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ICAI CA FOUNDATION EXAM PAPER

BUSINESS MATHEMATICS, LOGICAL REASONING AND STATISTICS

(JANUARY 2021)

1. The salaries of A, B and C are in the ratio 2 : 3 : 5. If increments of 15%, 10% and 20% are allowed respectively to their salaries, then what will be the new ratio of their salaries?

(a) 3 : 3 : 10 (b) 10 : 11: 20

(c) 23 : 33 : 60 (d) Cannot be determined

2. The ratio of two quantities is 15 : 17. If the consequent of its inverse ratio is 15, then the antecedent is.

(a) 15 (b) $\sqrt{15}$

(c) 17 (d) 14

3. In a certain business, A and B received Profit in a certain ratio; B and C received profits in the same ratio. If A gets Rs. 1,600 and C gets Rs. 2,500, then how much does B get?

(a) Rs. 2,000 (b) Rs. 2,500

(c) Rs. 1,000 (d) Rs. 1,500

4. Find the value of $\frac{3t^{-1}}{t^{-1/3}}$

(a) $\frac{3}{t^{2/3}}$

(b) $\frac{3}{t^{3/2}}$

(c) $\frac{3}{t^{1/3}}$

(d) $\frac{3}{t^{2}}$

5. **If $\log_a (ab) = x$, then $\log_b (ab)$ is –**

(a) 1/x (b) $\frac{x}{1+x}$

(c) $\frac{x}{x-1}$ (d) None of these

6. A business house wishes to simultaneously elevate two of its six branch heads. In howmany ways these elevations can take place?

(a) 12 (b) 3
(c) 6 (d) 15

7. ${}^{n}C_{p} + 2{}^{n}C_{p-1} + {}^{n}C_{p-2}$?

(a) ${}^{n}C_{p}$ (b) ${}^{n+2}C_{p}$
(c) ${}^{n+1}C_{p+1}$ (d) ${}^{n+2}C_{p-1}$

8. There are ten flights operating between city A and city B. The number of ways inwhich a person can travel from city A to city B and return by different flight, is

(a) 90 (b) 95
(c) 80 (d) 78

9. 'n' locks and 'n' corresponding keys are available but the actual combination is not known. The maximum number of trails that are needed to assigns the keys to the corresponding locks is.

(a) $(n - 1)C_2$ (b) $(n + 1)C^2$
(c) $\sum_{k=2}^{n} (k-1)$ (d) $\sum_{k=2}^{n} K$

10. How many different ways, can the letters of the word 'DETAIL' be arranged in such a way that the vowels occupy only the odd numbered position?

(a) 32 (b) 36
(c) 48 (d) 60

11. How many odd numbers of four digits can be formed with digits 0, 1, 2, 3, 4, 7 and 8 ?

(a) 150 (b) 300
(c) 120 (d) 210

12. Eight chairs are numbered form 1 to 8. Two women and three men are to be seated by allowing one chair for each. First, the women choose the chairs from the chairs numbered 1 to 4 and then men select the chairs from the remaining. The number of possible arrangements is.

(a) 120 (b) 288
(c) 32 (d) 1440

13. The number of integers from 1 to 100 which are neither divisible by 3, nor by 5 norby 7, is

(a) 67 (b) 55
(c) 45 (d) 33

14. In a geometric progression, the 3rd and 6th terms are, respectively, 1 and –1/8. The first term (a) and common ratio are respectively.

(a) 4 and ½ (b) 4 and –1/4
(c) 4 and –½ (d) 4 and 1/4

15. The n^{th} term of the series 3 + 7 + 13 + 21 + 31 + ... is

(a) 4 n –1 (b) $n^2 + 2n$
(c) $n^2 + n + 1$ (d) $n^2 + 2$

16. The set of cubes of natural numbers is

(a) Null set
(b) A finite set
(c) An infinite set
(d) Singleton set

17. $\int_1^2 e^x\left(\frac{1}{x}-\frac{1}{x^2}\right)ds =$

(a) $e\left(\frac{e}{2}-1\right)$
(b) $e(e-1)$
(c) a
(d) $e^2(e-i)$

18. For the set of observations {(1, 2), (2, 5), (3, 7), (4, 8), (5, 10)}, the value of Karlperson's coefficient of correlation is approximately given by

(a) 0.755
(b) 0.655
(c) 0.525
(d) 0.985

19. The coefficient of correlation between x and y is 0.5, the covariance is 16, and the standard deviation of x is 4. Then the standard deviation of y is

(a) 4
(b) 8
(c) 16
(d) 64

20. The intersecting point of the two regression lines: y or x and on y is.

(a) (0, 0)
(b) $(\bar{x}, \bar{y})$
(c) (b_{xy}, b_{yx})
(d) (1, 1)

21. Given that the variance of x is equal to the square of standard deviation of y and the regression line of y on x is y = 40 + 0.5 (x - 30). Then regression line of x on y is

(a) y = 40 + 4 (x - 30)
(b) x = 40 + .5 (y - 30)
(c) y = 40 + 2 (x - 30)
(d) x = 30 + 2 (y - 40)

22. The regression coefficients remain unchanged due to

(a) A shift of scale
(b) A sift of origin
(c) Replacing x - values by 1/x
(d) Replacing values by 1/y

23. **The cost function of production is given by** $C(x)=\frac{x^3}{2}-15x^2+36x$ **where x denotes the number of items produced. The level of output for which marginal cost is minimum and the level of output for which the average cost is minimum are given by, respectively**

(a) 10 and 15
(b) 10 and 12
(c) 12 and 15
(d) 15 and 10

24. Find the coefficient of mean deviation about mean for the data :
5, 7, 8, 10, 11, 13, 19
(a) 17.28
(b) 28.57
(c) 32.11
(d) 18.56

25. Which of the following is a relative measure of dispersion?
(a) Range
(b) Mean deviation
(c) Standard deviation
(d) Coefficient of quartile deviation

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

27. The relationship between P-series and Q series is given by 2P - 3Q - 10. If the range P- Series is 18. What would be the range of Q?
(a) 10
(b) 15
(c) 9
(d) 12

28. The best statistical measure used for comparing two series is
(a) Mean absolute deviation
(b) Range
(c) Coefficient of variation
(d) Standard deviation

29. **Let f. R $\Rightarrow$ R be defined by**

$$f(x)\begin{cases} 2x & \text{for} \quad x > 3 \\ x^2 & \text{for} \quad 1 < x \le 3 \\ 3x & \text{for} \quad x \le 1 \end{cases}$$

The value of f(−1)+ f(2) + f(4) is
(a) 9 (b) 14
(c) 5 (d) 6

30. A certain sum amounted to Rs. 575 at 5% in a time in which Rs. 750 amounted to Rs. 840 at 4%. If the rate of interest is simple, find the sum-
(a) 525
(b) 550
(c) 515
(d) 500

31. Find the amount of compound interest, if an amount of Rs. 50,000 is deposited in a bank for one year at the rate of 8% per annum compounded semiannually
    (a) 3080
    (b) 4080
    (c) 5456
    (d) 7856

32. The population of a town increase by 2% of the population at the beginning of the year. The number of year by which the total increases in population would be 40% is:
    (a) 7 years
    (b) 10 years
    (c) 17 years
    (d) 19 years (approx)

33. Find the future value of annuity of Rs. 1,000 made annually for 7 year at interest rate of 14% compounded annually (Given that $1.14^7 = 2.5023$)
    (a) Rs. 10,730.7
    (b) Rs. 5,365.35
    (c) Rs. 8,756
    (d) Rs. 9,892.34

34. Two equal amounts of money an deposited in two banks each at 15% p.a. fix 3.5 year in the bank and fix 5 years in the either. The difference between the interest amount from the bank in Rs. 144. Find the sum
    (a) Rs. 620
    (b) Rs. 640
    (c) Rs. 820
    (d) Rs. 840

35. The simple on sum at 4% p.a. for 2 years is Rs. 80. Find the CI on the came sum for the same period.
    (a) Rs. 81.6
    (b) Rs. 80.8
    (c) Rs. 83.2
    (d) Rs. 82.3

36. Which is a better investment 9% p.a. compounded quarterly or 9.1% p.a. simple interest?
    (a) 9% compounded
    (b) 9.1% S.T.
    (c) Both are same
    (d) Cannot be said

37. The effective rate of interest corresponding to a nominal rate of 7% p.a. compounded quarterly is
    (a) 7.5%
    (b) 7.6%
    (c) 7.7%
    (d) 7.18%

38. Assuming that the discount rate is 7% p.a. how much would pay to receive Rs. 200 growing at 5% annually for ever?
(a) Rs. 2,500
(b) Rs. 5,000
(c) Rs. 7,500
(d) Rs. 10,000

39. A man invested one-third of his capital at 7% one fourth at 8% and the remainder at 10%. If the annual income is Rs. 561. The capital is-
(a) Rs. 4,400
(b) Rs. 5,500
(c) Rs. 6,600
(d) Rs. 5,800

40. A sum of money is lent at C.I. Rate 20% p.a. 2 years. It would fetch Rs. 482 more if the interest is compounded half yearly. The sum is:
(a) Rs. 19,800
(b) Rs. 19,900
(c) Rs. 20,000
(d) Rs. 20,100

41. Rs. 800 is invested at the end of each month in an account paying interest 6% per year compounded monthly. What is the future value of this annually after 10th payment?
(a) Rs. 4,444
(b) Rs. 8,756
(c) Rs. 3,491
(d) Rs. 8,176

42. What 'i' denote the actual rate of interest in decimal, and n denote the number of conversion periods, the formula for computing the effective rate of interest E is given by.
(a) $(1 + i)^n$
(b) $(1 + i)^n - 1$
(c) $1 - (1 + i)^n$
(d) $(1 + i)^{-n}$

43. The present value of an Annuity immediate is the same as
(a) Annuity regular for (n -1) year plus the initial receipt in the beginning of the period
(b) Annuity regular for (n -1) years
(c) Annuity regular for (n + 1) years
(d) Annuity regular for (n + 1) years plus the initial receipt in the beginning of the period

44. From the records on sizes of shoes sold in a shop, one can compute the following to determine the most preferred shoe size.
(a) Mean
(b) Median
(c) Mode
(d) Range

45. Which of the following measure does not possess mathematical properties?
(a) Arithmetic mean
(b) Geometric mean
(c) Harmonic mean
(d) Median

46. If y = 3 + (4.5)x and the mode for x-value is 20, then the mode for y–is
(a) 3.225 (b) 12
(c) 24.5 (d) 93

47. If there are two groups with n_1 and n_2 observations and H_1 and H_2 are respective harmonic means, then the harmonic mean of combined observation is
(a) $\frac{n_1H_1+n_2H_2}{n_1+n_2}$ (b) $\frac{n_1H_1+n_2H_2}{H_1+H_2}$
(c) $\frac{n_1+n_2}{n_1H_1+n_2H_2}$ (d) $\frac{(n_1+n_2)H_1H_2}{n_1H_2+n_2H_1}$

48. **If an unbiased coin is tossed twice, then the probability of obtaining at least one tall is.**
(a) 1 (b) 0.5
(c) 0.75 (d) 0.25

49. **Two dice are thrown simultaneously. The probability of a total score of 5 from the outcomes of dice is**
(a) 1/18 (b) 1/12
(c) 1/9 (d) 2/25

50. **A basket contains 15 white bawls, 25 red balls and 10 blue balls. If a ball is selected at random, the probability of selecting a coloured ball is**
(a) 0.20 (b) 0.25
(c) 0.60 **(d) 0.70**

51. **Three identical and balanced dice are rolled. The probability that the same number will appear on each of them is**
(a) 1/6 (b) 1/18
(c) 1/36 (d) 1/24

52. **An event that can be subdivided into further events is called as**
(a) A Composite event (b) A complex event
(c) A mixed event (d) A simple event

53. A bar chart is drawn for
(a) Continuous date
(b) Nominal data
(c) Time series data
(d) Comparing different components

54. A tabular presentation can be used for
(a) Continuous series data (b) Nominal data
(c) Time series data for longer period (d) Primary data

55. A variable qualitative characteristic is known as
(a) Quality variable (b) An attribute
(c) A discrete variable (d) A continuous variable

56. The accuracy and consistency of data can be verified by
(a) Scrutiny (b) Internal Checking
(c) External Checking (d) Double Checking

57. From a histogram one cannot compute the approximate value of
(a) Mode (b) Standard deviation
(c) Median (d) Mean

58. The left part of a table providing the description of rows is called
(a) Caption (b) Box – head
(c) Stub (d) Body

59. Mode can be obtained from _____ .
(a) Frequency polygon (b) Histogram
(c) Ogive (d) All of the above

60. Most of the commonly used distributions provide a
(a) Bell-shaped (b) U-shaped
(c) J – shaped curve (d) Mixed Curve

61. Which of the following is suitable for the graphical representation of a cumulative frequency distribution?
(a) Frequency polygon (b) Histogram
(c) Ogive (d) Pic Chart

62. Sweetness of sweet dish is
(a) An Attribute (b) A discrete Variable
(c) A Continuous Variable (d) A Variable

63. **A coin with probability for head as 1/5 is tossed 100 times. The standard deviation of the number of heads turned up is.**
(a) 3 (b) 2
(c) 4 (d) 6

64. **If an unbiased coin is tossed three times, what is the probability of getting more than one head?**
(a) ½ (b) 3/8
(c) 7/ 8 (d) 1/3

65. **Which one of the following is an uniparametric distribution?**

(a) Poisson (b) Normal
(c) Binomial (d) Hyper geometric

66. **For a normal distribution, the value of third moment about mean is**

(a) 0 (b) 1
(c) 2 (d) 3

67. **If X is a Poission variable, and P (X = 1) = P(X=2), then P(x = 4) is**

(a) $\frac{2}{3}e^{-2}$ (b) $\frac{2}{3}e^{4}$
(c) $\frac{3}{2}e^{-2}$ (d) $\frac{3}{2}e^{4}$

68. **The cost of living index is always**
(a) Price index number (b) Quantity index number
(c) Weighted index number (d) Value index number

69. **Fisher's index number does not satisfy**
(a) Unit test (b) Circular test
(c) Time reversal test (d) Factor reversal test

70. **When the prices for quantities consumed of all commodities are changing in the same ratio. Then the index numbers due to Laspeyre's and passsche's will be**
(a) Equal
(b) Unequal
(c) Reciprocal of Marshall Edge worth Index number
(d) Reciprocal of Fisher Index number

71. $\frac{1}{2}, \frac{3}{4}, \frac{5}{8}, \frac{7}{16} = ?$
(a) 9/32
(b) 10/17
(c) 11/34
(d) 12/35

72. Find the missing term

P 3 C, R 5 F, T 8 I, V 12 L, _____?

(a) Y170

(b) X17M

(c) X170

(d) X160

73. Find out the odd man out in the Sequence 8, 27, 64, 125, 216.

(a) 27

(b) 64

(c) 125

(d) 216

74. In a certain Code Language BEAT is written as YVZG, then what will be code for MILD?

(a) ONRW

(b) NOWR

(c) ONWR

(d) NROW

75. In a certain code RIPPLE is written as 613382, and LIFE is written as 8192. How will RIFFLE be written in that code?

(a) 618892

(b) 689912

(c) 619982

(d) 629981

76. A man is facing west. He turns 45^{o} in the clockwise direction and then another 180^{o} in the same direction and then 270^{o} in the anti-clockwise direction. Which is the facing now?

(a) South-West

(b) North-West

(c) West

(d) South

77. One day Ram left home and bi-Cycled 10 km southwards, turned right and travelled 5km and turned right and went 10km he turned left and went 10km how many kilometers he has to cycle to reach his home straight?

(a) 10

(b) 15

(c) 20

(d) 25

78. Ms. N walks 19km towards North from there she walks 6km towards South. Then she walks 3km towards East. How far and in which direction is she with reference to her starting point?

(a) 4 km West

(b) 6 km West

(c) 3 km East

(d) 3 km North/East

79. A, B, C and D are playing cards, A and B are partners. D faces towards North. If a faces West, then who faces south?

(a) C

(b) B

(c) D

(d) Data is inadequate

80. A is seated between D and F at a round table. C is seated opposite to D. E is round adjust to D. Who sit opposite to B?

(a) A

(b) D

(c) C

(d) F

81. Four Indian, A, B, C and D and four Chinese E, F, G and H are sitting in a circle around a table facing the each other in a conference. No two Indians or Chinese are sitting side by side, C who is sitting between G and E is being D, F is between D and A and facing G, H is to the left of B. Who is sitting left of A?

(a) E

(b) F

(c) G

(d) H

82. Five friends A, B, C, D and E are sitting on a bench. A is sitting nest to B; C is sitting next to D, D is not sitting with E; E is at the left and of bench. C is on second position from the right; A is on the right side of B who is the right side of E. A and C are sitting together. What is the position of B?

(a) Second from right

(b) Centre

(c) Extreme left

(d) Second from left

83. P is the brother of Q and R, S is the mother of R. T is the father of P, Which of the following statement cannot be definitely true?

(a) S is the mother of P

(b) P is son of S

(c) T is husband of S

(d) Q is son of T

84. Pointing to a a lady in a photograph, Ram said "Her son's father is the son in law of my mother". How is Ram related to the lady?

(a) Aunt

(b) Cousin

(c) Sister

(d) Mother

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

(a) Son

(b) Brother

(c) Son-in-Law

(d) Uncle

86. Pointing to a lady, Sahil said, "She is the daughter of the woman who is the mother of the husband of my mother". Who is the lady to Sahil?

(a) Aunt

(b) Sister

(c) Daughter

(d) Sister-in-Law

87. **Statements:**

All men are cups.

All cups are plates

Conclusions:

I. All men are plates

II. All cups are buckets

(a) If only conclusion I follows

(b) If only conclusion II follows

(c) If either conclusions I or II follows

(d) If neither conclusions

88. **Statements:**

Lawyers marked only fair girls.

Shoba is very fair

Conclusions:

I. Shoba was married for lawyer

II. Shoba was not married lawyer

(a) If only I follows

(b) If only II follows

(c) If either I or II follows

(d) If neither I nor II follows

89. **Statements:**

Sohan a good sportsman

Sportsman are healthy

Conclusions:

I. All healthy persons are sportsman

II. Sohan is healthy

(a) If only I follows

(b) If only II follows

(c) If either I or II follows

(d) If neither i nor II follows

90. **Statements:**

No man is a tiger

Raj is a man

Conclusion:

I. Raj is a tiger

II. All man are not Raj

(a) If only I follows

(b) If only II follows

(c) If either I or II follows

(d) If neither I nor II follows

91. The value of P/or which the difference between the root of equation $x^2 + px + 8 = 0$ is 2

(a) ± 2

(b) ± 4

(c) ± 6

(d) ± 8

92. If the quadratic equation $x^2 + px + q = 0$ and $x^2 = qx + p = 0$ have a common root hen $p + q = ?$

(a) 0

(b) 1

(c) -1

(d) 2

93. If $A + B = \begin{bmatrix} 1 & 0 \\ 1 & 1 \end{bmatrix}$ and $A - 2B = \begin{bmatrix} -1 & 1 \\ 0 & -1 \end{bmatrix}$

Then A =

(a) $\begin{bmatrix} 1 & 1 \\ 2 & 1 \end{bmatrix}$

(b) $\begin{bmatrix} 2/3 & 1/3 \\ 1/3 & 2/3 \end{bmatrix}$

(c) $\begin{bmatrix} 1/3 & 1/3 \\ 2/3 & 1/3 \end{bmatrix}$

(d) $\begin{bmatrix} 2 & 1 \\ 1 & 2 \end{bmatrix}$

94. The matrix $A = \begin{vmatrix} 1 & -2 & 3 \\ 1 & -3 & 4 \\ 1 & 1 & 2 \end{vmatrix}$ is:

(a) Symmetric

(b) Skew-Symmetric

(c) Singular

(d) Non-Singular

95. The harmonic mean of the roots of the equation

$(5 + \sqrt{2})\, x^2 - (4 + \sqrt{5})\, x + 8 + 2\sqrt{5} = 0$ *is*

(a) 2

(b) 4

(c) 6

(d) 8

96. The common region in the graph of the inequalities $x + y \leq 4$, $x - y \leq 4$, $x \geq 2$ is

(a) Equilateral triangle

(b) Isosceles triangle

(c) Quadrilateral

(d) Square

97. In the set of all straight lines on a plane which of the following is Not 'TRUE'?

(a) Parallel to an equivalence relation

(b) Perpendicular to is a symmetric relation

(c) Perpendicular to is an equivalence relation

(d) Parallel to a reflexive relation

98. In a time series on yearly production, there will be no_____variations.

(a) Trend

(b) Seasonal

(c) Cyclical

(d) Irregular

99. For the time series data given below semi-average method is used to find trend values:

Year	2011	2012	2013	2014	2015	2016
Y:	80	120	140	100	150	160

What is the trend value for the year 2015?

(a) 150

(b) 130

(c) 110

(d) 120

100. The fire in a factory is an example of:

(a) Secular trend

(b) Seasonal movements

(c) Cyclical trend

(d) Irregular variations

ANSWER KEY

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

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