H_1+n_2H_2}$ (d) $\frac{(n_1+n_2)H_1+H_2}{n_1H_2+n_2H_1}$

20. The mean of 'n' observation is 'x'. If k is added to each observation, then the new mean is.

(a) k (b) xk

(c) x-k (d) x+k

21. What is the coefficient of range for the following distribution?

Class Interval	Frequency
10-19	11
20-29	25
30-39	16
40-49	7
50-59	3

(a) 22 (b) 50

(c) 75.82 (d) 72.46

22. The quartiles of a variable are 45, 52 and 65 respectively. Its quartile deviation is

(a) 10 (b) 20

(c) 25 (d) 8.30

23. For two numbers "a" and "b", Standard Deviation given by

(a) $\frac{|a-b|}{2}$ (b) $\sqrt{\frac{a-b}{2}}$

(c) $\frac{a+b}{2}$ (d) $\sqrt{\frac{a+b}{2}}$

24. If the standard deviation of 1,2,3,4,…….. 10 is σ, then the standard deviation of 11,12,13,14……,20 is

(a) 10σ (b) 10+σ

(c) σ (d) none of these

25. There are two startups in ecommerce sector struggling to acquire the market. Following data is for Mean and Standard Deviation of billing amount of bought items per month on their website

Startup	A	B
No of customers Per month	40	30
Mean billing amount	Rs.2500	Rs.2200
SD of billing amount	Rs.10	Rs.11

Which startup has a better consistency when it comes to sales numbers?

(a) Startup A (b) Startup B

(c) Both A and B (d) Need more information

26. If 5 is subtracted from each observation of some certain item then its co-efficient of variation is 10% and if 5 is added to each item then its coefficient of variation is 6%. Find original coefficient of variation.

(a) 8% (b) 7.5%

(c) 4% (d) None of these

27. Mean and S.D. of a given set of observations' is 1,500 and 400 respectively. If there is an increment of 100 in the first year and each observation is hiked by 20% in 2nd years, then find new mean and S.D.

(a) 1920,480 (b) 1920,580

(c) 1600,480 (d) 1600,400

28. The coefficient of Mean deviation about means for the first 9 natural numbers?
(a) 200/9 (b) 80
(c) 400/9 (d) 5

29. If same amount is added to or subtracted from all the values of an individual series then the standard deviation and variance both shall be __
(a) changed (b) unchanged
(c) same (d) none of these

30. The Q.D of 6 numbers 15, 8, 36, 40, 38, 41 is equal to
(a) 12.5 (b) 25
(c) 13.5 (d) 37

31. Standard deviation is _____ times of $\sqrt{\text{MD} \times \text{QD}}$
(a) 2/3 (b) 4/5
(c) $\sqrt{\frac{15}{8}}$ (d) $\sqrt{\frac{8}{15}}$

32. Coefficient of quartile deviation is 1/4 then Q^3/Q^1 is
(a) 5/3 (b) 4/3
(c) 3/4 (d) 3/5

33. The sum of mean and SD of a series is a + b, if we add 2 to each observation of the series then the sum of mean and SD is
(a) a + b + 2 (b) 6 - a + b
(c) 4 + a – b (d) a + b + 4

34. It is given that the mean ($\bar{X}$) is 10 and standard deviation (s.d.) is 3.2. If the observations are increased by 4, then the new mean and standard deviations are:
(a) $\overline{X} = 10$, s.d. $= 7.2$ (b) $\overline{X} = 10$, s.d. $= 3.2$
(c) $\overline{X} = 14$, s.d. $= 3.2$ (d) $\overline{X} = 14$, s.d. $= 7.2$

35. If a school has 14 teachers, their heights (in cm) are: 172, 173, 164, 178, 168, 169, 173, 172, 173, 164, 178, 168, 169, 173 then average deviation of this data is:
(a) 2.43 approx. (b) 3.93 approx.
(c) 3.43 approx. (d) 2.92 approx.

36. The covariance between two variables is
(a) Strictly positive (b) Strictly negative
(c) Always 0 (d) Either positive or negative or zero

37. If for two variable x and y, the covariance, variance of x and variance of y are 40, 16 *and* 256 respectively, what is the value of the correlation coefficient?
(a) 0.01 (b) 0.625
(c) 0.4 (d) 0.5

38. If the covariance between two variables is 20 and the variance of one of the variables is 16, what would be the variance of the other variable?
(a) $S^2y \geq 25$ (b) More than 10
(c) Less than 10 (d) More than 1.25

39. The sum of the squares of differences in ranks of marks obtained in Physics and Chemistry by 10 students in a test is 150, then the coefficient of rank correlation by:

(a) 0.849 (b) 0.091

(c) 0.909 (d) None of these

40. The coefficient of rank correlation of marks obtained by 10 students in English and Economics was found to be 0.5, it was later discovered that the difference in ranks in the two subjects obtained by one student was wrongly taken as 3 instead of 7. Find correct coefficient of rank correlation.

(a) 0.514 (b) 0.364

(c) 0.15 (d) 0.260

41. If x and y are two correlated variables with correlation 0.60. If $u = 3x + 5$ *and* $V = 5y - 7$. The correlation coefficient of U and V is:

(a) -0.60 (b) 0.60

(c) 1 (d) 0.36

42. The correlation between two variables x and y is found to be 0.4. What is the correlation between 2x and (–y)?

(a) 0.4 (b) –0.4

(c) 0.6 (d) None of these

43. Given that

x	-3	-3/2	0	3/2	3
y	9	9/4	0	9/4	9

Then Karl Pearson's coefficient of correlation is

(a) Positive (b) Zero

(c) Negative (d) None

44. In case speed of an automobile and the distance required to stop the car after applying brakes correlation is

(a) Positive (b) Negative

(c) Zero (d) None

45. If the coefficient of correlation between x and y is 0.5, the covariance is 16, and the standard deviation of x is 4 then the Standard of y is

(a) 4 (b) 8

(c) 16 (d) 64

46. There are two equations: $m + 3p = 2$ and $6n + 2q = 1$. Correlation coefficients for p and q is 0.5. Find the correlation coefficients of m and n

(a) 0.6 (b) 0.5

(c) -0.5 (d) none of these

47. If two regression lines are $5y = 9x - 22$ and $20x = 9y + 350$, then the value of correlation coefficient (r) will be:

(a) 0.10 (b) -0.10

(c) - 0.90 (d) 0.90

48. If two lines of regression are $x + 2y - 5 = 0$ and $2x + 3y - 8 = 0$. So $x + 2y - 5 = 0$ is
(a) y on x (b) x on y
(c) both (d) None

49. If r = 0.8, byx = 0.6, bxy = 0.5, $\bar{x} = 5$ and $\bar{y} = 3$, then the regression equation y on x
(a) y = 0.6x – 6.0 (b) y = 0.96x – 3.7
(c) y = 0.8x (d) y = 0.6x

50. If the regression coefficient (r_{yx}) of y on x is greater than unity, then other regression coefficient (r_{xy}) of x on y is:
(a) Less than one (b) Greater than one
(c) Equal to one (d) Equal to zero

51. In a bivariate data $\sum X = 30, \sum Y = 40, \sum X^2 = 196, \sum XY = 850$ and N = 10. The regression coefficient of Y on X is:
(a) -5.31 (b) -8.23
(c) 6.89 (d) None

52. If Y is dependent variable and X is independent variable and the S.D of X and Y are 5 and 8 respectively and Co-efficient of co-relation between X and Y is 0.8. Find the Regression co-efficient of Y on X.
(a) 0.78 (b) 1.28
(c) 6.8 (d) 0.32

53. If the regression line of Y on X is given by $Y - X + 2$ and Karl Pearson's coefficient of correlation is 0.5 then $\frac{\sigma_y^2}{\sigma_x^2}$ =_____.
(a) 3 (b) 2
(c) 4 (d) none of these

54. Equations of two lines of regression are $4x + 3y + 7 = 0$ and $3x + 4y + 8 = 0$, the mean of x and y are
(a) 5/7 and 6/7 (b) -4/7 and -1/7
(c) 2 and 4 (d) none of these

55. Two lines of regression are given by $5x + 7y - 22 = 0$ and $6x + 2y - 22 = 0$. If the variance of y is 15, find the standard deviation of x?
(a) $\sqrt{5}$ (b) $\sqrt{7}$
(c) $\sqrt{6}$ (d) $\sqrt{8}$

56. Let P be a probability function on $S = \{X_1, X_2, X_3\}$ if $P(X_1) = \frac{1}{4}$ and $P(X_3) = \frac{1}{3}$ then $P(X_2)$ is equal to:
(a) 5/12 (b) 7/12
(c) ¾ (d) none of these

57. The probability that a person travels by a plane is $\frac{1}{5}$ and that he travels by train is $\frac{2}{3}$. Find the probability of his travelling neither by plane nor by train?
(a) $\frac{13}{15}$ (b) $\frac{2}{15}$
(c) $\frac{1}{15}$ (d) none of these

58. Ticket numbered 1 to 20 are mixed up and then a ticket is drawn at random. What is the probability that the ticket drawn bears a number which is multiple of 3 or 7?

(a) 1/5 (b) 2/5

(c) 3/5 (d) None of these

59. If a number is selected at random from the first 50 natural numbers, what will be the probability that the selected number is a multiple of 3 and 4?

(a) 5/50 (b) 2/25

(c) 3/50 (d) 4/25

60. Rupesh is known to hit a target in 5 out of 9 shots whereas David is known to hit the same target in 6 out of 11 shots. What is the probability that the target would be hit once they both try?

(a) 79/99 (b) 10/13

(c) 14/26 (d) 13/18

61. What is the probability of getting neither total of 7 nor 11 when the pair of dice is tossed?

(a) 7/9 (b) 2/9

(c) 3/9 (d) 4/9

62. If two letters are taken at random from the word "HOME", what is the probability that none of the letters would be vowels?

(a) $\frac{1}{6}$ (b) $\frac{1}{2}$

(c) $\frac{1}{3}$ (d) $\frac{1}{4}$

63. In a game, cards are thoroughly shuffled and distributed equally among four players. What is the probability that a specific player gets all the four kings?

(a) $\frac{^{13}C_4 + ^{48}C_{13}}{^{52}C_{13}}$ (b) $\frac{^{4}C_4 + ^{48}C_9}{^{52}C_{13}}$

(c) $\frac{^{13}C_4 + ^{52}C_4}{^{52}C_{13}}$ (d) $\frac{^{4}C_4 + ^{39}C_9}{^{52}C_{13}}$

64. If two events A, B, $P(A) = \frac{1}{2}$, $P(B) = \frac{1}{3}$ and $P(A \cup B) = \frac{2}{3}$ then $P(A \cap B)$ is:

(a) $\frac{1}{4}$ (b) $\frac{1}{6}$

(c) $\frac{2}{3}$ (d) $\frac{1}{2}$

65. If two dice are thrown then what is the probability that the sum of the faces of dice are square or cube number?

(a) 1/4 (b) 1/2

(c) 1/3 (d) None of these

66. Let A and B are two events with $P(A) = \frac{2}{3}$, $P(B) = \frac{1}{4}$ and $P(A \cap B) = \frac{1}{12}$, then P(B/A) will be :

(a) 7/8 (b) 1/3

(c) 1/8 (d) 8/7

67. For any two events A and B:

(a) $P(A - B) = P(A) - P(B)$ (b) $P(A - B) = P(A) - P(A \cap B)$

(c) $P(A - B) = P(B) - P(A \cap B)$ (d) $P(B - A) = P(B) + P(A \cap B$

68. A brother and his sister appear in an interview for two vacancies for the same post. The probability of brother's selection is $\frac{1}{7}$ and the probability of sister's selection is $\frac{1}{5}$. The probability that

(i) both are selected

(ii) only one of them is selected and

(iii) none of them is selected will be:

(a) $\frac{1}{35}, \frac{10}{35}, \frac{24}{35}$ (b) $\frac{24}{35}, \frac{1}{35}, \frac{10}{35}$

(c) $\frac{10}{35}, \frac{1}{35}, \frac{24}{35}$ (d) $\frac{24}{35}, \frac{10}{35}, \frac{1}{35}$

69. The probability distribution of the demand for a commodity is given below:

Demand (x)	Probability P(x)
5	0.05
6	010
7	0.30
8	0.40
9	0.10
10	0.05

The expected value of demand will be

(a) 7.55 (b) 7.85

(c) 1.25 (d) 8.35

70. In a box carrying one dozen of oranges, one third has become bad. If 3 oranges are taken out from the box at random, what is the probability that at least one orange out of the three oranges picked up is good?

(a) $\frac{54}{55}$ (b) $\frac{1}{55}$

(c) $\frac{45}{50}$ (d) None of these

71. A husband and a wife appear in an interview for two vacancies in the same post. The probability of husband's selection is 3/5 and that of wife's selection is 1/5. Then the probability that only one of them is selected is:

(a) 16/25 (b) 17/25

(c) 14/25 (d) none of these

72. A candidate is selected for interview for 3 posts. For the first there are 3 candidates, for the second there are 4 and for the third there are 2. What are the chances of his getting at least one post?

(a) ¾ (b) 2/3

(c) 1/10 (d) 1

73. A machine is made of two parts A and B. The manufacturing process of each part is such that probability of defective in part A is 0.08 and that B is 0.05. What is the probability that the assembled part will not have any defect?

(a) 0.934 (b) 0.864

(c) 0.85 (d) 0.874

74. Probability of Ramesh & Deepak speaking truth is 1/4, 3/5. Find the probability of atmost one of them speaks truth.

(a) 0.60 (b) 0.85

(c) 0.75 (d) None of these

75. A father had three sons namely, Kailash, Harish and Prakash. All are above 65 years in age. Prakash happens to be the eldest while Kailash as youngest. As per the health history, it is estimated that the probability that Kailash survives another 5 years is $\frac{4}{5}$, Harish survives another 5 years is $\frac{3}{5}$ and Prakash survives another 5 years is $\frac{1}{2}$. The probabilities that Kailash and Harish survive another 5 years is 0.46, Harish and Prakash survive another 5 years is 0.32 and Kailash and Prakash survive another 5 years is 0.48. the probability that all three sons survive another 5 years is 0.26. What shall be the probability that at least one of them survives another 5 years?

(a) 0.78 (b) 0.72

(c) $\frac{7}{10}$ (d) $\frac{9}{10}$

All the Best !!

Space for Rough Work