# PAPER – 3: QUANTITATIVE APTITUDE

*All Question are compulsory.*

**Time: 2 Hours** **Marks: 100**

1. A startup business was initiated by an entrepreneur by investing ₹ 1,40,000. His friend joined him after six months with an amount of ₹ 2,10,000. Thereafter an angel investor joined them with ₹ 2,80,000 after another six months. What should be the ratio of distribution of total earnings, three years since beginning of business among entrepreneur, his friend and angel investor?

   (A) 7:6:10

   (B) 12:15:16

   (C) 42:45:56

   (D) 2:3:4

2. The sum of three numbers is 98. If the ratio of the first to second number is 2 : 3 and that of the second to third is 5: 8, then the second number is

   (A) 20

   (B) 30

   (C) 48

   (D) 58

3. If $\log \frac{a+b}{4} = \frac{1}{2}(\log a + \log b)$, then the value of $\frac{a}{b} + \frac{b}{a}$ will be

   (A) 12

   (B) 14

   (C) 16

   (D) 8

4. If $4^x = 5^y = 20^z$ then z is equal to

   (A) xy

   (B) $\frac{(x+y)}{xy}$

   (C) $\frac{1}{xy}$

   (D) $\frac{xy}{(x+y)}$

5. If ₹ 58 is divided among 150 children such that each girl and each boy gets 25 p and 50 p respectively. Then how many girls are there?

   (A) 52

   (B) 54

   (C) 68

   (D) 62

6. Puru gets on the elevator at the 11th floor of a building and rides up at the rate of 57 floors per minute. At the same time, Ishu gets on an elevator at the 51" floor of the same building and rides down at the rate of 63 floors per minute. If they continue travelling at these rates, then at which floor will their paths cross?

   (A) 17

   (B) 19

   (C) 27

   (D) 30

7. The quadratic equation $2x^2 - \sqrt{5}\,x + 1 = 0$ has

   (A) Two distinct real roots

   (B) Two equal real roots

   (C) No real roots

(D) More than two real roots

8. For equation $x^3 - 6x^2 + 5x + 12 = 0$, the product of two roots is 12. Which of the following is correct set of roots of the equation?

(A) 1, -3, -4

(B) 1, 6, 2

(C) -1, 3, 4

(D) -1, -6, -2

9. On solving the inequalities $6x + y \geq 18$, $x + 4y \geq 12$, $2x + y \geq 10$; which of the following are correct solutions?

(A) (0, 18), (12, 0), (4, 2) and (2, 6)

(B) (3,0), (0, 3), (4, 2) and (7, 6)

(C) (5,0), (0, 10), (2, 4) and (2, 6)

(D) (0, 18), (12, 0), (4, 2) and (0, 7)

10. The longest side of a triangle is 2 times the shortest side and the third side is 4 cm shorter than the longest side. If the perimeter of the triangle is at least 61 cm, find the minimum length of the shortest side.

(A) 7 cm

(B) 9 cm

(C) 11 cm

(D) 13 cm

11. A sum of ₹ 725 is lent in the beginning of a year at a certain rate of simple interest. After 8 months, a sum of ₹ 362.50 more is lent but at the rate twice the former. At the end of the year, ₹ 33.50 is earned as interest from both the loans. What was the original rate of interest?

(A) 3.6%

(B) 4.54%

(C) 3.46%

(D) 4.12%

12. There is 60% increase in amount in 6 years at simple interest. What will be the compound interest of ₹ 12,000 after three years at the same rate?

(A) ₹ 2,160

(B) ₹ 3,120

(C) ₹ 3,972

(D) ₹ 6,240

13. The effective annual rate of interest corresponding to a nominal rate of 6% per annum payable half-yearly is

(A) 6.06%

(B) 6.07%

(C) 6.08%

(D) 6.09%

14. The compound interest on a certain sum for 2 years at 10% per annum is ₹ 525. The simple interest on the same sum for double the time at half the rate percent per annum is -

(A) ₹ 400

(B) ₹ 500

(C) ₹ 600

(D) ₹ 800

15. Find the future value of an investment of ₹ 7,000 compounded quarterly at 10% per annum for 3 years. [Given that $(1.025)^{12} = 1.34489$]

(A) ₹ 9,414.20

(B) ₹ 7,435.73

(C) ₹ 7,941.42

(D) ₹ 8,000.00

16. Raju will pay instalments of ₹ 3,150 per month for the next 3 years towards his loan at an interest rate 12.4%, discounted monthly, what was the approximate amount of loan taken initially?

    [Given that $(1.01033)^{36} = 1.448$]

    (A) ₹ 13,683.60

    (B) ₹ 9,742.29

    (C) ₹ 94,345.17

    (D) ₹ 74,158.24

17. Shiv deposits ₹ 10,000 annually in a bank for 5 years, at 10 percent annual compounding interest rate. Calculate the approximate value of this series of deposits at the end of five years, if each deposit occurs at the beginning of the year.

    (A) ₹ 61,050

    (B) ₹ 67,156

    (C) ₹ 71,050

    (D) ₹ 77,160

18. If you deposit ₹ 4,000 into an account paying 6% annual interest compounded quarterly, how much approximate money will be in the account after 5 years?

    [Given that $(1.015)^{20} = 1.34489$]

    (A) ₹ 3387.42

    (B) ₹ 4387.42

    (C) ₹ 5387.42

    (D) ₹ 6387.42

19. Relationship between annual nominal rate of interest and annual effective rate of interest, if frequency of compounding is greater than one

    (A) Effective rate < Nominal rate

(B) Effective rate > Nominal rate

(C) Effective rate = Nominal rate

(D) Effective rate = 0.9 times Nominal rate

20. Madhu invests ₹ 15,000 in a scheme and at the time of maturity the amount became₹ 25,000. If CAGR for this investment is 8.88%, calculate the approximate number of years for which she has invested the amount.

[Given that log (1.667) = 0.2219 and log (1.089) = 0.037]

(A) 6 years

(B) 7.7 years

(C) 5.5 years

(D) 7 years

21. How much approximate amount should you save annually to accumulate ₹ 20,00,000 by the end of 12 years, if the saving earns an interest of 14 percent compound annually?

[Given that $(1.14)^{12}$ = 4.8179]

(A) ₹ 4,15,118

(B) ₹ 5,23,848

(C) ₹ 73,339

(D) ₹ 1,11,200

22. Dinesh received a cash bonus of ₹ 1,00,000 which he deposited in a bank which pays 10 percent interest compounded annually. How much approximate equal amount can Dinesh withdraw annually for a period of 10 years?

[Given that $(1.1)^{10}$ = 2.59374]

(A) ₹ 16,273

(B) ₹ 38,554

(C) ₹ 62,745

(D) ₹ 32,474

23. Find the approximate future value of an annuity due of 500 per quarter for 8 years and 9 months at the interest rate of 6% compounded quarterly.

[Given that $(1.015)^{35} = 1.6839$]

(A) ₹ 13,740.86

(B) ₹ 29,428.23

(C) ₹ 56,971.95

(D) ₹ 22,796.66

24. A project is expected to provide cash inflows as follows for 3 years:

| **Year** | 1 | 2 | 3 |
|---|---|---|---|
| **Cash Inflows (₹):** | 40,000 | 50,000 | 30,000 |

The company's cost of capital or required rate of return is 15%. What is the present value of cash inflows of the company?

(A) ₹ 99,240

(B) ₹ 1,02,840

(C) ₹ 1,12,640

(D) ₹ 92,315

25. In how many of distinct permutations of the letters in "MISSISSIPPI" when four I's do not come together?

(A) 34650

(B) 40320

(C) 840

(D) 33810

26. Out of 7 consonants and 4 vowels, how many words of 3 consonants and 2 vowels can be formed?

(A) 210

(B) 1050

(C) 25200

(D) 21400

27. Seema, Bharati, Priyanka, Khusboo and Lalita are 5 speakers. The number of ways in which Seema will always speak before Bharati shall be -

(A) 24

(B) 4! x 2!

(C) 5!

(D) 12

28. A team of 3 persons is to be constituted from a group of 2 men and 3 women. In how many ways can this be done if these teams would consist of 1 man and 2 women?

(A) 10

(C) 16

(B) 6

(D) 8

29. Find the sum of n terms of the A.P., whose $n^{th}$ term is 5n + 1

(A) $\frac{n}{2}$

(B) $\frac{2n}{7}$

(C) $\frac{n(7+5n)}{2}$

(D) $\frac{n(7+4n)}{2}$

30. The sum of first three terms of a G.P. is $\frac{21}{2}$ and their product is 27. Which of the following is not a term of the G.P., if the numbers are positive?

(A) 3

(B) $\frac{2}{3}$

(C) $\frac{3}{2}$

(D) 6

31. Insert 4 numbers between 2 and 22 such that the resulting sequence is an Arithmetic Progression (A.P.).

(A) 4, 8, 12, 16

(B) 5, 9, 13, 17

(C) 4, 10, 15, 19

(D) 6, 10, 14, 18

32. Find the sum of series $1+\frac{1}{2}+\frac{1}{4}+\ldots\ldots$ upto 6 terms.

(A) $\frac{63}{32}$

(B) $\frac{32}{63}$

(C) $\frac{26}{53}$

(D) $\frac{53}{26}$

33. Which of the following relations is transitive but not reflexive for the set S = {3, 4, 6}?

(A) R = {(3, 4), (4, 6), (3, 6)}

(B) R = {(1, 2), (1, 3), (1, 4)}

(C) R = {(3, 3), (4, 4), (6, 6)}

(D) R = {(3, 4), (4, 3)}

34. If A = {1, 2, 3, 4}, B = {2, 4, 6, 8} and C = {3, 4, 5, 6} the value of A – {B ∪ C} is -

(A) {1, 2, 3}

(B) {2, 3, 4, 5}

(C) {1}

(D) {0}

35. The range of the function f(x) = 3x - 2 is

(A) $(-\infty, \infty)$

(B) R - {3}

(C) $(-\infty, 0)$

(D) $(0, -\infty)$

36. Find the value of $\lim_{x \to 4} \frac{\left(x^2 - 2x - 8\right)}{\left(x - 4\right)}$

(A) 0

(B) 2

(C) 8

(D) 6

37. Evaluate: $\int_2^4 (3x - 2)^2 \, dx$

(A) 104

(C) 10

(B) 100

(D) 52

38. Determine f(x), given that f' (x) = $12x^2$ - 4x and f(- 3) = 17

(A) f(x) = $4x^3$ - $2x^2$ + 143

(B) f(x) = $6x^2$- $x^4$+ 137

(C) $f(x) = 3x^4 - x^3 - 137$

(D) $f(x) = 4x^3 - 2x^2 - 143$

39. Find $\frac{dy}{dx}$, where $\frac{e^t + e^{-t}}{2}$ and $\frac{e^t - e^{-t}}{2}$

(A) $\frac{y}{x}$

(B) $\frac{x}{y}$

(C) $\frac{e^t}{e^{-t}}$

(D) $\frac{1}{e^t}$

40. What is the differential function of $\sqrt{(x^2+2)}$ ?

(A) $x\sqrt{(x^2+2)dx}$

(B) $\frac{x}{\sqrt{x^2+2}}dx$

(C) $\frac{x}{\sqrt{x^2-2}}dx$

(D) $-\frac{x}{\sqrt{x^2+2}}dx$

41. Identify the next number in the following series: 2, 8, 26, 62, 122, 212, _____

(A) 332

(B) 338

(C) 356

(D) 362

42. Find the missing number in the given series: 4, 18 _____, 100, 180, 294, 448

(A) 48

(B) 52

(C) 56

(D) 64

43. Find the odd man out from the following:

445, 221, 109, 46, 25, 11, 4

(A) 25

(B) 46

(C) 109

(D) 221

44. In a certain code "CH4IR" is written as "GL8MV". How is "1N5T4GR4M" is written in that code?

(A) 4HFID8E8N

(B) 4P8W7JU8O

(C) 5R9X8KV8Q

(D) 5KF2E4GR4

45. A certain code "564" means "all the best", "736" means "best of luck" and "423" means "all is luck". Which of the following is the code for "luck"?

(A) 6

(B) 4

(C) 3

(D) 7

46. A man is facing North-West. He turns 90° in the clockwise direction, then 180° in the anticlockwise direction and then another 90° in the same direction. Which direction is he facing now?

(A) South

(B) South-West

(C) South-East

(D) East

47. Rajni walked 20 m towards the North. Then she turned right and walks 30 m. Then she turns right and walks 35 m. Then she turns left and walks 15 m. Finally she turns left and walks 15 m. In which direction and how many meters is she from the starting position?

(A) 15 m West

(B) 30 m East

(C) 30 m West

(D) 45 m East

48. At a crossing, there was a direction pole, which was showing all the four correct directions. But due to the wind, it turns in such a manner that now West pointer is showing South. Harish went in the wrong direction thinking that he was travelling East. In which direction he was actually travelling?

(A) South

(B) North

(C) West

(D) East

49. Two cars start from the opposite places on a highway, 150 km apart. First car runs for 25 km and takes a right turn and then runs 15 km. It then turns left and then runs for another 25 km and then takes the direction back to reach the main road. In the meantime, due to minor break down the other car has run only 35 km along the main road. What would be the distance between two cars at this point?

(A) 65 km.

(B) 75 km.

(C) 80 km.

(D) 85 km.

50. Some boys are sitting in three rows all facing North such that A is in the middle row. P is just to the right of A but in the same row. Q is just behind of P, while R is in the North of A. In which direction of R is Q?

(A) South

(B) South-West

(C) North-East

(D) South-East

51. Seven persons namely H, I, J, K, M, N, O are sitting in a straight line facing North direction. Total three number of persons are sitting between H and N. Both N and H sits at extreme sides. Total two number of persons sit between H and O. M is not an immediate neighbour of H or N. I sits third to the right of M. I and H both are not an immediate neighbours. M is also not an immediate neighbour of J. Who is sitting between H and M?

(A) J

(B) O

(C) I

(D) K

52. A, B, C, D and E are sitting on a bench. A is sitting next to B, C is sitting next to D, D is not sitting with E who is on the left end of the bench. C is on the second position from the right. A is to the right of B and E. A and C are sitting together. In what position A is sitting?

(A) Between B and D

(B) Between B and C

(C) Between E and D

(D) Between C and E

53. In a class, there are seven students (including boys and girls) A, B, C, D, E, F and G. They sit on three benches I, II and III, such that at least two students on each bench and at least one girl on each bench. C who is a girl student, does not sit with A, E and D. F the boy student sits with only B. A sits on the bench I with his best friends. G sits on the bench III. E is the brother of C. Which of the following is the group of girls?

(A) BCG

(B) BFC

(C) BCD

(D) CDF

54. Five boys A, B, C, D and E are sitting in a row. A is to the right of B and E is to the left of B but to the right of C. A is to the left of D. Who is second from the left end?

(A) D

(B) A

(C) B

(D) E

55. Six friends P, Q, R, S, T and U are sitting around the hexagonal table each at one corner and are facing the centre of the hexagonal. P is second to the left of U. Q is neighbour of R and S. T is second to the left of S. Which one is sitting opposite to P?

(A) R

(B) Q

(C) T

(D) S

56. If "A # B" means A is father of B, "A*B" means A is brother of B, "A @ B" means A is mother of B, then which of the following is correct about G@T#P?

(A) G is mother of P.

(B) P is father of T.

(C) T is son of G.

(D) P is brother of T.

57. Pointing to a photograph, Rajesh said, "He is Aarav and he is the son of the only daughter of the father of my brother", how Rajesh is related to the Aarav referred in the photograph?

(A) Nephew

(B) Brother

(C) Father

(D) Maternal Uncle

58. Study the following information carefully:

- A3P means A is the mother of P.
- A4P means A is the brother of P.
- A9P means A is the husband of P.
- A5P means A is the daughter of P.

Which of the following means that K is the mother-in-law of M?

(A) M9N3K4J

(B) M9N5K3J

(C) K5J9M3N

(D) K3J9N4M

59. Q, W, E, R, T and Y are members of a family consisting of two children, one of whom is T is a boy. Q and R are brothers and Q is an engineer. E is a doctor married to one of the brothers. W is married to R, and Y is their only child. How T is related to Q?

(A) Father

(B) Brother

(C) Nephew

(D) Son

60. K is the son of A's mother's sister. Q is daughter of D, who is the father of G and grandfather of A. P is the daughter of H, who is grandmother of K. D is husband of H and G is husband of L. How is P related to Q?

(A) Mother

(B) Sister

(C) Daughter

(D) Cousin

61. The mode of a continuous frequency distribution can be determined graphically from

(A) By using Histogram

(B) By using frequency polygon

(C) By using ogive

(D) By using frequency curve

62. Frequency density corresponding to a class interval for the continuous frequency distribution, is the ratio of

(A) class frequency to the total frequency

(B) class frequency to the class length

(C) class length to the class frequency

(D) class frequency to the cumulative frequency

63. The curve obtained by joining the points, whose X co-ordinates are the upper limits of the class intervals and Y co-ordinates are corresponding cumulative frequencies, is called

(A) Ogive

(B) Histogram

(C) Frequency polygon

(D) Frequency curve

64. The following data relate to the wages of a group of workers:

| **Wages (in ₹)** | **Below 100** | **Below 200** | **Below 300** | **Below 400** |
|---|---|---|---|---|
| No. of workers: | 15 | 38 | 65 | 90 |

How many workers got wages more than 300?

(A) 25

(B) 65

(C) 90

(D) 27

65. The law of statistical regularity says that

(A) Sample drawn from the population under discussion possesses the characteristics of population.

(B) A large sample drawn at random from the population would possess the characteristics of the population.

(C) A large sample drawn at random from the population would possess the characteristics of the population on an average.

(D) An optimum level of efficiency can be attained at a minimum cost.

66. A population comprises 5 members. The number of possible samples of size 2, that can be drawn from it with replacement is

(A) 100

(B) 15

(C) 125

(D) 25

67. Which of the following statements about simple random sampling is NOT true?

(A) Simple random sampling ensures that each unit in the population has an equal chance of being selected.

(B) In simple random sampling with replacement, each selected unit is replaced to the population before the next unit is drawn.

(C) Simple random sampling is highly effective when the population is very large and heterogeneous.

(D) In a simple random sampling without replacement, a unit is selected, it will never be selected again.

68. A frequency curve which starts with a minimum frequency and then gradually reaches its maximum frequency at the other extremity is known as

(A) Bell shaped curve

(B) Mixed curve

(C) U-shaped curve

(D) J-shaped curve

69. In tabulation, source of data, if any, is shown in the

(A) Footnote

(C) Stub

(B) Body

(D) Caption

70. A helicopter flies from A to B at the rate of 500 km/hr. and comes back at the rate 700 km/hr. The average speed of the helicopter is

(A) 600 km/hr.

(B) 583.33 km/hr.

(C) $100\sqrt{35}$ km/hr.

(D) 620 km/hr.

71. If Arithmetic Mean (A.M.) and Geometric Mean (G.M.) of two numbers are 6.50 and 6 respectively, then the two numbers are

(A) 6 and 7

(B) 9 and 4

(C) 10 and 3

(D) 8 and 5

72. Which of the following is not a method of dispersion?

(A) Standard deviation

(B) Mean deviation

(C) Range

(D) Concurrent deviation method

73. Find out co-efficient of variation, if N = 14, $\Sigma fx = 280$ and $\sigma$(S.D.) = 3.

(A) 20

(B) 15

(C) 4.67

(D) Zero

74. The monthly profit/loss for six months of the firm is as under:

| Months | January | February | March | April | May | June |
|---|---|---|---|---|---|---|
| Profit/loss (in ₹): | 1,000 | 900 | 0 | -200 | -400 | 2,000 |

The co-efficient range of the above data is

(A) 122

(B) 150

(C) 33.33

(D) 55.55

75. Which one of the following is the absolute measure of dispersion for open ended distributions?

(A) Range

(B) Standard deviation

(C) Mean deviation

(D) Quartile deviation

76. If the mean of the following frequency distribution is 2.6, then the value of Y is

| Marks (X) | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| No. of Students (f) | 8 | 10 | Y | 2 | 4 |

(A) 16

(B) 6

(C) 26

(D) 12

77. Which one of the following measures of central tendency is based on only fifty percent (50%) of the central values?

(A) Geometric Mean

(B) Harmonic Mean

(C) Median

(D) Mode

78. The Arithmetic Mean (A.M.) and mode of the data are 32 and 26, respectively, then find the median of the data.

(A) 30

(B) 12

(C) 6

(D) 29

79. Find out the mode from the following data: 100, 110, 125, 225, 325, 125, 90, 80, 455, 375, 125

(A) 325

(B) 110

(C) 455

(D) 125

80. Two dice are thrown simultaneously. Find the probability that the sum of digits on the two dice would be 8 or more.

(A) $\frac{5}{18}$

(B) $\frac{5}{12}$

(C) $\frac{5}{36}$

(D) $\frac{8}{20}$

81. A number is selected from the first 20 natural numbers. Find the probability that it would be divisible by 3 or 7.

(A) $\frac{7}{20}$

(B) $\frac{12}{37}$

(C) $\frac{24}{67}$

(D) $\frac{8}{20}$

82. 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) $\frac{9}{10}$

83. In a class, there are 15 boys and 10 girls. Three students are selected at random. The probability that 1 girl and 2 boys are selected is

(A) $\frac{21}{46}$

(B) $\frac{25}{17}$

(C) $\frac{1}{50}$

(D) $\frac{3}{25}$

84. Two cards are drawn from a pack of 52 cards. The probability that one is a spade and one is a heart; is

(A) $\frac{3}{20}$

(B) $\frac{29}{34}$

(C) $\frac{47}{100}$

(D) $\frac{13}{102}$

85. A problem is given to 5 students P, Q, R, S and T. If the probability of solving the problem individually is $\frac{1}{2},\frac{1}{3},\frac{2}{3},\frac{1}{5}$ and $\frac{1}{6}$ probability that the problem is solved. and 1/6 respectively, then find the

(A) 0.47

(B) 0.93

(C) 0.57

(D) 0.27

86. In a leap year, what is the probability that there will be 53 Sundays?

(A) $\frac{53}{365}$

(B) $\frac{1}{7}$

(C) $\frac{3}{7}$

(D) $\frac{2}{7}$

87. Poisson probability distribution is appropriately applied in

(A) The height of students in the university.

(B) The distribution of passing of students in university examinations.

(C) Tossing of a coin hundred times.

(D) Number of deaths by a rare disease.

88. If the points of inflexion of a normal curve are 6 and 14, then standard deviation of the distribution is

(A) 4

(B) 8

(C) 9.17

(D) 32

89. What is the probability of making 3 corrected guesses in 5 True-False answer type questions?

(A) 0.3125

(B) 0.4156

(C) 1.3888

(D) 0.5235

90. If 5% of the families in large population city do not use gas as a fuel, what will be the probability of selecting 10 families in a random sample of 100 families who do not use gas as a fuel?

[Given that $e^{-5}=0.0067$]

(A) 0.038

(B) Zero

(C) 0.018

(D) 0.048

91. The correlation co-efficient between X and Y is 0.8. If we add a number 10 in the X variable and subtracted 20 from Y variable, then the new correlation co-efficient will be -

(A) 0.4

(B) 0.6

(C) 0.9

(D) 0.8

92. When both the regression co-efficients are $b_{xy}$ = 0.7 and $b_{yx}$ = 0.8, respectively, then correlation co-efficient between x and y is

(A) 0.75

(B) 0.56

(C) 0.28

(D) 0.87

93. For 9 college students group, the sum of squares of differences in ranks for History and Hindi marks was found to be 62, then what is the value of rank correlation co-efficient?

(A) 1

(B) 0.48

(C) 0.52

(D) 0.87

94. If r = 0.7 then co-efficient of non-determination is

(A) 0.49

(B) 0.51

(C) Zero

(D) 0.71

95. Given x = 2y + 4 and y = kx + 6 are the two lines of regression x on y and y on x respectively. If the value of correlation co-efficient (r) is 0.5, then the value of k is

(A) $\frac{1}{8}$

(B) $\frac{1}{4}$

(0) $\frac{1}{3}$

(D) $\frac{1}{2}$

96. If $\sum P_n q_n = 249$, $\sum P_0 q_0 = 150$, $\sum P_n q_0 = 145$ and Paasche's Index Number = 150, then Fisher's Ideal Price Index Number is

(A) 75

(B) 126.9

(C) 120.62

(D) 171

97. From the following data, find out an Index number for 2022 taking 2021 as base (using simple aggregative method):

| Commodities | Price in 2021 | Price in 2022 |
|---|---|---|
| A | 80 | 120 |
| B | 220 | 200 |
| C | 300 | 400 |

(A) 100

(B) 120

(C) 108

(D) 190

98. From the following chain base index numbers based on 2015, find out new chain base index number for the year 2022 by shifting the base year 2019.

| Years: | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|---|---|---|
| Index No: (Base 2015) | 100 | 105 | 95 | 85 | 120 | 110 | 130 | 150 |

(A) 125

(B) 180

(C) 100

(D) 150

99. The prices of a commodity in the years 2015 and 2020 were 50 and 60 respectively. Price relative of 2015 on 2020 is

(A) 100

(B) 110

(C) 83.33

(D) 120

100. Chain Index is equal to

(A) $\frac{\text{link relative of current year} \times \text{chain index of current year}}{100}$

(B) $\frac{\text{link relative of previous year} \times \text{chain index of current year}}{100}$

(C) $\frac{\text{link relative of current year} \times \text{chain index of previous year}}{100}$

(D) $\frac{\text{link relative of previous year} \times \text{chain index of previous year}}{100}$

## ANSWER

| MCQ | Correct Option | MCQ | Correct Option | MCQ | Correct Option | MCQ | Correct Option |
|---|---|---|---|---|---|---|---|
| 1. | (B) | 26. | (C) | 51. | (D) | 76. | (A) |
| 2. | (B) | 27. | (A) | 52. | (B) | 77. | (C) |
| 3. | (B) | 28. | (B) | 53. | (C) | 78. | (A) |
| 4. | (D) | 29. | (C) | 54. | (D) | 79. | (D) |
| 5. | (C) | 30. | (B) | 55. | (D) | 80. | (B) |
| 6. | (D) | 31. | (D) | 56. | (C) | 81. | (D) |
| 7. | (C) | 32. | (A) | 57. | (D) | 82. | (D) |
| 8. | (C) | 33. | (A) | 58. | (B) | 83. | (A) |
| 9. | (A) | 34. | (C) | 59. | (D) | 84. | (D) |
| 10. | (D) | 35. | (A) | 60. | (B) | 85. | (B) |
| 11. | (C) | 36. | (D) | 61. | (A) | 86. | (D) |
| 12. | (C) | 37. | (A) | 62. | (B) | 87. | (D) |
| 13. | (D) | 38. | (A) | 63. | (A) | 88. | (A) |
| 14. | (B) | 39. | (B) | 64. | (A) | 89. | (A) |
| 15. | (A) | 40. | (B) | 65. | (C) | 90. | (C) |
| 16. | (C) | 41. | (B) | 66. | (D) | 91. | (D) |
| 17. | (B) | 42. | (A) | 67. | (C) | 92. | (A) |
| 18. | (C) | 43. | (B) | 68. | (D) | 93. | (B) |
| 19. | (B) | 44. | (C) | 69. | (A) | 94. | (B) |
| 20. | (A) | 45. | (C) | 70. | (B) | 95. | (A) |
| 21. | (C) | 46. | (C) | 71. | (B) | 96. | (C) |
| 22. | (A) | 47. | (D) | 72. | (D) | 97. | (B) |
| 23. | (D) | 48. | (B) | 73. | (B) | 98. | (A) |
| 24. | (D) | 49. | (A) | 74. | (B) | 99. | (C) |
| 25. | (D) | 50. | (D) | 75. | (D) | 100. | (C) |

# PAPER – 3: QUANTITATIVE APTITUDE

*All Question are compulsory.*

**Time: 2 Hours** **Marks: 100**

1. The value of $x$ in $\log_x(4)+\log_x(16)+\log_x(64)=12$ is _____

   (A) 1

   (B) 2

   (C) 3

   (D) 4

2. XYZ invested ₹ 1,68,000 in a business. After a few months, MNP joined in the business by investing ₹ 1,12,000 in the business. At the end of year, the total profit was divided between them in the ratio 2:1. After how many months, did MNP join the business?

   (A) 3

   (B) 2

   (C) 4

   (D) 9

3. The value of $\log_{\sqrt{a}}\left(\sqrt{a\sqrt{a\sqrt{a\sqrt{a}}}}\right)$ is _____

   (A) $\frac{7}{8}$

   (B) $\frac{15}{16}$

   (C) $\frac{15}{8}$

   (D) $\frac{3}{4}$

4. The ratio of $\frac{1}{2}\sqrt{35} : \frac{1}{3}\sqrt{140}$ is equal to the ratio _____

(A) 4:3

(B) 2:1

(C) 5:4

(D) 3:4

5. If α and β are the roots of the equation $x^2$-x-6=0, then the value of $\alpha^3+\beta^3+\alpha^2+\beta^2+\alpha+\beta$ is equal to _____

(A) 35

(B) 29

(C) 31

(D) 33

6. The roots of the equation $\left(\frac{x}{x-1}\right)^2 - 5\left(\frac{x}{x-1}\right) + 6 = 0$ are:

(A) 2, 3/2

(B) 3,1/2

(C) 2,1/3

(D) 3, 2/3

7. If α and β are the roots of the equation $2x^2$-6x+3=0, then the equation with the roots $\frac{\alpha}{\beta}$ and $\frac{\beta}{\alpha}$ is----------

(A) $x^2$+4x +1=0

(B) $x^2$-4x +1=0

(C) $x^2$-4x -1=0

(D) $x^2$+4x -1=0

8. Which of the following is a solution of the inequality $\frac{5x}{3} \leq \frac{x}{6} - 5$ ?

(A) $(-\infty, -\frac{10}{3}]$

(B) $(-\infty, -\frac{10}{3})$

(C) $(-\infty, -\frac{8}{3}]$

(D) $(-\infty, -\frac{8}{3})$

9. The number of solutions of $\frac{5-2x}{4} \leq \frac{x}{8} - 5 > 3-2x$ are _____, where x is a real number.

(A) Infinitely many

(B) Only two

(C) Exactly one

(D) No solution

10. The region specified by the inequalities $10x+29y \geq 40$ and $15x-4y \leq 25$ includes the point _____

(A) (1,1.25)

(B) (3,2.25)

(C) (2.5,2.5)

(D) (4,1.25)

11. The compound interest on ₹ 1,00, 000 compounded quarterly, for 9 months at 4% per annum is ₹ _____

(A) 3010.1

(B) 3030.1

(C) 3330.1

(D) 3003.1

12. The difference between the compound interest and the simple interest on a certain sum at 12% per annum for 2 years is ₹ 90, when the interest is compounded annually. Then the sum is ₹ _____

(A) 6150

(B) 6050

(C) 6350

(D) 6250

13. A machine is depreciated at the rate of 15% on the reducing balance. The original cost of machine was ₹ 2,00,000. In approximately how many years, the value of machine was ₹ 54,000? (Given: $0.85^4 = 0.522$)

(A) 9

(B) 6

(C) 8

(D) 7

14. Mohan invests ₹ 25,000 every year starting from today for next 5 years Interest rate is 7% per annum compounded annually. The future value of the annuity is ₹_____. (Given $(1+0.07)^5 = 1.40255$)

(A) 1,46,768

(B) 1,43,768

(C) 1,45,768

(D) 1,44,768

15. Mr. X borrowed ₹ 6000 from Mr. Y at 10% per annum simple interest. After two years Mr. X wanted to repay this amount, Mr. Y is insisted on paying the amount at compound interest at the same rate compounded annually. How much extra does Mr. X have to pay?

(A) ₹ 60

(B) ₹ 1260

(c) ₹ 1200

(d) ₹ 80

16. If ₹ 2,470 is obtained as an interest in 4 years and 4 months at the rate of 3% per annum simple interest rate in bank deposit, how much amount was deposited in ₹?

(A) 17,000

(B) 18,000

(C) 19,000

(D) 20,000

17. The compound interest of ₹ 4,900 is ₹ 1661 for 2 years at a certain rate of interest, compounded annually. What is the rate of interest per annum in percentage?

(A) 19.71

(B) 17.71

(C) 13.71

(D) 15.71

18. If Mr. XYZ is investing ₹ 86,000 in a bank fixed deposit scheme where interest will be payable at 12% per annum, compounded half-yearly, what will be the effective rate of interest in a year?

(A) 12.36%

(B) 12.24%

(C) 12.12%

(D) 12.48%

19. Ms. Y invested ₹ 2,00,000 in a mutual fund equity scheme. She redeemed entire investment after 96 months and received ₹ 6,00,000 after redemption. What was the Compound Annual Growth Rate (CAGR) in percentage? (Given: $1.1472^4 = 1.732$)

(A) 14.72

(B) 15.72

(C) 13.72

(D) 12.72

20. A loan of ₹ 5,000 is lent for three years at the rate of 10% per annum, compounded semi-annually. The future value of the money is ₹ _____ (Given: $1.05^6 = 1.34$)

(A) 6,500

(B) 6,600

(C) 6,700

(D) 6,800

21. One person wants to have ₹ 20,000 at the end of six years. Hence, he deposits ₹ _____ (rounded in rupee) in a fund that pays 3% per annum, compounded annually. (Given : $1.03^6 = 1.194$)

(A) 17,000

(B) 17,250

(C) 17,750

(D) 16,750

22. Suppose you deposit ₹ 1,000 today, ₹ 2,000 after one year from today and 3,000 after two years from today, in a deposit that pays 10% per annum, compounded annually. What is the balance in the deposit at the end of two year in just after deposit of ₹ 3,000?

(A) 6,000

(B) 6,410

(C) 6,600

(D) 6,800

23. You are interested in an investment of ₹ 5,000 in a fund that promises ₹ 50 at the end of each year, forever. What is the annual interest rate on this investment?

(A) 1%

(B) 2%

(C) 1.5%

(D) 2.5%

24. An investment was priced at ₹ 100 per share in year 0, priced at 150 per share in the end of the first year, and priced ₹ 200 per share in the end of second year. What is the Compound Annual Growth Rate (CAGR) of the investment?

(A) 21.42%

(B) 31.42%

(C) 41.42%

(D) 51.42%

25. How many different words from the letters of the word MATHEMATICS can be formed so that all the vowels always come together in any word?

(A) 10080

(B) 120960

(C) 4989600

(D) 20160

26. Find n if ${}^{n}P_{5} = 20\ {}^{n}P_{3}$

(A) 7

(B) 8

(C) 9

(D) 10

27. In a school, for a class monitor selection, there are 6 candidates, and students need to choose up to 3 monitors. A student can vote for 1 or 2 or 3 candidates. In how many ways a student can vote?

(A) 41

(B) 42

(C) 43

(D) 44

28. Different words are made with rearrangement of letters of the word "TROPICAL" in a way that the vowels occupy odd places when counted from left. How many such words are there?

(A) 720

(B) 1440

(C) 2880

(D) 2160

29. The common difference of the arithmetic progression $\frac{1}{3}, \frac{1-3b}{3}, \frac{1-6b}{3}$.... is _____.

(A) -b

(B) b

(C) -3b

(D) 3b

30. If the numbers x, 2x + 2 and 3x + 3 are in the geometric progression, then the fourth term of the progression is _____.

(A) 27

(B) -27

(C) 13.5

(D) -13.5

31. The sum of all natural numbers between 200 and 600 those are divisible by 13 is _____.

(A) 12493

(B) 14493

(C) 16493

(D) 18493

32. The sum of first two terms of a geometric progression is 14 and its infinite sum i.e. sum up to infinity is 32. What is the common ratio of the progression?

(A) 0.5

(B) 0.75

(C) 1.25

(D) 0.25

33. For a relation R, aRb represents that a is related to b. If for all a, b, c, aRb and bRc gives that aRc, then the relation is _____.

(A) Reflexive

(B) Symmetric

(C) Transitive

(D) Asymmetric

34. Let S = {a, b, c, d, e}. The number of non-empty proper subsets of S is _____.

(A) 30

(B) 31

(C) 32

(D) 28

35. If $f(y)=\frac{1}{1+y}$ and $g(y)=\frac{y+1}{y}$ then fog(y)= ____

(A) $\frac{y}{2y+1}$

(B) $\frac{2y}{y+1}$

(C) $\frac{2y+1}{y}$

(D) $\frac{y+1}{y}$

36. The inverse of the function $f(x)=\frac{2+3x}{x+5}$, by taking f(x) as y, is _____

(a) $\frac{2+5y}{y+3}$

(b) $\frac{2-5y}{y+3}$

(c) $\frac{2-5y}{y-3}$

(d) $\frac{2+5y}{y-3}$

37. Find $\frac{dy}{dx}$ for $x^2y^2+y = 0$.

(A) $\frac{dy}{dx}=\frac{2y^2x}{2y^2x^2+1}$

(B) $\frac{dy}{dx}=\frac{-2y^2x}{2yx^2+1}$

(C) $\frac{dy}{dx}=\frac{-2y^2x+1}{2y^2x^2}$

(D) $\frac{dy}{dx}=\frac{2y^2x-1}{2y^2x^2}$

38. The cost function of an organisation as $C(x) = 500-5x^2+\frac{x^3}{3}$, where x denotes the output. Find the level of output at which marginal cost is the minimum.

(A) 5

(B) 4

(C) 10

(D) 6

39. The value of $\int_0^4 \frac{x+3}{x+2}dx$ is _____.

(A) $4- \log_e 6 - \log_e 2$

(B) $4+\log_e 6 - \log_e 2$

(C) $4+\log_e 6$

(D) $4+\log_{10} 6 - \log_{10} 2$

40. The value of $\int_3^4 \frac{2x}{1+x^2}dx$ *is* _____.

(A) $\log\frac{16}{10}$

(B) $\log\frac{17}{10}$

(C) $\log\frac{16}{9}$

(D) $\log\frac{17}{9}$

41. Complete the given series: 0, 6, 24, 60, 120, 210, _____.

(A) 240

(B) 290

(C) 336

(D) 504

42. Find the odd one out in the series: 2, 5, 10, 17, 26, 37, 50, 64.

(A) 17

(B) 26

(C) 37

(D) 64

43. If in a certain language, MADRAS is coded as NBESBT. How is DELHI coded in that language?

(A) EMFIJ

(B) EFMIJ

(C) EFMKJ

(D) EFJMI

44. In a certain code, GLAMOUR is written as IJCNMWP and MISRULE is written as OGUSSNC, then how will MUSICAL be written in that code?

(A) OSUJECN

(B) OSUHACJ

(C) OSUJACJ

(D) OSUJABJ

45. In the following series, one term is wrong. Find out the wrong term.

48, 50, 82, 170, 290

(A) 48

(B) 50

(C) 82

(D) 170

46. Suresh started walking 4 km west from his office. Then he turned right and walked 2 km. Again he turned right and walked 2 km to reach his house. In which direction is Suresh's house from his office?

(A) South

(B) South-East

(C) North-West

(D) East

47. Mr. PQR walked 50 metres towards east, took a right turn and walked 40 metres. Then he took a left turn and walked 30 metres. In which direction is he now from the starting point?

(A) North-East

(B) East

(C) South-East

(D) South

48. Starting from point A, PQ walked 40 metres south. She turned left and walked 40 metres. She then turned left and walked 40 metres. She again turned left and walked 60 metres and reached point B. How far and in which direction is the point B from the point A?

(A) 20 metres West

(B) 20 metres East

(C) 30 metres West

(D) 10 metres West

49. Two persons, P and Q, start walking from a meeting point towards North. After walking 100 metres, P turns left and Q turns right. P, after walking 50 metres, takes a left turn and walks 150 metres. But Q walks 30 metres, turns to his right and walks 90 metres. What is the shortest distance between P and Q now in metres?

(A) 80

(B) 90

(C) 100

(D) 110

50. A hunter is chasing a deer, by running 200 metres in east direction, turns to his right, runs 100 metres and turns to his right, runs 90 metres. Turning to his left, he runs 50 metres and then turns to left, runs 120 metres. Finally, he turns to left and runs 60 metres. He finds the deer in front of him at 100 metres. In which direction is the hunter standing with respect to the deer now?

(A) South

(B) North

(C) East

(D) West

51. Six persons A, B, C, D, E and F are sitting in a circle facing the centre. A is facing D. C is left of A and right of E. D is between B and E. F is right of A. Which one of the following statements is incorrect?

(A) F and C are neighbours.

(B) F is between A and B.

(C) F and A are neighbours.

(D) B is left of D.

52. Six persons A, B, C, D, E and F are sitting in two rows with 3 persons in each row facing same side. C is sitting in the middle of first row. B is sitting in the left of C. E is also sitting in the middle. A is sitting in the right of E. F is sitting in the right of C. Who is not sitting at one of the ends of any row?

(A) A

(B) E

(C) D

(D) F

53. Six people, A, B, C, D, E and F are sitting in a hexagonal shape. All the sides of the hexagon so formed are of same length. A is not adjacent to B or C; D is not adjacent to C or E; B and C are adjacent; F is in the middle of D and C. Which of the following is not a correct neighbour pair?

(A) A and F

(B) D and F

(C) B and E

(D) C and F

54. Seven persons with names T, B, L, A, P, Z and R are standing in a row, facing East. It is given that T is to the right of R; A is between B and Z, L, who is third to the left of B, is at the end; R is fourth to the right of L. Who is at the immediate right of T?

(A) Z

(B) B

(C) P

(D) R

55. Eight friends with names P, Q, R, S, T, U, V and W are sitting on a bench and facing North. U is sitting between S and V; Q is sitting between W and P; T is third to the left of V; W is third left of R; V is sitting at one of the corners. Who is sitting immediate right of W?

(A) P

(B) Q

(C) R

(D) T

56. A girl introduced a boy as the son of daughter of the father of her uncle. The boy is girl's

(A) Father

(B) Son

(C) Uncle

(D) Cousin/Brother

57. A and B are Brothers. C and D are Sisters. A's son is D's Brother. How is B related to C?

(A) Father

(B) Brother

(C) Grandfather

(D) Uncle

58. Ms. X told Ms. Y, "The girl I met yesterday at the market was the youngest daughter of the brother-in-law of my friend's mother." How is the girl related to Ms. X's friend?

(A) Cousin

(B) Daughter

(C) Niece

(D) Aunt

59. There are six members, named as, A, B, C, D, E and F. It is given that E is the brother of A's husband; F is the mother of E; B is the daughter of D and A and is the granddaughter of C. How is C related to E?

(A) Son

(B) Father

(C) Brother

(D) Grandfather

60. It is given that a person named as A is married to B; the person E is a brother of D and the person B is the mother of C whose sister is D. How is D related to A?

(A) Sister

(B) Aunt

(C) Daughter

(D) Granddaughter

61. Sampling method which belongs to the category of Mixed sampling is

(A) Systematic Sampling

(B) Simple Random Sampling

(C) Stratified Sampling

(D) Multi-stage Sampling

62. Number of students in a college is an example of

(A) An attribute

(B) A discrete variable

(C) A continuous variable

(D) A constant

63. For manifold classification, this method of presentation of data cannot be recommended:

(A) Textual presentation

(B) Tabular presentation

(C) Bar Diagram

(D) Pie Chart

64. The most commonly used distribution is _____ in which the maximum frequency is at the central part and the frequency decreases when one moves away from the central part on either the left side or the right side.

(A) Bell-shaped curve

(B) U-shaped curve

(C) J-shaped curve

(D) Mixed curve

65. Which of the followings is not a basic principle of sample survey?

(A) Principle of Inertia

(B) Principle of Optimization

(C) Principle of Large Numbers

(D) Law of Statistical Regularity

66. After a singing competition on a live TV show, the winner is selected according to the number of likes each candidate has received on a messaging app. This method of data collection is known as _____ sampling.

(A) Random

(B) Probabilistic

(C) Purposive

(D) Multi-Stage

67. A bar chart can be drawn for the data having numbers on

(A) Students of various disciplines

(B) Persons of different age groups

(C) Sales of a commodity over a year

(D) Temperature recorded during a month.

68. An investigator collects information on salaries received by 1000 persons. From this collection, the data on women are extracted. Now the data is called _____ data.

(A) Primary

(B) Secondary

(C) Census

(D) Ordinal

69. Two sales-persons present their numbers of sales per week for a month. An appropriate diagram that can be drawn for this data is _____

(A) Histogram

(B) Pie chart

(C) Ogive

(D) Adjacent bar chart

70. If X and Y are related by 4X+3Y+5=0 and Mean of X is 10, then the Mean of Y is

(A) -23

(B) -15

(C) -20

(D) 23

71. For a moderately skewed distribution of marks in English for a group of 145 students the mean marks and median marks were found to be 55.10 and 52.40, respectively. The modal marks are -

(A) 47

(B) 42

(C) 53.1

(D) 52.2

72. If there are two groups with 10 and 12 observations and harmonic mean of the two groups are 3 and 5 respectively, then the combined Harmonic mean is

(A) 8.0

(B) 2.0

(C) 3.8

(D) 4.0

73. Best measure of Dispersion for open-end classification is the _____, which does not change with the change of _____.

(A) Quartile Deviation, Scale

(B) Standard Deviation, Scale

(C) Quartile Deviation, Origin

(D) Standard Deviation, Origin

74. Coefficient of range of 84, 93, 53, 70, 82, 65 is

(A) 28.38

(B) 27.39

(C) 26.75

(D) 29.31

75. Calculate the Harmonic Mean of 1, $\frac{1}{3}, \frac{1}{6}$ and $\frac{1}{9}$

(A) 2.48

(B) 0.21

(C) 0.31

(D) 0.25

76. Find the Coefficient of variation for the following numbers; 7,5,9,3,6

(A) 33.33

(B) 66.66

(C) 3

(D) 300

77. A set contains seven numbers whose average is 12. The average of four greater numbers is 18 and the average of four smaller numbers is 8. Which of the followings is the value of one of the numbers?

(A) 12

(B) 16

(C) 18

(D) 20

78. If the sum of ten values is 20 and sum of squares of these values is 80, then the standard deviation is _____.

(A) 1

(B) 2

(C) 1/2

(D) 4

79. A data set has first eleven positive multiples of 6. The semi inter-quartile range is _____.

(A) 12

(C) 18

(B) 24

(D) 36

80. The number of tosses of a coin, that are needed so that the probability of getting at least one head is 0.875, is

(A) 2

(C) 4

(B) 3

(D) 5

81. Two-person X and Y appear in an interview for two vacancies for the same post. The probability of X's selection is 1/5 and that of Y's selection is 1/3. The probability that none of them will be selected is

(A) 7/15

(B) 8/15

(C) 9/15

(D) 10/15

82. A number is selected at random from the first 50 natural numbers. What is the probability that it would be either a two-digit prime number or a composite number lying between 5 and 40?

(A) 0.54

(B) 0.48

(C) 0.64

(D) 0.72

83. Some dice with six faces have numbers written from Four to Nine. Two such dice are thrown simultaneously. Find the probability that the sum of numbers on the two dice would be 14 or less.

(A) 11/18

(B) 13/18

(C) 1/6

(D) 2/9

84. Three components A, B and C are manufactured separately and then assembled into a finished product. While producing the three components, it is found that 5 percent of component A, 4 percent of component B and 1 percent of component C are defective. What is the probability that the assembled product is free from defects?

(A) 0.75

(B) 0.8

(C) 0.85

(D) 0.9

85. Two persons are playing a set of matches. The winner of 4 matches is declared as the winner. Any player has 50% chance to win a match. The probability that the game comes to an end at the fourth match is _____.

(A) 5/8

(B) 4/8

(C) 3/8

(D) 1/8

86. The Mode of binomial distribution B (7,1/3) is

(A) 3

(B) 2

(C) 7/3

(D) 8/3

87. An emergency room receives an average of 3 patients per hour. What is the probability that exactly 2 patients arrive in an hour? (Given: $e^{0} = 1$, $e^{-1} = 0.367$, $e^{-2} = 0.135$, $e^{-3} = 0.049$, $e^{-4} = 0.018$, $e^{-5} = 0.0067$)

(A) 0.22

(B) 0.3

(C) 0.27

(D) 0.25

88. If a binomial distribution has n = 20 and p = 0.3 what is its variance?

(A) 4.2

(B) 5.6

(C) 3.4

(D) 2.9

89. It is given that X has normal distribution with mean zero and standard deviation one. Also given that P [- 2 < X < 2] = 0.95, P[- 2 < X < - 1.5] = 0.045. Find the probability for P[0 < x < 1.5].

(A) 0.63

(B) 0.53

(C) 0.33

(D) 0.43

90. The probability mass function of a distribution is given below in a tabular form:

| x | 0 | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|
| p(x) | k | $2k + k^2$ | 3k | $2k + k^2$ | k |

Where k is a non-negative constant. The median of the distribution is

(A) 3k

(B) 2

(C) 2k

(D) 3

91. For a group of students, the sum of squares of differences in ranks for Maths and Physics marks are found to be 60, which is 120 times the value of rank correlation coefficient. How many students are there in the group?

(A) 8

(B) 10

(C) 9

(D) 12

92. If two variables move in the same direction i.e. an increase (or decrease) on the part of one variable introduces an increase (or decrease) on the part of the other variable, then the two variables are known to be

(A) Positive correlation

(B) Negative correlation

(C) Zero correlation

(D) Curvilinear correlation

93. If m + 3x=10 and 2y + 5n=25 and regression coefficient of y on x is 0.80, what is the regression coefficient of n on m?

(A) -0.106

(B) 9.375

(C) 0.106

(D) 0.0106

94. If the regression coefficient $b_{yx}$ is greater than one, then the regression coefficient $b_{xy}$

(A) cannot be less than one

(B) cannot be greater than one

(C) can be equal to one

(D) can be equal to zero

95. The sum of squares of the differences between two ranks awarded by two judges on 10 candidates is _____ if the rank correlation coefficient is 0.8.

(A) 44

(B) 55

(C) 66

(D) 33

96. Two indices that is current on base and base on current should be reciprocals of each other in

(A) Unit test

(B) Time reversal test

(C) Circular test

(D) Average weighted test

97. If $\Sigma p_0q_0 = 160.7$ and $\Sigma p_1q_0 = 178.6$, then the cost of living index is

(A) 111.14

(B) 93.10

(C) 104.71

(D) 105.7

98. Which sampling technique can be used for the construction of Index numbers?

(A) Systematic sampling

(B) Quota sampling

(C) Cluster sampling

(D) Random sampling

99. From the year 2015 to 2025, Consumer price index increased from 125 to 196. During this period, salary of the employees as per $7^{th}$ pay commission recommendations was revised from ₹ 25,000 to ₹ 37,250. In real terms, an employee should get following amount as an additional amount to maintain his previous standard of living:

(A) ₹ 1,965

(B) ₹ 1,950

(C) ₹ 1,945

(D) ₹ 14,200

100. If the consumer price index number is 750, then the purchasing power of one rupee is _____.

(A) 12.5 paise

(B) 15 paise

(C) 13.3 paise

(D) 16.5 paise

**Answer Key**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1. | **(B)** | 2. | **(A)** | 3. | **(C)** | 4. | **(D)** | 5. | **(D)** |
| 6. | **(A)** | 7. | **(B)** | 8. | **(A)** | 9. | **(A)** | 10. | **(A)** |
| 11. | **(B)** | 12. | **(D)** | 13. | **(C)** | 14. | **None of the options were correct*** | 15. | **(A)** |
| 16. | **(C)** | 17. | **(D)** | 18. | **(A)** | 19. | **(A)** | 20. | **(C)** |
| 21. | **(D)** | 22. | **(B)** | 23. | **(A)** | 24. | **(C)** | 25. | **(B)** |
| 26. | **(B)** | 27. | **(A)** | 28. | **(C)** | 29. | **(A)** | 30. | **(D)** |
| 31. | **(A)** | 32. | **(B)** | 33. | **(C)** | 34. | **(A)** | 35. | **(A)** |
| 36. | **(C)** | 37. | **(B)** | 38. | **(A)** | 39. | **(B)** | 40. | **(B)** |
| 41. | **(C)** | 42. | **(D)** | 43. | **(B)** | 44. | **(C)** | 45. | **(A)** |
| 46. | **(C)** | 47. | **(C)** | 48. | **(A)** | 49. | **(C)** | 50. | **(A)** |
| 51. | **(A)** | 52. | **(B)** | 53. | **(A)** | 54. | **(C)** | 55. | **(B)** |
| 56. | **(D)** | 57. | **(D)** | 58. | **(A)** | 59. | **(B)** | 60. | **(C)** |
| 61. | **(A)** | 62. | **(B)** | 63. | **(A)** | 64. | **(A)** | 65. | **(C)** |
| 66. | **(C)** | 67. | **(A)** | 68. | **(B)** | 69. | **(D)** | 70. | **(B)** |
| 71. | **(A)** | 72. | **(C)** | 73. | **(C)** | 74. | **(B)** | 75. | **(B)** |
| 76. | **(A)** | 77. | **(D)** | 78. | **(B)** | 79. | **(C)** | 80. | **(B)** |
| 81. | **(B)** | 82. | **(D)** | 83. | **(B)** | 84. | **(D)** | 85. | **(D)** |
| 86. | **(B)** | 87. | **(A)** | 88. | **(A)** | 89. | **(D)** | 90. | **(B)** |
| 91. | **(C)** | 92. | **(A)** | 93. | **(C)** | 94. | **(B)** | 95. | **(D)** |
| 96. | **(B)** | 97. | **(A)** | 98. | **(D)** | 99. | **(B)** | 100. | **(C)** |

*Correct answer is 1,53,832.

# PAPER – 3: QUANTITATIVE APTITUDE

*All Question are compulsory.*

**Time: 2 Hours** **Marks: 100**

1. If $2x + 3y = 34$ and $\frac{x+y}{y} = \frac{13}{8}$, find the value of $7x + 5y$.

   (A) 45

   (B) 53

   (C) 75

   (D) 35

2. The solution of the inequality $\frac{5-2x}{3} \leq \frac{x}{6} - 5$ is

   (A) $x \geq 8$

   (B) $x \leq 8$

   (C) $x \geq 6$

   (D) $x \leq 6$

3. The value of is $\sqrt{5+\sqrt{5+\sqrt{5+\sqrt{5}}}+.....\infty}$ is

   (A) 0

   (B) $\frac{1+\sqrt{21}}{2}$

   (C) 1

   (D) $\frac{-1+\sqrt{21}}{2}$

4. Solve the system and $\frac{5-2x}{4} \leq \frac{x}{8} - 5$ and $\frac{x+4}{3} \leq 6$.

   (A) $x \leq 10$

(B) $x \geq 8$

(C) $10 \leq x \leq 14$

(D) $x \geq 14$

5. If a sum double itself in 8 years, then in how many years it will becomes four times, assuming that the simple interest is calculated.

(A) 16 years

(B) 12 years

(C) 24 years

(D) 20 years

6. Mr. XYZ is investing a certain amount at the end of each month in his account. He is supposed to get interest 12% per annum compounded monthly. If the future value of this annuity after the $10^{th}$ payment is ₹ 50,000, then amount invested by Mr. XYZ in each month will be? Given $(1.01)^{10} = 1.104622$

(A) ₹ 4,779

(B) ₹ 4,735

(C) ₹ 4,375

(D) ₹ 4,977

7. If an amount is compounded annually so that it tripled itself in 4 years, then the annual rate of interest is (Given that $3^{1/4} = 1.316$)

(A) 13.6%

(B) 31.1%

(C) 31.6%

(D) 11.3%

8. Bank B provides loans at 15% per annum compound interest. If Mr. XYZ borrowed ₹ 3,200 for 2 years from Bank B, then how much interest must Mr. XYZ pay to his bank?

(A) ₹ 400

(B) ₹ 960

(C) ₹ 4,232

(D) ₹ 1,032

9. An investor intends to purchase a three years bond at a price of ₹ 907.125 having nominal interest rate of 10%. What is the par value of the bond if it matures at par and the investor requires returns at the rate of 14%?

(A) ₹ 1,200

(B) ₹ 1,100

(C) ₹ 900

(D) ₹ 1,000

10. A sinking fund is created for replacement of machine at the end of 20 years. Its present cost is ₹ 8,00,000. After 20 years cost of new machine would be ₹ 10,00,000, How much provision need to be made out of the profit each year provided sinking fund investments can earn interest at the rate of 7% pa? The scrap value of the machine at the end of 20 years would be ₹ 2,00,000. Given $1.07^{20}$= 3.8697.

(A) ₹ 15,514

(B) ₹ 13,514

(C) ₹ 19,514

(D) ₹ 17,514

11. The net asset value (NAV) of a Mutual Fund is calculated at the end of the financial year. For the last five years following values are computed.

| **Year** | **2021** | **2022** | **2023** | **2024** | **2025** |
|---|---|---|---|---|---|
| NAV | 100 | 115 | 150 | 120 | 200 |

Calculate the Compounded Annual Growth Rate of NAV.

(A) 16.92%

(B) 18.92%

(C) 20.92%

(D) 22.92%

12. The third term of a geometric progression is 5. Then the product of first five terms is

(A) $5^5$

(B) $5^6$

(C) $5^7$

(D) $5^9$

13. The sum of infinity of the series $\frac{1}{2}+\frac{1}{6}+\frac{1}{18}+\frac{1}{54}+\ldots\ldots$ is:

(A) $\frac{1}{4}$

(B) $\frac{1}{2}$

(C) $\frac{3}{4}$

(D) 1

14. If the arithmetic mean of two numbers is 13 and the geometric mean is 12, then the difference between the two numbers is:

(A) 8

(B) 10

(C) 12

(D) 14

15. If $f(x) = 3e^{x^2}$, then $f'(x) - 2xf(x) + \frac{1}{6}f(0)-f'(0)$ is equal to

(A) 0

(B) -0.5

(C) 0.5

(D) -1

16. The cost of production of an item is given as $C=50x - 5x^2 + \frac{x^3}{6}$ where 'x' is number of items to be produced. If the average cost and marginal cost are equal then, what quantity of items should be produced?

(A) 20

(B) 15

(C) 10

(D) 5

17. If A = {2, 3}, B = {4, 5} and C = {5, 6} then the A × (B∩C) is

(A) {(3, 5), (2, 6)}

(B) {(2, 4), (5, 3)}

(C) {(5, 2), (5, 3)}

(D) {(2, 5), (3, 5)}

18. The cost function of a company is given by $C(x) = 600x - 10x^2 + \frac{x^3}{2}$ where x denotes the output. Find the level of output (in nearest integer) at which average cost is minimum.

(A) x = 8

(B) x = 9

(C) x = 10

(D) x = 11

19. Which of the followings is odd one?

(A) CEHL

(B) KMPT

(C) OQTX

(D) NPSV

20. Mr. ABC started walking down a road in the evening while facing the sun. After walking for a distance, he turned to his left, and then he turned to his right. In which direction is he facing now?

(A) East

(B) West

(C) North

(D) South

21. Find the odd number in the following series: 7, 11, 13, 15, 19, 23, ...

(A) 11

(B) 13

(C) 15

(D) 19

22. A boy is facing East. Turning to the right, he goes 20 m, then turning to the left he goes 20 m and turning to the right, he goes 20 m, then again turning to the right, he goes to 40 m and then again he goes 40 m to the right. In which direction is he from his original position?

(A) North

(B) West

(C) South

(D) East

23. In line, A sits $12^{th}$ from the left. B is sitting $20^{th}$ from the right and $5^{th}$ to the left of A. How many people are sitting in the line?

(A) 25

(B) 26

(C) 27

(D) 28

24. Eight persons P, Q, R, S, T, U, V, and W are sitting around a circular table facing the centre. Two persons sit between Q & W. V sits immediate left of W. Three persons sit between S & T. R sits immediate left of T. U is not the neighbour of P. One person sits between P & Q. Which of the following statement is correct?

(A) Q sits to the immediate right of U

(B) One person sits between P & S

(C) One person sits between S & U

(D) Three persons sit between Q & R

25. Six friends P, Q, R, S, T and U are sitting around the hexagonal table each at one corner and are facing the centre of the hexagonal. P is second to the left of U. Q is neighbour of R and S. T is second to the left of S. Which one is sitting opposite to S?

(A) R

(B) P

(C) Q

(D) T

26. Five friends P, Q, R, S, and T are sitting in row facing north. S is between T & Q and Q is to the immediate left of R. P is to be the immediate left of the T. Who is sitting at extreme left end?

(A) S

(B) R

(C) Q

(D) P

27. A market researcher divides a city into 5 regions, where variation within region is little and there is a maximum variation between regions and randomly selects 100 households from cach region for a survey. This sampling method is known as:

(A) Cluster Sampling

(B) Quota Sampling

(C) Stratified Sampling

(D) Systematic Sampling

28. Frequency density of a class interval may be defined as the ratio of

(A) the frequency of that class length to the corresponding class interval

(B) the frequency of that class interval to the corresponding class length

(C) the frequency of that class frequency to the corresponding class length

(D) the frequency of that class frequency to the corresponding cumulative class frequency

29. P, Q, R, S, T, and U are six members of a family. R is spouse of Q. U is mother of T and S is daughter of U. P's daughter is T and R's son is P. There are two couples in the family. Which of the following is correct?

(A) T is granddaughter of Q

(B) Q is grandfather of T

(C) R is mother of P

(D) Q is uncle of S

30. During the tabular presentation of data, _____ is the entire upper part of table which includes columns and sub-column numbers, unit(s) of the measurement along with caption.

(A) Stub

(B) Box-head

(C) Attribute

(D) Body

31. This type of sampling method depends entirely on the discretion or judgement of the sampler

(A) Systematic Sampling

(B) Simple Random Sampling

(C) Purposive Sampling

(D) Quota Sampling

32. Which of the following sampling methods is completely free from sampler's biases

(A) Stratified Sampling

(B) Random sampling

(C) Multi-stage sampling

(D) Systematic sampling

33. The diagrammatic representation of the cumulative frequency distribution is:

(A) Frequency polygon

(B) Ogive

(C) Histogram

(D) Line curve

34. In two groups, unit one has 700 people with monthly salary of ₹ 2,500, unit two has 650 with salary of ₹ 2,750 then approximate combined arithmetic mean with monthly salary (in ₹) is

(A) 2,620

(B) 2,520

(C) 2,420

(D) 2,720

35. If the relationship between x and y is given by 5x - 3y = 15 and if range of x is given as 24 then the range of y is given by:

(A) 25

(B) 20

(C) 30

(D) 40

36. The two variables 'x' and 'y' are related by 2x - 3y - 3 = 0 If the mode of 'x' is 15, then the mode of 'y' is:

(A) 30

(B) 3

(C) 15

(D) 9

37. If mean of 5 observations x + 1, x + 3, x + 5, x + 7 and x + 9 is given as 125, then the value of x will be.

(A) 110

(B) 111

(C) 115

(D) 120

38. If two samples of size 30 and 20 have means as 55 and 60 and standard deviation 5 and 6 respectively then what would be the standard deviation of combined sample of size 50?

A) 5.95

(B) 5.90

(C) 5.85

(D) 5.80

39. Find the probability that a 3-digit number formed using the digits 1, 3, and 5 (without repetition), is divisible by 3?

(A) 1

(B) 0

(C) $\frac{1}{3}$

(D) $\frac{2}{3}$

40. Ms. Radhika appeared in interview at three different companies. In the first company there are 5 candidates, in second company there are 12 candidates and in third company there are 15 candidates. What is probability that Ms. Radhika would be selected?

(A) $\frac{231}{375}$

(B) $\frac{321}{375}$

(C) $\frac{154}{225}$

(D) $\frac{71}{225}$

41. The odds in favour of Mr. A to solve a problem is 5:7 and odds against to Mr. B to solve the same problem is 9:6. What is the probability that if both of them try, the problem will be solved?

(A) $\frac{117}{180}$

(B) $\frac{127}{180}$

(C) $\frac{137}{180}$

(D) $\frac{147}{180}$

42. If the slope of the regression line is calculated to be 3.5 and the intercept 14 then the value of Y when X is 6 is

(A) 35

(B) 85

(C) 15

(D) 75

43. For the variables x and y, the regression equations are given as

$x + 2y - 5 = 0$

$2x + 3y\ 8 = 0$

and the arithmetic means of x and y are 1 and 2 respectively. Compute the correlation coefficient between x and y.

(A) -0.87

(B) 0

(C) 0.87

(D) 1

44. A quality control inspector finds that 20% of light bulbs are defective. If a batch of 5 light bulbs is tested, what is the probability that exactly 1 bulb is defective?

(A) 0.4096

(B) 0.8026

(C) 0.2746

(D) 0.1296

45. If $b_{yx}$ =1.6 and $b_{xy}$ = 0.4, then $r_{xy}$ will be:

(A) 0.4

(B) 0.8

(C) 0.64

(D) -0.8

46. The test of shift ability of the base is called?

(A) Unit test

(B) Factor reversal test

(C) Time reversal test

(D) Circular test

47. The property of an index number that allows shifting of the base year without referring each time to the original base is tested by which of the following?

(A) Time Reversal Test

(B) Factor Reversal Test

(C) Circular Test

(D) Unit Test

48. Which of the following index does not satisfy the time reversal test?

(A) Edge worth Marshall's index

(B) Paasche's index

(C) Fisher's Ideal index

(D) Bowely's Index

49. If $3x \times b^{5\ \log_b x} = 192$ then the value of $x$ is

(A) 8

(B) 4

(C) 2

(D) $2\sqrt{2}$

50. In India, an examination is conducted in two sessions. In the first session the ratio of boys to girls among 455 students is 8: 5. If 50 new girls are admitted in the second session, how many new boys must be admitted so that the ratio of girls to boys becomes 3: 4?

(A) 20

(B) 30

(C) 40

(D) 50

51. If α and β are the roots of the equation $2x^2 - 3x + 1 = 0$ then the equation whose roots are 1/ α and 1/β is:

(A) $x^2 + 3x + 2 = 0$

(B) $x^2 - 3x + 2 = 0$

(C) $x^2 + 3x - 2 = 0$

(D) $x^2 - 3x - 2 = 0$

52. One year ago, the ratio of ages (in years) of A and B was 5:4. The ratio of their ages, 4 years from now, will be 6:5. What will be the age of A (in years) after 10 years from now?

(A) 36

(B) 18

(C) 19

(D) 26

53. Find the value of $\left(\frac{x^b}{x^c}\right)^{(b+c-a)} \times \left(\frac{x^c}{x^a}\right)^{(c+a-b)} \times \left(\frac{x^a}{x^b}\right)^{(a+b-c)}$

(A) $x^{abc}$

B) 1

(C) 0

(D) -1

54. If ₹ 80,000 grows to ₹ x in 3 years at compound interest compounded annually at 8% rate of interest per annum, then the value of x is:

(A) ₹ 1,00,776.96

(B) ₹ 1,02,985.98

(C) ₹ 1,03,680.64

(D) ₹ 99,850.50

55. The value of compound interest (in nearest ₹) if ₹ 30,00,000 is deposited in a bank for 1 year at the rate of 16% per annum compounded quarterly is:

(A) 5,07,575

(B) 5,78,360

(C) 5,09,576

(D) 5,72,540

56. The common region represented by inequalities: $2x + y \geq 8$, $x + y \geq 12$, $3x + 2y \leq 34$, $x \geq 0$ and $y \geq 0$ is

(A) Unbounded

(B) Feasible unbounded

(C) Infeasible bounded

(D) Feasible bounded

57. The present value (in nearest ₹) of an annuity of ₹ 90,000 for 13 years at 5.5% compounded annually is (Given $1.005^{13}$ = 2.0058)

(A) 9,99,996

(B) 8,20,548

(C) 9,69,996

(D) 7,22,536

58. Ms. Rina buys a refrigerator worth ₹ 25,000. She pays ₹ 5,000 upfront and agrees to settle the remaining amount through five equal annual installments. The unpaid balance carries an interest of 18% per annum, compounded annually. Calculate the approximate value of each annual installment. Given P(5, 0.18)=3.12717.

(A) ₹ 6,350

(B) ₹ 6,395

(C) ₹ 6,410

(D) ₹ 4,430

59. A sum of money lent at compound interest for 2 years at 20% p.a. would fetch ₹ 482/- more if the interest was payable half yearly then if it was payable annually. What is the value of sum deposited?

(A) ₹ 10,000

(B) ₹ 15,000

(C) ₹ 17,500

(D) ₹ 20,000

60. Mr. Ravi allocates a corpus of ₹ 50,000 into a term deposit account which accrues interest at a nominal annual rate of 10%, compounded on a quarterly basis. What will be the effective annual rate of interest?

(A) 10%

(B) 10.25%

(C) 10.38%

(D) 10.50%

61. Shiva invested an amount of ₹ 12,000 at the rate of 10% pa simple interest and another amount at the rate of 20% pa simple interest. The total interest earned at the end of the year on total amount invested became 14% pa. Find the total amount invested.

(A) ₹ 18,000

(B) ₹ 20,000

(C) ₹ 24,000

(D) ₹ 26,000

62. If ${}^{n}C_{r-1} = 28,\ {}^{n}C_{r} = 56,\ {}^{n}C_{r+1} = 70,$ then the value of n and r are

(A) n = 8, r = 3

(B) n = 8, r = 4

(C) n = 9, r = 4

(D) n = 9, r = 3

63. In a meeting, 5 analysts, 2 consultants, and 3 managers are to be seated in a row. If members of the same profession must sit together, in how many ways can they be seated?

(A) 11,232

(B) 8,640

(C) 6,912

(D) 9,504

64. The total numbers greater than 2000 that can be formed with the digits 1, 2, 3, 4, 5 and no digits being repeated in any number are:

(A) 216

(B) 96

(C) 864

(D) 468

65. How many 3-digit number can be formed from the digits 2, 3, 5, 6, 7 and 9 which are divisible by 5 and none of the digit is repeated?

(A) 18

(B) 20

(C) 22

(D) 24

66. If $f(x)=1+\frac{1}{x}$, then the value of $f\left(f\left(\frac{1}{x}\right)\right)$ is

(A) $\frac{x-2}{x+1}$

(B) $\frac{x+2}{x+1}$

(C) 2

(D) -1

67. The function $f(x)=\frac{x^2-25}{x-5}$ is undefined at x = 5 what value must be assigned to f(5) if f(x) is to be continuous at x = 5?

(A) 0

(B) 1

(C) 10

(D) 100

68. A GP series consists of 2n terms. If the sum of the terms occupying the odd places is $S_1$ and that of the terms in even places is $S_2$, the common ratio of the progression is?

(A) n

(B) $2S_1$

(C) $\frac{S_2}{S_1}$

(D) $\frac{S_1}{S_2}$

69. Let $\mathbb{R}$ is the set of real numbers such that the function f : $\mathbb{R} \to \mathbb{R}$ and g : $\mathbb{R} \to \mathbb{R}$ are defined by $f(x) = x^2 + 3x - 1$ and $g(x) = 2x + 3$ then $f \circ g(x)$ is:

(A) $4x^2 + 6x + 1$

(B) $4x^2 + 18x + 17$

(C) $4x^2 - 18x + 17$

(D) $4x^2 - 6x + 1$

70 The next term of the series 1, 7, 17, 31, 49, 71, _____ is

(A) 97

(B) 153

(C) 89

(D) 111

71. If in a certain code language PAINT is coded as 74128 and ACCEPT is coded as 455978, what will be the code for PATIENT?

(A) 7419828

(B) 7481298

(C) 7491828

(D) 7481928

72. Evaluate the integral $\int_0^1 \left(2x^2 - x^3\right) dx$

(A) $\frac{1}{3}$

(B) $\frac{4}{3}$

(C) $\frac{7}{12}$

(D) $\frac{5}{12}$

73. If in a certain language, MONKEY is coded as NNOJFX, how is PUZZLE coded in that language?

(A) QTBXMD

(B) QTAYMD

(C) QTAWME

(D) PTAYMD

74. A man drives 10 km towards north; from there he turns towards right and drive 3 Km. then he takes right turn and drives 6 km. How far and in which direction is he with reference to starting point?

(A) 5 km North-east

(B) 3 km North-east

(C) 5 km South-east

(D) 3 km South-east

75. A, B, C, D and E are sitting on a bench. A is sitting next to B, C is sitting next to D, D is not sitting with E who is on the left end of the bench. C is on the second position from the right. A is to the right of B and E. A and C are sitting together. In which position B is sitting?

(A) Between E and C

(B) Between E and D

(C) Between E and A

(D) Between C and A

76. Mr. Q walks 20 km north, then walks 14 km south, and then walks 8 km east. How far is he from his starting point?

(A) 6 km

(B) 8 km

(C) 10 km

(D) 12 km

77. If west is replaced with north-east then south will be replaced by which of the following direction?

(A) South-west

(B) North-west

(C) West

(D) East

78. A is the son of C; C and Q are sisters; Z is the mother of Q and P is the son of Z. Which of the following statements is true?

(A) P is the maternal uncle of A

(B) P and A are cousins

(C) C and P are sisters

(D) Q is maternal grandfather of A

79. 'A+B' means A is the father of B.

'A - B' means A is the wife of B.

'A x B' means A is the brother of B.

'A/B' means A is the daughter of B.

If it is given D x E + F, which of the following is true?

(A) D is the father of F

(B) D is the grandfather of F

(C) D is the uncle of F

(D) D is the brother-in-law of F

80. Pointing to a photograph of a boy Suresh said, "He is the son of the only son of my mother." How is Suresh related to that boy?

(A) Brother

(B) Grandfather

(C) Father

(D) Son

81. A and B are sisters, B is the wife of C, D is the son of E, F is the daughter of B, G is the husband of A, E is the father of B. Who is the brother of B?

(A) C

(B) D

(C) E

(D) F

82. According to the _____, if a sample of fairly large size is drawn from the population under discussion at random, then on an average the sample would possess the characteristics of that population.

(A) Principle of Inertia

(B) Principle of Optimization

(C) Law of Statistical Regularity

(D) Principle of Validity

83. On _____, the frequency, starting from a rather low value, gradually reaches the maximum value, somewhere near the central part and then gradually decreases to reach its lowest value at the other extremity.

(A) Bell-shaped curve

(B) U-shaped curve

(C) J-shaped curve

(D) Mixed curve

84. In the Stratified Sampling, When the strata-variances differ significantly among themselves, we take recourse to "Neyman's allocation" where:

(A) Sample size is proportional to the population size

(B) Sample size is proportional to the sample SD

(C) Sample size is proportional to the sample variance

(D) Population size is proportional to the sample variance

85. If arithmetic mean of two numbers is 64 and harmonic mean is 16 then geometric mean is

(A) 64

(B) 16

(C) 32

(D) 8

86. In continuous frequency distribution, the median of the data is 32. If each observation is increased by 7, then the new median will be:

(A) 39

(B) 32

(C) 25

(D) 35

87. If mean is 21 and median is 25 then value of mode is

(A) 33

(B) 25

(C) 31

(D) 21

88. Calculate the coefficient of quartile deviation for 11, 55, 65, 22, 33, 98, 88,

(A) 6

(B) 166.6

(C) 60

(D) 0.6

89. If two variables 'x' and 'y' are related to 3x + 4y - 7 = 0 and mean & mean deviation about mean of 'x' are 1.2 and 0.4 respectively then the coefficient of mean deviation of 'y' about its mean is?

(A) 34.3

(B) 32.3

(C) 35.3

(D) 36.3

90. If in a class, 50% of the student study mathematics and science and 70% of the student study mathematics, then the probability of a student studying science given that he/she is already studying mathematics is

(A) $\frac{3}{7}$

(B) $\frac{6}{7}$

(C) $\frac{4}{7}$

(D) $\frac{5}{7}$

91. Tickets numbered 1 to 20 are mixed up and then a ticket is drawn at random. What is the probability that the ticket drawn has a number which is a multiple of 3 or 5?

(A) $\frac{9}{20}$

(B) $\frac{1}{2}$

(C) $\frac{2}{5}$

(D) $\frac{8}{15}$

92. If two dice are rolled, then the probability of getting a greater number on the first die than the one on the second, given that the sum should be equal to 7 is

(A) $\frac{1}{2}$

(B) $\frac{1}{6}$

(C) $\frac{1}{3}$

(D) $\frac{2}{3}$

93. For a binomial distribution, if the mean is 10 and the standard deviation is 3, find n. (number of trials)

(A) 30

(B) 90

(C) 15

(D) 100

94. If a binomial distribution has n = 25 and p = 0.2 what is its mean?

(A) 5

(B) 4

(C) 25

(D) 2

95. If X is a Poisson variate such that P(X = 1) = 0.3 P(X = 2) = 0.2 then P(X = 0) =

(A) $e^{\frac{4}{3}}$

(B) $e^{\frac{-1}{3}}$

(C) $e^{\frac{-4}{3}}$

(D) $e^{\frac{-2}{3}}$

96. If the first quartile ($Q_1$) and third quartile ($Q_3$) of a normal distribution are 22 and 28, what is the median of the distribution?

(A) 22

(B) 25

(C) 30

(D) 28

97. The coefficient of rank correlation in a beauty contest of 10 candidates by two judges A & B was found to be 0.5. If it was later discovered that the difference in rank of one candidate was wrongly taken as 3 instead of 7. The corrected coefficient of rank correlation is ?

(A) 0.26

(B) 0.32

(C) 0.49

(D) 0.93

98. Fisher's Ideal Price Index is defined as the _____ Index and the Paasche's Index. of the Laspeyres'.

(A) Harmonic Mean

(B) Geometric Mean

(C) Arithmetic Mean

(D) Simple Mean

99. The coefficient of correlation between 'x' and 'y' is 0.6. If 'u' & 'v' variables are defined as 2u-x+3 = 0 and 3v+y-2 = 0 then the coefficient of correlation between 'u' & 'v' is?

(A) 0.6

(B) -0.6

(C) 0.58

(D) -0.58

100. Which index number method uses current year quantities as weights?

(A) Fisher's Ideal Price Index

(B) Marshall Edge Worth Index Number

(C) Laspeyres' Index

(D) Paasche's index

**Answer Key**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1. | **(C)** | 21 | **(C)** | 41 | **(A)** | 61 | **(B)** | 81 | **(B)** |
| 2. | **(A)** | 22 | **(B)** | 42 | **(A)** | 62 | **(A)** | 82 | **(C)** |
| 3. | **(B)** | 23 | **(B)** | 43 | **(A)** | 63 | **(B)** | 83 | **(A)** |
| 4. | **(C)** | 24 | **(C)** | 44 | **(A)** | 64 | **(A)** | 84 | **(A)** |
| 5. | **(C)** | 25 | **(B)** | 45 | **(B)** | 65 | **(B)** | 85 | **(C)** |
| 6. | **(A)** | 26 | **(D)** | 46 | **(D)** | 66 | **(B)** | 86 | **(A)** |
| 7. | **(C)** | 27 | **(C)** | 47 | **(C)** | 67 | **(C)** | 87 | **(A)** |
| 8. | **(D)** | 28 | **(B)** | 48 | **(B) & (D** | 68 | **(C)** | 88 | **(C)** |
| 9. | **(D)** | 29 | **(A)** | 49 | **(C)** | 69 | **(B)** | 89 | **(C)** |
| 10. | **(C)** | 30 | **(B)** | 50 | **(A)** | 70 | **(A)** | 90 | **(D)** |
| 11. | **(B)** | 31 | **(C)** | 51 | **(B)** | 71 | **(D)** | 91 | **(A)** |
| 12. | **(A)** | 32 | **(B)** | 52 | **(A)** | 72 | **(D)** | 92 | **(A)** |
| 13. | **(C)** | 33 | **(B)** | 53 | **(B)** | 73 | **(B)** | 93 | **(D)** |
| 14. | **(B)** | 34 | **(A)** | 54 | **(A)** | 74 | **(A)** | 94 | **(A)** |
| 15. | **(C)** | 35 | **(D)** | 55 | **(C)** | 75 | **(C)** | 95 | **(C)** |
| 16. | **(B)** | 36 | **(D)** | 56 | **(D)** | 76 | **(C)** | 96 | **(B)** |
| 17. | **(D)** | 37 | **(D)** | 57 | **(B)** | 77 | **(B)** | 97 | **(A)** |
| 18. | **(C)** | 38 | **(A)** | 58 | **(B)** | 78 | **(A)** | 98 | **(B)** |
| 19. | **(D)** | 39 | **(A)** | 59 | **(D)** | 79 | **(C)** | 99 | **(B)** |
| 20 | **(B)** | 40 | **(D)** | 60 | **(C)** | 80 | **(C)** | 100 | **(D)** |

# PAPER – 3: QUANTITATIVE APTITUDE

*All Question are compulsory.*

**Time: 2 Hours** **Marks: 100**

1. If $\alpha$ & $\beta$ are roots of the equations $x^2 - 2x - 35 = 0$, where ($\alpha \geq \beta$), then find the value of $\frac{(\alpha-\beta)^2}{(\alpha+\beta)^2}$

   (a) 18

   (B) 24

   (C) 32

   (D) 36

2. The set of inequalities $2x + 3y < 9$, $5x - y > 3$ has _____ region.

   (A) Unbounded solution

   (B) Bounded solution

   (C) No solution

   (D) Exactly a point solution

3. The feasible region formed by linear inequalities is always a _____ region.

   (A) Circular

   (B) Concave

   (C) Convex

   (D) Irregular

4. The system of equations

   $$2x + y = 10$$

   $$4x + 6y = 36$$

   has solution with x = _____

   (A) 2

(B) 3

(C) 5

(D) 6

5. One experienced person does 10 units of work per day, while a fresher does 5 units of work per day. The employer wants to maintain at least 50 units of work per day. This situation can be expressed as _____

(A) $10x + 5y > 50$ $x \geq 0, y \leq 0$

(B) $10x + 5y \leq 50$ $x \geq 0, y \leq 0$

(C) $10x + 5y \geq 50$ $x \geq 0, y \geq 0$

(D) $10x + 5y = 50$ $x \geq 0, y \leq 0$

6. If the difference between the annually compounded interest and simple interest on a certain sum of money at 8% per annum for 3 years is ₹ 788. Then the principle amount is _____.

(A) ₹ 39,175

(B) ₹ 39,475

(C) ₹ 39,975

(D) ₹ 40,475

7. What will be the approximate future value of an annuity of ₹ 1000 made annually for 5 years at interest rate of 7% per annum, compounded annually? (Given $(1.07)^5 = 1.40255$)

(A) ₹ 8,025

(B) ₹ 5750

(C) ₹ 7,013

(D) ₹ 6,412

8. A machine depreciates at a rate of 10% per year on its beginning-of-year value. If it is sold for ₹ 6,000 after 9 years, what was its original purchase price?

(A) ₹ 14,587

(B) ₹ 15,488

(C) ₹ 14,875

(D) ₹ 15,888

9. Rakesh requires ₹ 1,00,000 to buy a scooter after 4 years. What will be the approximate present value of ₹ 1,00,000 if the interest rate is 10% per annum?

(A) ₹ 67,800

(B) ₹ 68,300

(C) ₹ 70,935

(D) ₹ 71,430

10. Raju deposit ₹ 20,000 in a nationalized bank for 3 years at an annual interest rate of 8%, with the interest compounded every quarter. Find out how much interest Raju earns in the first year and the second year.

(A) ₹ 1,632 & ₹ 1,712

(B) ₹ 1,684 & ₹ 1,738

(C) ₹ 1,648 & ₹ 1,784

(D) ₹ 1,696 & ₹ 1,746

11. Find the effective interest rate, if nominal rate is 12% per annum, quarterly compounding.

(A) 12%

(B) 12.36%

(C) 12.55%

(D) 13%

12. Find out the number of 5-digit even numbers that can be formed from digits 1 to 7 without repetition of any digit.

(A) 720

(B) 360

(C) 1080

(D) 840

13. If the first term of a geometric progression exceeds the second term by 4 and the sum of its terms till infinity is 100, then the common ratio is _____.

(A) $\frac{1}{5}$

(B) $\frac{4}{5}$

(C) $\frac{3}{5}$

(D) $\frac{2}{5}$

14. The sum of the first n terms of an arithmetic progression (A.P.) is $4n^2 + 3n$. The $10^{th}$ term of the A.P. is _____.

(A) 77

(B) 83

(C) 81

(D) 79

15. If the sum of $4^{th}$ and $8^{th}$ term of an arithmetic progression (A.P.) is 120, then the $6^{th}$ term of the A.P. is _____.

(A) 10

(B) 70

(C) 60

(D) 100

16. The sum of infinite terms of the geometric series $1-\frac{1}{5}+\frac{1}{25}-\frac{1}{125}+....$ will be _____.

(A) 1

(B) $\frac{5}{6}$

(C) $\frac{6}{5}$

(D) $\frac{4}{5}$

17. If x (m) = $am^2$, y(m) = a / $m^2$, then find the value of $\frac{dy}{dx}$

(A) $\frac{1}{m^2}$

(B) $\frac{-1}{m^2}$

(C) $\frac{1}{m^4}$

(D) $\frac{-1}{m^4}$

18 Calculate the integral $\int \frac{x^{25}}{x^{26}} dx$

(A) logx + C

(B) log *x*

(C) *C*

(D) 2 log *x*

19. If $x^y = y^X$ then $\frac{dy}{d}$ = _____

(A) $\frac{y(x\log y - y)}{x(y\log x - x)}$

(B) $\frac{y(x\log y + y)}{x(y\log x - x)}$

(C) $\frac{y(x\log y - y)}{x(y\log x + x)}$

(D) $\frac{x(x\log y - y)}{y(y\log x - x)}$

20. For a given Revenue function R(x) =100x - $2x^2$, the maximum revenue occurs at x = _____.

(A) 20

(B) 25

(C) 30

(D) 50

21. Find the next term in the series 11, 12, 14, 17, 22, 30, _____.

(A) 42

(B) 43

(C) 38

(C) 41

22. Anil's house faces east. From the back-side of the house, he walks straight 50 meters, then turns to the right and walks 50 meters. Finally, he turns towards left and stops after walking 25 meters. Now, in which direction is Anil from the starting point?

(A) South-East

(B) North-East

(C) South-West

(D) North-West

23. If A x B means A is to the south of B; A + B means A is to the north of B; A % B means A is to the east of B; A - B means A is to the west of B; then in P % Q + R - S, in which direction is S with respect to Q?

(A) South-West

(B) South-East

(C) North-East

(D) North-West

24. Vishal started from his house toward west. After walking a distance 30 meters, he turned towards right and walk 20 meters. He then turned left and moved a distance of 10 meters, turned to his left again and walked 40 meters. He now tum to left and walk 5 meters, finally he turns to left. In which direction he is walking now?

(A) North

(B) South

(C) East

(D) South-West

25. Puru started from his house towards west. After walking a distance of 25 m, he turned to the right and walked 10 m. He then again turned to the right and walked 15 m. After this, he is to tum right at 135° and to cover 30 m. In which direction should he go?

(A) West

(B) South

(C) South-West

(D) South-East

26. Six students A, B, C, D, E and F are sitting in a bench facing north. C is sitting second to the right of F. A is sitting extreme left end of the bench. E is sitting second to the right of C. D is sitting immediate left of E. Who is sitting between F and C?

(A) A

(B) B

(C) E

(D) D

27. Sharma points to a girl and says, "She is the mother of my son's wife's daughter". What is the relation of the girl with Sharma?

(A) Mother

(B) Daughter

(C) Sister

(D) Daughter-in-law

28. P is the sister of Q. R is the mother of Q. S is the father of C. R is the sister of S. T is the mother of S. What is the relation of P with T?

(A) P is Mother of T

(B) T is P's Grand Mother

(C) P is Sister of T

(D) T is Brother of P

29. Dr. Madhu said, "The engineer who is my brother is the son of the only Professor in our family." If the Professor is Mr. Murli, how is Mr. Murli related to Dr. Madhu?

(A) Uncle

(B) Father

(C) Brother

(D) Cousin

30. A is brother of B. P is the sister of Q. B is the son of P. How is A related to P?

(A) Brother

(B) Son

(C) Father

(D) Uncle

31. Q's mother is the sister of P and daughter of S. A is the son of P and Brother of H. G is the father of H. How is G related to S?

(A) Nephew

(B) Son-in-law

(C) Grandfather

(D) Father-in-law

32. Interview method is used for collection of _____.

(A) Primary data

(B) Secondary data

(C) Discrete data

(D) Continuous data

33. An ogive represents cumulative frequencies on a graph. By what other name is this graphical form commonly known?

(A) Frequency Histogram

(B) Cumulative Frequency Curve

(C) Frequency Polygon

(D) Area Diagram

34. If the mean 40, k, 6k, $4k^2$, $8k-4k^2$ is 20, then the value of k is _____.

(A) 15

(B) 10

(C) 8

(D) 4

35. The standard deviation is zero only if all the observations assumed by a variable are _____.

(A) different

(B) equal

(C) square of natural numbers

(D) square root of natural numbers

36. To add flexibility to the sampling process, the _____ is preferred.

(A) Simple Random Sampling

(B) Stratified Sampling

(C) Multi-stage Sampling

(D) Judgment Sampling

37. In a sample survey, sampling error mainly arises because:

(A) Enumerators record some responses incorrectly

(B) A part of the selected sample does not respond

(C) Only a subset of the population is observed instead of a complete census

(D) Some questions in the schedule are ambiguously worded

38. The mean of five observations is 28. Among the five observations, three observations are 10, 23 and 62. The difference between the remaining two observations is 13. Then the remaining two observations are _____.

(A) 30 and 17

(B) 38 and 15

(C) 29 and 16

(D) 35 and 22

39. Which of the followings is a property of Arithmetic Mean?

(A) Sum of deviations from Arithmetic Mean is always positive.

(B) Arithmetic Mean is not affected by extreme values.

(C) Sum of deviations from Arithmetic Mean is always zero.

(D) Arithmetic Mean cannot be calculated for grouped data.

40. The probability of getting pass in an examination is $\frac{x}{3}$. If the probability of getting fail is $\frac{2}{3}$, then the value of x is _____.

(A) 2

(B) 3

(C) 1

(D) 0

41. Two dice are rolled. What will be the probability that one dice have multiple of 3 and other dice have multiple of 2?

(A) $\frac{1}{2}$

(B) $\frac{1}{3}$

(C) $\frac{1}{4}$

(D) $\frac{1}{5}$

42. The mean of 10 observations is 15. If one observation 12 is replaced by 22, what will be the new mean?

(A) 16

(B) 14

(C) 17

(D) 18

43. If $f(x) = kx^2$, $0 \leq x \leq 1$ is a probability density function of a random variable x, then the value of k is _____.

(A) 0

(B) 3

(C) $\frac{1}{3}$

(D) 2

44. In a binomial distribution, the probability of success is 0.7. The variance for n = 15 is _____.

(A) 4.50

(B) 3.15

(C) 7.35

(D) 2.10

45. For a Binomial Distribution with mean = 4 and variance = 3, what are the values of n and p?

(A) n = 16, p = 0.25

(B) n = 12, p = 1/3

(C) n = 8, p = 0.5

(D) n = 16, p = 0.75

46. The covariance between two variables X and Y is 4. The standard deviation of X is 10 and the correlation coefficient between X and Y is 0.4. Find the standard deviation of Y.

(A) 1

(B) 2

(C) 3

(D) 4

47. The mean and mean deviation of a normal distribution are 13.5 and 4.8 respectively. Then the third quartile of the normal distribution is _____.

(A) 6.25

(B) 17.55

(C) 4.05

(D) 1.75

48. The mean of a binomial distribution is 4 and the variance is 3.2. If p < 0.5, find the value of p.

(A) 0.2

(B) 0.4

(C) 0.1

(D) 0.3

49. If 2x + 3y + 2 = 0 is the regression equation of x on y and the arithmetic mean of y is -2, then arithmetic mean of x is _____.

(A) 4

(B) 6

(C) -2

(D) 2

50. A price index with base 2000 shows:

Index for 2010: 140

Index for 2020: 210.

What is the index for 2010 when base is shifted to 2020?

(A) 57.14

(B) 66.67

(C) 75.00

(D) 133.33

51. Which formula correctly represents Fisher's Price Index?

(A) $\sqrt{\left[\left(\Sigma p_1 q_0 / \Sigma p_0 q_0\right) \times \left(\Sigma p_1 q_1 / \Sigma p_0 q_1\right)\right]} \times 100$

(B) $\left(\Sigma p_1 q_0 / \Sigma p_0 q_0\right) \times 100$

(C) $\left(\Sigma p_1 q_1 / \Sigma p_0 q_1\right) \times 100$

(D) $\sqrt{\left[\left(\Sigma p_0 q_1 / \Sigma p_1 q_0\right)\right]} \times 100$

52. If $\Sigma p_0 q_0 = 400$ and $\Sigma p_n q_0 = 720$ and Paasche's index number is 125, then the Fisher's index number is _____.

(A) 125

(B) 250

(C) 150

(D) 180

53. What is the approximate real wage of a worker earning ₹ 12,500 nominal wage, when the cost of living index is 250 (base 100)?

(A) ₹ 3,125

(B) ₹ 4,500

(C) ₹ 5,000

(D) ₹ 6,250

54. The simplified value of $\sqrt[4]{a^{6b}x^4}\sqrt{\left(a^3x^{-4}\right)^{-b}}$ will be _____.

(A) $x^{1+2b}$

(B) $x^{2b}$

(C) 1

(D) $a^{\frac{3}{2}b}x^b$

55. If a : b = 3 : 4, then the value of $\frac{2a+3b}{3a+2b}$

(A) 18/17

(B) 17/18

(C) 6/7

(D) 7/6

56. The product of two numbers is 7644 and their ratio is 12:13. Then, the smaller of two numbers is _____.

(A) 91

(B) 84

(C) 82

(D) 90

57. The value of $\frac{\log_3 16 \times \log_{\sqrt{2}} 3}{\log_8 3 \times \log_9 4}$

(A) 16

(B) 24

(C) $\frac{1}{16}$

(D) $\frac{1}{12}$

58. If $x = 3 + \sqrt{8}$, then the value of $x + \frac{1}{x}$ is

(A) $3\sqrt{8}$

(B) 6

(C) $\sqrt{8}$

(D) $2\sqrt{8}$

59. The compound interest for ₹ 15,000 at 20% per annum for 2 years compounded semi-annually is _____.

(A) ₹ 9,661.50

(B) ₹ 6,961.50

(C) ₹ 9,691.50

(D) ₹ 6,696.15

60. Mr. Amit bought a car for ₹ 3,00,000 by making a down payment ₹ 50,000 and decided to pay equal annual payment for 10 years. How much would be each payment if the interest on unpaid amount is 18% per annum, compound annually? (Given that P(10, 0.18) = 4.49409)

(A) ₹ 55,628.61

(B) ₹ 55,266.86

(C) ₹ 55,555.28

(D) ₹ 50,000.00

61. The simple interest at the rate of p% per annum for p years will be ₹ p. Then, the principal is _____.

(A) ₹ p

(B) ₹ 100 p

(C) ₹ $\frac{100}{P^2}$

(D) ₹ $\frac{100}{P}$

62. The future value of an annuity of ₹ 2000 made annually for 8 years at interest rate of 14% per annum, compound annually is _____. (Given that $(1.14)^8 = 2.8526$)

(A) ₹ 26,465.71

(B) ₹ 26,646.57

(C) ₹ 20,000.55

(D) ₹ 18,564.52

63. Ravi deposits some amount in bank for $5\frac{1}{2}$ years at the simple interest rate of 7% per annum. Ravi receives ₹ 66,480 at the end of term. Compute the amount of initial deposit by Ravi in the Bank.

(A) ₹ 48,000

(B) ₹ 50,000

(C) ₹ 45,000

(D) ₹ 51,000

64. In how many years will ₹ 50,000 become ₹ 75,000 at 8% per annum compound interest? (Given log (1.5) = 0.1761 and log (1.08) = 0.0334)

(A) 4.8 years

(B) 5.1 years

(C) 5.3 years

(D) 5.6 years

65. If ₹ 50,000 grows to ₹ 80,525.5 in 5 years, the compound annual growth rate (CAGR) is _____.

(A) 9%

(B) 10%

(C) 11%

(D) 12%

66. In how many ways 5 Indians and 5 Americans people are seated around a table so that no two Indians are in adjacent positions?

(A) 3! x 4!

(B) 3! x 5!

(C) 4! x 5!

(D) 4! x 6!

67. A loan of ₹ 1,00,000 is repaid in 3 equal annual instalments at 10% per annum interest, compounded annually. Find the amount of each instalment. (Given P(3,0.1) = 2.48685)

(A) ₹ 41,211

(B) ₹ 41,311

(C) ₹ 39,800

(D) ₹ 40,212

68. A group consists of 7 men and 5 women. In how many ways can a group of 4 members be selected if the group has no women?

(A) 70

(B) 30

(C) 24

(D) 35

69. Four cards are drawn at random from a standard deck of 52 playing cards without replacement. In how many ways it can be done such that the selected cards consist of exactly one Jack and three Aces?

(A) 2304

(B) 2440

(C) 2260

(D) 2164

70 In a class, 50 students have expressed that they like Mathematics, while 66 students like Accountancy. Among these, 36 students like both

Mathematics and Accountancy. Based on this information, determine how many students in the class like either Mathematics or Accountancy?

(A) 14

(B) 20

(C) 52

(D) 80

71. Relation on integers is defined by:

aRb $\Leftrightarrow$ a - b is divisible by 5.

This relation is _____.

(A) Reflexive only

(B) Symmetric only

(C) Equivalence relation

(D) Neither symmetric nor transitive

72. Let the function $f : R \to R$ is defined by $f(x) = x^2 + 3$, then $f^{-1}(12)$ is

(A) $\sqrt{3}$

(B) 3

(C) 9

(D) 12

73. Evaluate $\lim_{x\to\infty} \frac{x^2+2x+2}{3x^2+x+1}$

(A) $\frac{1}{3}$

(B) $\frac{2}{3}$

(C) $\frac{3}{8}$

(D) 2

74. If 'DOCTOR' is coded as 423527 and 'PATIENT' is coded as 8651905, then how is 'OPERATION' coded?

(A) 289765120

(B) 297681205

(C) 298765120

(D) 286712065

75. If the word 'CODE' is coded as 1357 and 'GAMER' is coded as 24678, what word does the number 84178 represent?

(A) ROVER

(B) RCEAR

(C) RACER

(D) RAECR

76. Ram started walking 2 kms towards the Sun in the morning. He turned right and walked 2 kms. Then, he turned right and walked 2 kms. Finally, he turned left and walked 2 kms. In which direction is he walking now?

(A) South

(B) North

(C) East

(D) West

77. In a certain Language, 'SUBJECT' is written as 'UWDLGEV' then 'MENTION' will be written as _____.

(A) OGKVPQP

(B) NOFUPOJ

(C) OGVPKJP

(D) OGPVKQP

78. Find the next term of the series: 7, 8, 18, 57, 232, 1165, _____.

(A) 6996

(B) 5840

(C) 4672

(D) 6990

79. Five persons A, B, C, D & E are sitting on a bench. A is immediately to the left of C. E is immediately to the left of D and right of A. D is to the left of B. Which person is sitting in the middle of the bench?

(A) B

(B) E

(C) A

(D) D

80. Six friends A, B, C, D, E and F sit in a row facing north.

A and B have two persons between them.

C, who is at right end, is immediate right of A.

D is not neighbour of B.

E sits at left end.

Who sits third from left?

(A) F

(B) A

(C) D

(D) B

81. Six persons A, B, C, D, E, and F are seated at a round table facing outside the centre but not necessarily in the same order. A sits at the immediate right of E. C sits after one person to the right of A. B sits beside A and F sits at the immediate right of D. How many persons are sitting between A & D?

(A) 1

(B) 2

(C) 3

(D) 4

82. In a circular arrangement of 5 persons facing centre, A is sitting between B and C, D is sitting immediate right of C, and E is sitting immediate left of B. Who is sitting between D and B?

(A) A

(B) B

(C) C

(D) E

83. Which one of the following parts is used to show the units of measurement?

(A) Body

(B) Caption

(C) Box-head

(D) Stub

84. Data that is classified according to an attribute or characteristic of the items under study is referred to as _____.

(A) Qualitative data

(B) Chronological data

(C) Geographical data

(D) Quantitative data

85. A researcher wants to study the effectiveness of a new treatment by surveying the most experienced doctors in a city. He selects 50 doctors based on their reputation and years of experience. Which type of sampling method is used in this survey?

(A) Simple Random Sampling

(B) Stratified Sampling

(C) Judgment Sampling

(D) Systematic Sampling

86. Which of the following statement is true?

(A) Mean of the statistic is known as Standard Error

(B) Mean deviation of the statistic is known as Standard Error

(C) Standard deviation of the statistic is known as Standard Error

(D) Geometric mean of the statistic is known as Standard Error

87. Mutually Exclusive classification of class intervals _____.

(A) Excludes both the class limits

(B) Excludes the upper class limit but includes the lower class limit

(C) Includes the upper class limit but excludes the lower class limit

(D) Include both the class limits

88. The given frequency distribution is:

| X | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| Y | 5 | 9 | 12 | 17 | 14 | 10 | 6 |

The arithmetic mean of the Frequency distribution is _____.

(A) 2.99

(B) 3.06

(C) 4.10

(D) 4.71

89. What will be the mean deviation for the numbers {2, 4, 7, 8, 9, 12} from the mean?

(A) 2.14

(B) 2.33

(C) 2.55

(D) 2.67

90. If third quartile and first quartile are 64.5 and 22 respectively, then the quartile deviation is

(A) 42.5

(B) 21.25

(C) 36.25

(D) 30.5

91. The arithmetic mean (A.M.) of two positive numbers exceeds their harmonic mean by 30. If their A.M. is 45, Then, their geometric mean will be _____.

(A) $27\sqrt{2}$

(B) $25\sqrt{3}$

(C) 42

(D) $15\sqrt{3}$

92. Two groups of students have harmonic means of 50 and 30 for their test scores, with 10 students in the first group and 15 students in the second group. What will be the combined harmonic mean of the two groups?

(A) 15.35

(B) 35.71

(C) 38.11

(D) 42.50

93. A card is drawn at random from a well-shuffled deck of 52 cards. What is the probability that the card drawn is either a King or a Heart?

(A) $\frac{13}{52}$

(B) $\frac{17}{52}$

(C) $\frac{4}{13}$

(D) $\frac{15}{52}$

94. If the standard deviation of a Poisson distribution is 3, then P(X = 0) is _____.

(A) $e^{-6}$

(B) $e^{-3}$

(C) $e^{-9}$

(D) $e^{-1}$

95. In a Shooting competition, A hit the target 6 out of 13 shots, and B hit 8 out of 11 shots. If they both try once, what is the probability that the target would be hit at least once?

(A) $\frac{21}{143}$

(B) $\frac{56}{143}$

(C) $\frac{74}{143}$

(D) $\frac{122}{143}$

96. A bag contains 5 red, 4 blue, and 3 green balls. Two balls are drawn at random without replacement. What is the probability that both balls are of different colours?

(A) $\frac{45}{66}$

(B) $\frac{47}{66}$

(C) $\frac{47}{132}$

(D) $\frac{45}{132}$

97. For a set of observations on variables *x* and *y,* the following summary statistics are given:

$n = 5,\ \sum x = 10,\ \sum y = 25,\ \sum xy = 70,\ \sum x^2 = 30$.

The regression equation of *y* on *x* is expressed as:

$y = a + bx$.

What is the value of the slope b?

(A) 0.5

(B) 1.0

(C) 1.5

(D) 2.0

98. The product of the price index and the quantity index are equal to the corresponding value index in _____.

(A) Time reversal test

(B) Factor reversal test

(C) Circular test

(D) Unit test

99. The Spearman's Rank correlation coefficient between Economics and Accountancy marks for a class student $\frac{75}{99}$ is and the sum of Square of differences in ranks for Economics and Accountancy marks is 40. What is the number of students in the class?

(A) 10

(B) 15

(C) 18

(D) 20

100. When the two regression coefficients are given as $b_{xy} = 0.6$ and $b_{yx} = 0.9$, determine the value of the coefficient of correlation.

(A) 0.73

(B) 0.90

(C) 0.82

(D) 0.54

## ANSWERS

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1. | **(D)** | 2. | **(A)** | 3. | **(C)** | 4. | **(B)** | 5. | **(C)** |
| 6. | **(C)** | 7. | **(B)** | 8. | **(B)** | 9. | **(B)** | 10. | **(C)** |
| 11. | **(C)** | 12. | **(C)** | 13. | **(B)** | 14. | **(D)** | 15. | **(C)** |
| 16. | **(B)** | 17. | **(D)** | 18. | **(A)** | 19. | **(A)** | 20. | **(B)** |
| 21. | **(B)** | 22. | **(D)** | 23.. | **(B)** | 24. | **(A)** | 25. | **(C)** |
| 26. | **(B)** | 27. | **(D)** | 28 | **(B)** | 29. | **(B)** | 30. | **(B)** |
| 31. | **(B)** | 32. | **(A)** | 33. | **(B)** | 34. | **(D)** | 35. | **(B)** |
| 36. | **(C)** | 37. | **(C)** | 38. | **(C)** | 39. | **(C)** | 40. | **(C)** |
| 41. | **( )*** | 42. | **(A)** | 43. | **(B)** | 44. | **(B)** | 45. | **(A)** |
| 46. | **(A)** | 47. | **(B)** | 48. | **(A)** | 49. | **(D)** | 50. | **(B)** |
| 51. | **(A)** | 52. | **(C)** | 53. | **(C)** | 54. | **(A)** | 55. | **(A)** |
| 56. | **(B)** | 57. | **(B)** | 58. | **(B)** | 59. | **(B)** | 60. | **(A)** |
| 61. | **(D)** | 62. | **(A)** | 63. | **(A)** | 64. | **(C)** | 65. | **(B)** |
| 66. | **(C)** | 67. | **(D)** | 68. | **(D)** | 69. | **( )*** | 70. | **(D)** |
| 71. | **(C)** | 72. | **(B)** | 73. | **(A)** | 74. | **(A)** | 75. | **(C)** |
| 76. | **(A)** | 77. | **(D)** | 78. | **(A)** | 79. | **(B)** | 80. | **(A)** |
| 81. | **(B)** | 82. | **(D)** | 83. | **(C)** | 84. | **(A)** | 85. | **(C)** |
| 86. | **(C)** | 87. | **(B)** | 88. | **(C)** | 89. | **(D)** | 90. | **(B)** |
| 91. | **(D)** | 92. | **(B)** | 93. | **(C)** | 94. | **(C)** | 95. | **(D)** |
| 96. | **(B)** | 97. | **(D)** | 98. | **(B)** | 99. | **(A)** | 100. | **(A)** |

* **Q No: 41 and Q No 69: None of the options are correct**

07 SEP 2026

CA Foundation P-3
Quantitative Aptitude
Sep-2026 Exam.
07/09/26
5:29pm

**Question Paper Booklet No.** 4702561

## GENERAL INSTRUCTIONS TO CANDIDATES

1. Please do not open this Booklet till you are told to do so.
2. **If the Question Paper Booklet does not contain 100 questions or if it is not of the medium opted or Answer Sheet is not in good condition, ask for change immediately.**
3. Duration of the test is 2 hours.
4. Before commencement of the exam, please fill up the necessary information in the space provided below and also in the answer sheet.
5. Use HB pencil only to darken the circles for answers in the answer sheet.
6. After each MCQ, four options are given. Choose the correct or most appropriate option and darken the appropriate circle against the question number in the OMR Answer Sheet, completely, as shown below, with HB Pencil.

| **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) | **Not as shown below (Wrong method) :** 12 (A) (B) ⊘ (D) 12 (A) (B) ⊗ (D) 12 (A) (B) (C) (D) 12 (A) (B) ◉ (D) 12 (A) ● ● (D) |

7. Any answer marked in the question booklet will not be considered and no marks will be awarded.
8. If a candidate wants to change the answer already darkened, he should erase it completely, with good quality eraser and ensure that no mark is visible after erasing.
9. For each correct answer, one mark will be awarded. For each wrong answer, 1/4$^{th}$ of the mark 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.
10. Rough work, if any, must be done on the pages, specified as SPACE FOR ROUGH WORK only.
11. When you have completed, even before time, please remain in your seat. The Invigilator will come to you and collect your Answer Sheet against acknowledgement on the admit card. No candidate can leave the examination hall till the end of the test.
12. Candidate found copying or receiving or giving any help or defying instructions of the Invigilators or having/using mobile phone or smart watch or any other electronic gadget will be expelled from the examination and will also be liable for further punitive action.

**Time : 2 Hours** **Maximum Marks : 100**

**Total No. of Printed Pages : 64** **Question Paper Booklet Code** | P | Y | C | (H) |

**Roll No.** | | | | | | | **Question Paper Booklet No.** | |

**Name of the Candidate** |

**OMR Answer Sheet No.** | | | | | | | | **Signature of the Candidate**

SEAL

*(1) After each MCQ, four options have been given. Choose the correct or most appropriate option and darken the corresponding circle against the MCQ number in the OMR answer sheet.*

*(2) Please ensure to write and darken correct MCQ booklet number in the OMR answer sheet. The correct MCQ booklet number must also be written in the attendance register.*

*(3) Please write your Roll No. and name on the topmost page of the MCQ booklet at the specified place without fail.*

**PYC(H)**

1. A number when divided by 5 leaves remainder 3. When divided by 7 leaves remainder 5. The smallest such number is

(A) 38 (B) 33

(C) 68 (D) 73

2. If $\frac{mn}{m+n}=14$ ; $\frac{np}{n+p}=21$ ; and $\frac{mp}{m+p}=6$ , then determine $(m,n,p)$

(A) $\left(\frac{21}{2}, -42, 14\right)$ (B) $\left(-\frac{21}{2}, 42, -14\right)$

(C) $\left(14, \frac{21}{2}, -42\right)$ (D) $\left(-14, \frac{-21}{2}, 42\right)$

3. Column A denotes the system of equations and Column B represents the solutions, then match the right options from Column A to Column B.

| | A – System of equations | B – Solutions $(X, Y, Z)$ |
|---|---|---|
| (I) | $X-Y+Z=2$ ; $X+2Y+3Z=14$ ; $2X+Y+Z=7$ | (a) (2, 1, 3) |
| (II) | $X-Y+Z=4$ ; $2X+Y-Z=2$ ; $X+Y-Z=0$ | (b) (1, 2, 3) |
| (III) | $2X+3Y+Z=14$ ; $X+Y+Z=6$ ; $3X+2Y+4Z=16$ | (c) (3, 2, 1) |
| (IV) | $X+Y+Z=6$ ; $2X+3Y+Z=13$ ; $X+4Y+5Z=16$ | (d) (2, 3, 1) |

(A) (I)-(c), (II)-(a), (III)-(d), (IV)-(b)

(B) (I)-(a), (II)-(b), (III)-(d), (IV)-(c)

(C) (I)-(b), (II)-(a), (III)-(d), (IV)-(c)

(D) (I)-(b), (II)-(c), (III)-(a), (IV)-(d)

4. The difference between the compound interest and the simple interest on a certain sum of money at 5% per annum for 2 years is ₹15. Find the sum.

(A) ₹ 8,000 (B) ₹ 10,000

(C) ₹ 4,000 (D) ₹ 6,000

5. Future value of ₹10,000 deposited annually for 4 years at 10% is

(A) ₹ 46,000 (B) ₹ 46,410

(C) ₹ 46,641 (D) ₹ 47,000

6. A sum of ₹3,90,625 is invested at 4% per annum compound interest, compounded annually. In how many years will the investment grow to ₹ 4,56,976?

(A) 6 years (B) 5 years

(C) 4 years (D) 7 years

7. The compound interest on a sum of money for 2 years at 10% per annum is ₹ 420. Find the simple interest considering the same rate and same time.

(A) ₹ 400 (B) ₹ 800

(C) ₹ 600 (D) ₹ 300

8. The effective rate of interest corresponding a nominal rate of 8% per annum compounded quarterly is

(A) 8.10% (B) 8.16%

(C) 8.24% (D) 8.30%

9. A computer loses 15% of its value every year. If its value after five year is ₹ 44,370, then what was its original cost?

(A) ₹ 90,000 (B) ₹ 1,25,000

(C) ₹ 1,20,000 (D) ₹ 1,00,000

10. Match the following projects with their respective Net Present Value (NPV) when the cost of capital is 10% per annum. (All cash flows are given in ₹ thousands)

| | Projects | Year 0 | Year 1 | Year 2 | Year 3 |
|---|---|---|---|---|---|
| (1) | Project P | 50 | 30 | 35 | 25 |
| (2) | Project Q | 90 | 50 | 60 | 55 |
| (3) | Project R | 60 | 40 | 30 | 25 |
| (4) | Project S | 70 | 45 | 50 | 35 |

(NPV's in ₹ thousands) :

(a) 14.46
(b) 38.36
(c) 5.86
(d) 24.98

Match the correct pairs :

(A) (1)-(a) ; (2)-(b) ; (3)-(c) ; (4)-(d)
(B) (1)-(a) ; (2)-(c) ; (3)-(d) ; (4)-(b)
(C) (1)-(d) ; (2)-(b) ; (3)-(a) ; (4)-(c)
(D) (1)-(c) ; (2)-(b) ; (3)-(a) ; (4)-(d)

11. A company wants to accumulate ₹ 5,00,000 in 5 years by depositing equal annual amounts in a sinking fund earning 8% annually. The annual approximate deposit required is [Given that $(1.08)^5 = 1.4693$]

(A) ₹ 85,233 (B) ₹ 27,230

(C) ₹ 3,40,300 (D) ₹ 34,030



□

12. Five people are to be seated in a row. In how many ways can they be arranged so that two particular people X and Y, never sit together.

(A) 24 (B) 72

(C) 48 (D) 96

13. Five men and four women are seated in a row, such that 4 women are always together. In how many ways they can be seated?

(A) 27,280 ways (B) 37,590 ways

(C) 51,270 ways (D) 17,280 ways

14. Find the number of ways of arranging 4 letters chosen from 8 distinct letters of the word "SPLENDOR" (no letter repeated)

(A) 1,680 (B) 336

(C) 840 (D) 512

15. How many numbers greater than 2,000 and less than 7,000 can be made with the digits 0, 1, 2, 3, 4, 5, 7 and 9 ; provided that the repetition of digit in the number is not allowed?

(A) 480 (B) 220

(C) 840 (D) 640

16. An A.P. has first term 7 and common difference 3. The minimum number of terms whose sum exceeds 500 is

(A) 17 (B) 16

(C) 15 (D) 18

17. Evaluate $\underset{x\to\infty}{Lim}\ \frac{x^2+2x+2}{3x^2+x+1}$.

(A) 2/3 (B) 1/4

(C) 2 (D) 1/3

18. Given $X=m+\frac{1}{m}$ and $Y=m-\frac{1}{m}$. The value of $\frac{dY}{dX}$ at $m = 1$ is

(A) 0 (B) $\infty$

(C) $-3/5$ (D) 5/3

19. If $f(X)=1-\frac{1}{X}$, then the value of $f\left(f\left(\frac{1}{X}\right)\right)$ is

(A) $\frac{X+2}{X+1}$ (B) $\frac{X-2}{X-1}$

(C) $\frac{-X}{X+1}$ (D) $X$

20. If $X^2Y-Y^2+4X=7$, then $\frac{dY}{dX}$ is equal to

(A) $(2XY+4)/(2Y-X^2)$

(B) $-(2XY+4)/(2Y-X^2)$

(C) $(2XY-4)/(X^2-2Y)$

(D) $(2X+4)/(2Y+X)$

21. In a certain language "TWENTY" is written as "863985" and "ELEVEN" is written as "323039", then how will "TWELVE" be written in that code?

(A) 863063 (B) 863903

(C) 863584 (D) 863203

22. A man walked 30 m towards south, then turned to his right and walked 30 m. Then, turned to his left and walked 20 m. Again, he turned to his left, walked 30 m. How far is he from his initial position?

(A) 30 m (B) 50 m

(C) 20 m (D) 80 m

23. In a certain code "CH4IR" is written as "GL8MV". How is "1N5T4GR4M" is written in that code?

(A) 5R9X8KV8Q (B) 4HFID8LE8N

(C) 4P8W7JU8O (D) 5KF2E4GR4

24. Mr. X started walking towards East. After moving a distance of 1 km; he turned southward and walked 5 km. Again, he turned to east and walked 2 km. Finally, he turned to the north and walked 9 km. How far is he from his starting point?

(A) 3 km (B) 7 km

(C) 5 km (D) 4 km

25. Five people A, B, C, D and E are seated about a round table facing outside the centre but not necessary in the same order. A sits immediate right of E. C sits third to the left of D. Who sits at the immediate right of A and how many persons are sitting between C and D?

(A) D is immediate right of A and 2 persons between C and D

(B) E is immediate right of A and 2 persons between C and D

(C) E is immediate right of A and 1 person between C and D

(D) D is immediate right of A and 1 person between C and D

26. In a group of discussion, six people A, B, C, D, E and F are sitting around a rectangular table.

A is sitting on a side alone.

B and C are sitting on the same side.

F is facing A.

D is sitting immediate left of F.

C is facing D.

Who is between B and F?

(A) D (B) C

(C) A (D) E

27. Five people A, B, C, D and E are standing in a row. A is between B and D. E is not at the start of row. C is just before D. Who is in the middle of the row?

(A) C (B) B

(C) A (D) E

28. Anay is son of Aarti, Rajat is Aarti's brother, Kashika is the daughter of Ranjana and Ranjana is Rajat's sister. How is Anay related with Kashika?

(A) Nephew (B) Cousin

(C) Brother (D) Uncle

29. If A is the brother of B, B is the son of C, C is the daughter of D, and D is the wife of E, how is E related to B?

(A) Uncle (B) Mother

(C) Grand Mother (D) Grand Father

30. A is the son of C; C and Q are sisters; Z is the mother of Q. P is the son of Z. Which of the following statement is true?

(A) Q is the maternal grandfather of A

(B) P and A are cousins

(C) P is the maternal uncle of A

(D) C and P are sisters

31. Class boundaries may be defined as

(A) The actual class limit of a class interval

(B) The minimum value of the class interval

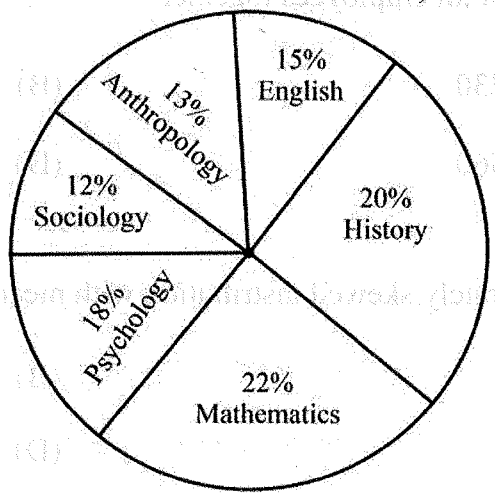
(C) The maximum value of the class interval

(D) The average of maximum and minimum value of class interval

32. The following pie-charts show the percentage-wise distribution of students admitted to six different post graduate level programmes in universities P and Q.

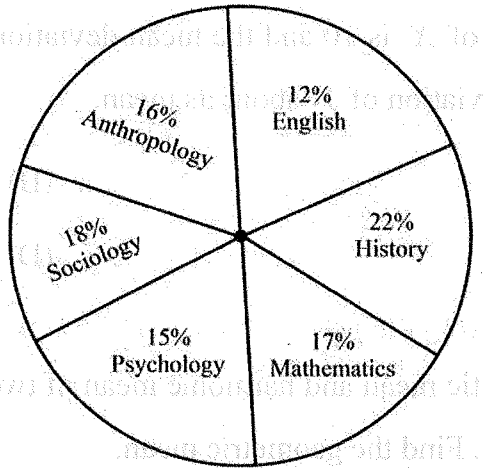
University P

Total number of students = 2,000




University Q

Total number of students = 3,000




The number of students in Mathematics in both the universities is how much more than the number of students in sociology in both the universities?

(A) 170 (B) 200

(C) 100 (D) 250

33. A company has 80 engineers with an average salary of ₹ 60,000 and a standard deviation of ₹ 5,000. It also has 20 managers with an average salary of ₹ 90,000 and a standard deviation of ₹ 8,000. Calculate the standard deviation of salaries of all employees together.

(A) ₹ 15,230 (B) ₹ 13,296.60

(C) ₹ 12,560 (D) ₹ 14,110

34. For a moderately skewed distribution with mean 24 and mode 18, the median is

(A) 64 (B) 16

(C) 18 (D) 22

35. In a manufacturing process, two variable $X$ and $Y$ are related by $Y = 3X + 5$. If the mean of $X$ is 10 and the mean deviation about the mean of $X$ is 4, find the mean deviation of $Y$ about its mean.

(A) 0.786 (B) 0.928

(C) 0.343 (D) 0.107

36. The arithmetic mean and harmonic mean of two positive numbers are 25 and 16 respectively. Find the geometric mean.

(A) 20 (B) 12

(C) 15 (D) 30

37. The standard deviation of a data set is 12. If each observation in the data set is increased by 8, what will be the standard deviation of the new data set?

(A) 4 (B) 12

(C) 20 (D) 96

38. Stratified sampling is advisable if

(A) The population is not large

(B) Some prior information is not available

(C) There is not much heterogeneity among the units of population

(D) The population is large and heterogeneous

39. If the relationship between $X$ and $Y$ is given by $4X + 6Y = 20$ and the range of $X$ is ₹ 30, what would be the range of $Y$?

(A) ₹ 25 (B) ₹ 30

(C) ₹ 20 (D) ₹ 35

40. From a pack of 52 cards, 4 cards are drawn. What is the probability that it has all four kings?

(A) $\frac{1}{270725}$ (B) $\frac{1}{38912}$

(C) $\frac{1}{22475}$ (D) $\frac{1}{54145}$

41. For a expected value of a random variable, which statement is not correct?

(A) Expectation of a constant K is K

(B) Expectation of sum of two random variables is not the sum of their expectations

(C) Expectation of the product of a constant and a random variable is the product of the constant and the expectation of the random variable

(D) Expectation of the product of two random variables is the product of the expectation of the two random variables, provided the two variables are independent

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

(A) $\frac{54}{55}$ (B) $\frac{1}{55}$

(C) $\frac{1}{12}$ (D) $\frac{1}{3}$

43. The value of K for the probability distribution of a random variable X, is

| X : | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|
| P(X) : | K | 2K | 4K | 6K | 7K | 8K | 11K |

(A) $\frac{1}{40}$ (B) $\frac{1}{13}$

(C) $\frac{1}{39}$ (D) $\frac{1}{49}$

44. The two regression lines are $2X+3Y=10$ and $4X+Y=12$. The mean values $(\overline{X}, \overline{Y})$ are

(A) (3, 0)
(B) (2, 2)
(C) (1.6, 2.6)
(D) (2.6, 1.6)

45. For 10 students, Spearman's rank correlation coefficient is 0.70. Find the sum of the squares of the differences between the ranks $(\sum d_i^2)$.

(A) 45.5
(B) 49.5
(C) 52.5
(D) 55.5

46. Consider the statements :

$S_1$ : Correlation does not necessarily imply causation.

$S_2$ : If both regression coefficients are greater than one, the correlation is still valid.

(A) Both true
(B) $S_1$ false $S_2$ false
(C) $S_1$ true $S_2$ false
(D) $S_1$ false $S_2$ true

47. The regression coefficients of Y on X and X on Y are respectively – 0.72 and – 0.50, then what is the correlation coefficient between X and Y?

(A) – 0.60
(B) + 0.60
(C) + 0.70
(D) – 0.66

48. The link relatives of three consecutive years are given below :

| Year : | 2022 | 2023 | 2024 |
|---|---|---|---|
| Link Relatives : | 108 | 115 | 125 |

If the chain index for 2021 is taken as 100, what will be the chain index number for 2024?

(A) 148.50 (B) 155.25

(C) 151.20 (D) 162.00

49. Which statement is false?

(A) For Construction of index number, the choice of base period which should be normal and relatively recent is essential

(B) The index number is a special type of average

(C) Theoretically, geometric mean is the best average in the construction of index numbers but in practice, mostly the arithmetic mean is used

(D) There is no such things as unweighted index numbers

50. Which test does not satisfy the Fisher's index number?

(A) Unit test

(B) Time reversal

(C) Circular test

(D) Factor reversal

51. Determine the correct proportion from the given expression : $\frac{X}{2}=\frac{Y}{3}=\frac{Z}{4}$

(A) $\frac{X+2}{X-2}=\frac{Y-3}{Y+3}$ (B) $\frac{Y+3}{Y-3}=\frac{Z+4}{Z-4}$

(C) $\frac{X-2}{X+2}=\frac{Z+4}{Z-4}$ (D) $\frac{Y+3}{Y-3}=\frac{Z-4}{Z+4}$

52. Based on the given expression : $3^X=\left(\frac{10}{3}\right)^Y=10^Z$, identify the correct condition that satisfies the relation

(A) $\frac{1}{X}+\frac{1}{Y}+\frac{1}{Z}=1$ (B) $\frac{1}{X}-\frac{1}{Y}+\frac{1}{Z}=1$

(C) $\frac{1}{X}-\frac{1}{Y}-\frac{1}{Z}=0$ (D) $\frac{1}{X}+\frac{1}{Y}-\frac{1}{Z}=0$

53. If the ratio of income of A and B is 7 : 9 and each saves ₹ 2,000, their expenditures are in the ratio 3 : 4. Find their income respectively.

(A) ₹ 14,000 and ₹ 18,000 (B) ₹ 7,000 and ₹ 9,000

(C) ₹ 27,000 and ₹ 27,000 (D) ₹ 28,000 and ₹ 36,000

54. If $\log_3(x-2)+\log_3(x+2)=2$ then the value of $x$ is :

(A) $\sqrt{11}$ (B) $\sqrt{15}$

(C) $\sqrt{13}$ (D) 5

55. The sum of the ages of father and his son is 60 years. Five years ago, father's age was four times that of his son. The present age of father is

(A) 40 years (B) 35 years

(C) 50 years (D) 45 years

56. Consider a system defined by a linear inequality $X \geq 0, Y \geq 0, X + Y \geq 6$. Based on the above, which of the following statement is correct?

(A) The feasible region is bounded

(B) The feasible region is unbounded

(C) The feasible region contains exactly one point

(D) No feasible region exists

57. For a company, the cost and revenue functions are given as $C(x) = 1000 + 5x$, $R(x) = 9x$, where $x$ is the number of items produced and sold. Match Column A with Column B.

| A – Value of $x$ | B – Corresponding value in ₹ |
|---|---|
| (a) $x = 250$ | (i) Profit = ₹ 200 |
| (b) $x = 150$ | (ii) Break-even point |
| (c) $x = 300$ | (iii) Profit = ₹ 100 |
| (d) $x = 275$ | (iv) Loss = ₹ 400 |

(A) (a)-(ii), (b)-(iv), (c)-(i), (d)-(iii)

(B) (a)-(i), (b)-(ii), (c)-(iii), (d)-(iv)

(C) (a)-(i), (b)-(iii), (c)-(ii), (d)-(iv)

(D) (a)-(i), (b)-(ii), (c)-(iv), (d)-(iii)

58. If the discount rate is 15% per annum, how much (in nearest ₹) should a company pay today to receive ₹3,000 in the first year, growing at 8% annually, forever?

(A) ₹ 50,000 (B) ₹ 45,000

(C) ₹ 40,000 (D) ₹ 42,857

59. A perpetuity of ₹ 2,000 is purchased for ₹ 25,000. The implied annual rate is

(A) 6% (B) 8%

(C) 7% (D) 10%

60. The following table shows the number of male and female students enrolled in the data science department of a postgraduate program over five years

| Year | Male | Female |
|---|---|---|
| 2020 | 20 | 60 |
| 2021 | 28 | 72 |
| 2022 | 39 | 90 |
| 2023 | 55 | 108 |
| 2024 | 68 | 135 |

For the Compound Annual Growth Rate (CAGR) of male and female students during the period 2020-2024, which gender shows a higher growth rate and what is the growth percentage of that gender?

(A) Male with 35.8% (B) Female with 22.5%

(C) Female with 35.8% (D) Male with 22.5%

61. The number of mobile app users is currently 2,00,000 in a city. If the user base grows at a Compound Annual Growth Rate (CAGR) of 18% for 5 years, find the number of users (approximate) after 5 years in the city. [Given that $(1.18)^5 = 2.2878$]

(A) 6,90,000 (B) 4,57,560

(C) 8,20,000 (D) 5,50,000

62. A project requires an initial investment of ₹ 1,20,000 and generates ₹ 35,000 annually for 5 years. Cost of capital is 10%. [Given P (5, 0.10) = 3.7908]. Compute Net Present Value (NPV) and decide.

(A) NPV = ₹ 5,000 reject

(B) NPV = ₹ 10,000 accept

(C) NPV =₹ 15,000 accept

(D) NPV= ₹ 12,678 accept

63. A machine costing ₹ 2,00,000 is proposed to be leased out for 5 years at an annual rent of ₹ 56,000 payable at year end, with compound interest at 12% per annum. Which one of the following statement is correct in this case? [Given P(5, 0.12) = 3.6048].

(A) PV = ₹ 1,95,000 not favourable to lessor

(B) PV = ₹ 1,90,000 not favourable to lessor

(C) PV = ₹ 2,01,868 favourable to lessor

(D) PV = ₹ 2,05,000 favourable to lessor

64. The sum of infinite G.P. 12, 4, $\frac{4}{3}$, $\frac{4}{9}$,.....is

(A) 16 (B) 18

(C) 20 (D) 24

65. The sum of the first two terms of a geometric progression (G.P.) is 12, and the sum of the third and fourth terms is 48. Then $6^{th}$ term of the G.P. is

(A) 64 (B) 72

(C) 96 (D) 128

66. On the set of all integers, the relation R defined by "aRb if and only if a – b is divisible by 3" is

(A) Only reflexive

(B) An equivalence relation

(C) Only symmetric

(D) Only transitive

67. Three number in G.P. have a sum 38 and a product 1728. The numbers are

(A) 9, 12, 16 (B) 6, 12, 24

(C) 8, 12, 18 (D) 4, 12, 36

68. In a survey of 250 people, 140 like Brand A, 150 like Brand B, and 100 like Brand C. 60 like both A and B, 70 like B and C, 50 like both A and C, and 30 like all three. Find the number of people who like none of the Brands.

(A) 10 (B) 40

(C) 210 (D) 240

69. A firm's marginal cost function is $MC = 12 - 4X + 3X^2$, and its fixed cost is ₹ 500. The total cost function $C(X)$ is :

(A) $X^3 + 2X^2 + 12X + 500$

(B) $3X^3 - 2X^2 + 12X + 500$

(C) $2X + 300$

(D) $X^3 - 2X^2 + 12X + 500$

70. Find the odd man out from the following :

3, 10, 29, 66, 127, 220, 345

(A) 220 (B) 127

(C) 29 (D) 345

71. Evaluate $\int_0^1 e^X dX$.

(A) $e+1$ (B) $e$

(C) $e-1$ (D) 1

72. Find the missing number of the series 8, 6, 9, 23, 87, .....

(A) 429 (B) 128

(C) 226 (D) 324

73. In a certain code language, "REFRIGERATOR" is coded as "ROTAREGIRFER" which word would be coded as "NOITINUMMA"

(A) AMNTOMUIN (B) NMMUNITIOA

(C) AMMUNITION (D) ANMOMIUTNI

74. A child is looking out his father. He went 90 meters in the East before turning to his right. He went 20 meters before turning to his right again to look for his father at his uncle's place which is 30 meters from his point. His father was not there. From there, he went 100 meters to his North before meeting his father in a street. How far the son from his starting point?

(A) 110 m (B) 90 m

(C) 80 m (D) 100 m

75. Four persons A, B, C and D live in a same society. The house of B is in the East of A's house but in the north of C's house. The house of C is in the West of D's house. D's house is in which direction of A's house?

(A) North –East (B) South-East

(C) East (D) West

76. Poru starts walking facing west. He turns 90° anticlockwise, then 180° clockwise, and finally 90° clockwise, which direction is he facing now?

(A) He is facing East

(B) He is facing South

(C) He is facing North

(D) He is facing West

77. Six Girls are sitting in a circle facing to the centre of the circle. They are P, Q, R, S, T and V. T is not between Q and S but some other one. P is immediate next to the left of V. R is 4$^{th}$ to the right of P. If P and R interchange their positions then which of the following pair will sit together?

(A) RT (B) PV

(C) VT (D) QV

78. If 'P × Q ' ⇒ P is mother of Q;

'P + Q' ⇒ P is father of Q;

'P – Q' ⇒ P is brother of Q;

Then 'M + N – O × P', how M is related to P?

(A) Uncle (B) Brother

(C) Father (D) Grand father

79. P, Q, R, S, T, U, V and W are sitting round the circle and are facing the centre.

P is second to the right of T, who is the neighbour of R and V.

S is not neighbour of P.

V is the neighbour of U.

Q is not between S and W.

W is not between U and S.

Which of the following are not neighbours?

(A) US (B) RT

(C) RQ (D) QW

80. While introducing a man, a woman said, he is the only son of my mother's mother. How is woman related to man?

(A) Niece (B) Mother

(C) Aunt (D) Sister

81. In a statistical table, which part contains the description of rows placed on the left part of table?

(A) Caption
(B) Stub
(C) Main body
(D) Box-head

82. The following table shows a less than cumulative frequency distribution of marks.

| Marks less than | Cumulative frequency |
|---|---|
| 10 | 4 |
| 20 | 9 |
| 30 | 15 |
| 40 | 22 |
| 50 | 30 |

What is the frequency of the class interval 20-30?

(A) 4
(B) 5
(C) 7
(D) 6

83. The curve which starts with a minimum frequency and then gradually reaches its maximum frequency at the other extremity?

(A) Bell shaped
(B) U shaped curve
(C) J-shaped curve
(D) Mixed curve

84. A population of 1,000 people contains 600 people who support a certain policy. A Simple Random Sample (SRS) of size 50 is drawn with replacement. What will be the Standard Error (S.E.) percentage of the proportion for this sample?

(A) 3.93% (B) 6.93%

(C) 4.76% (D) 5.67%

85. For a data set consisting of positive observations, which of the following inequalities among the three averages is always true?

(A) H.M. ≥ G.M. ≥ A.M.

(B) G.M. ≥ A.M. ≥ H.M.

(C) G.M. ≥ H.M. ≥ A.M.

(D) A.M. ≥ G.M. ≥ H.M.

86. As the sample size increases, the standard error of the sample mean is also

(A) Increases

(B) Becomes zero always

(C) Decreases

(D) Remains constant

87. A company has 4,800 employees. A sample of 240 employees is selected systematically. If the position of the first employee chosen at random is 5, then what is the position of the $25^{th}$ employee in the sample?

(A) 485 (B) 465

(C) 475 (D) 495

88. The mean and variance of 8 observations are 6 and 8 respectively. If some of observations are 3, 5, 6, 8, 9, 10, then the remaining two observations are

(A) 1, 5 (B) 1, 6

(C) 2, 6 (D) 3, 5

89. The frequency distribution of students marks of a university are:

| Marks | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 |
|---|---|---|---|---|---|---|
| Frequency | 5 | 8 | 15 | 20 | 10 | 7 |

Calculate the mode of students marks.

(A) 32.50 (B) 32.67

(C) 35.33 (D) 33.33

90. The marks obtained by 11 students are 25, 32, 28, 40, 36, 30, 42, 34, 38, 44 and 46. Find the quartile deviation of marks.

(A) 3 (B) 18

(C) 6 (D) 12

91. The following frequency distribution has mean 11.

| Y: | 5 | 10 | 15 | 20 |
|---|---|---|---|---|
| f: | 4 | X | 6 | 2 |

The missing frequency X is

(A) 18 (B) 8

(C) 10 (D) 12

92. A bag contains 6 green balls and 8 yellow balls. Two balls are drawn successively without replacement. What is the probability that the first ball drawn is green and the second ball drawn is yellow?

(A) 20/91 (B) 24/91

(C) 48/196 (D) 3/7

93. A disease affects 1% of a population. A test is 90% accurate (both ways). If a person tests positive, the probability they have the disease is

(A) 0.90 (B) 0.50

(C) 0.009 (D) 0.083

94. In a school, 40% of the students have brown eyes, 45% have green eyes, and remaining 15% have hazel eyes. For an inter-house competition:

- 70% of the brown-eyed students were selected,
- 80% of the green-eyed students were selected ; and
- 60% of the hazel-eyed students were selected.

If a student is chosen at random from the school and it is known that the student was not selected what is the probability that the student has green eyes?

(A) 1/2 (B) 1/4

(C) 1/3 (D) 2/3

95. If X and Y are two independent binomial variates with parameters $\left(2 \text{ and } \frac{1}{2}\right)$, $\left(3 \text{ and } \frac{1}{2}\right)$ respectively, what is $P(X+Y \geq 1)$?

(A) $\frac{1}{32}$ (B) $\frac{1}{2}$

(C) $\frac{5}{8}$ (D) $\frac{31}{32}$

96. For a certain types of mobiles, the length of time between charges of the battery is normally distributed with a mean of 50 hours and a standard deviation of 15 hours. A person owns of these mobiles and wants to know the probability that the length of time will be between 50 and 70 hours is :

[Given that $P(Z \leq 1.33) = 0.9082$]

(A) 0.0918 (B) 0.4082

(C) 0.5 (D) 0.54082

97. A call centre receives an average of 3 calls per hour. Assuming that the number of calls follows a Poisson distribution, what is the probability of receiving exactly 2 calls in a given hour?

[Given that $e^{-3} = 0.0498$]

(A) 0.2241 (B) 0.1494

(C) 0.4482 (D) 0.0747

98. The original price index of various years is as follows :

| Year : | 1980 | 1981 | 1982 | 1983 | 1984 |
|---|---|---|---|---|---|
| Original Price Index : | 100 | 104 | 107 | 110 | 112 |

What will be the splicing price index for the year 1981 if the base shifted to year 1984?

(A) 89.28 (B) 104.67

(C) 116.48 (D) 92.86

99. The two lines of regression is given by $9X+12Y=36$ and $3X+6Y=12$ respectively. The correlation coefficient between $X$ and $Y$ is

(A) 1.225 (B) $+\sqrt{\frac{2}{3}}$

(C) $-\sqrt{\frac{2}{3}}$ (D) 0.92

100. The weighted aggregative price index numbers for 2001 with 2000 as the base year using Fisher's ideal index number is

| Commodity | Price (in ₹) | | Quantities | |
|---|---|---|---|---|
| | 2000 | 2001 | 2000 | 2001 |
| A | 10 | 12 | 20 | 22 |
| B | 8 | 8 | 16 | 18 |
| C | 5 | 6 | 10 | 11 |
| D | 4 | 4 | 7 | 8 |

(A) 112.26 (B) 112.40

(C) 112.50 (D) 112.38

**PYC(H)**

**(Hindi Version)**

1. एक संख्या को 5 से विभाजित करने पर 3 शेषफल बचता है। जब 7 से विभाजित किया जाता है तब 5 शेषफल बचता है। ऐसी सबसे छोटी संख्या है।

(A) 38 (B) 33
(C) 68 (D) 73

2. यदि $\frac{mn}{m+n}=14$ ; $\frac{np}{n+p}=21$ और $\frac{mp}{m+p}=6$ तब $(m, n, p)$ ज्ञात कीजिए।

(A) $\left(\frac{21}{2}, -42, 14\right)$ (B) $\left(-\frac{21}{2}, 42, -14\right)$
(C) $\left(14, \frac{21}{2}, -42\right)$ (D) $\left(-14, \frac{-21}{2}, 42\right)$

3. स्तंभ A समीकरणों के निकाय को दर्शाता है और स्तंभ B हलों को प्रस्तुत करता है। तब स्तंभ A से स्तंभ B में सही विकल्पों का मिलान कीजिए :

| | A – समीकरणों का निकाय | B – हल $(X, Y, Z)$ |
|---|---|---|
| (I) | $X-Y+Z=2$ ; $X+2Y+3Z=14$ ; $2X+Y+Z=7$ | (a) (2, 1, 3) |
| (II) | $X-Y+Z=4$ ; $2X+Y-Z=2$ ; $X+Y-Z=0$ | (b) (1, 2, 3) |
| (III) | $2X+3Y+Z=14$ ; $X+Y+Z=6$ ; $3X+2Y+4Z=16$ | (c) (3, 2, 1) |
| (IV) | $X+Y+Z=6$ ; $2X+3Y+Z=13$ ; $X+4Y+5Z=16$ | (d) (2, 3, 1) |

(A) (I)-(c), (II)-(a), (III)-(d), (IV)-(b)
(B) (I)-(a), (II)-(b), (III)-(d), (IV)-(c)
(C) (I)-(b), (II)-(a), (III)-(d), (IV)-(c)
(D) (I)-(b), (II)-(c), (III)-(a), (IV)-(d)