FOUNDATION COURSE EXAMINATION

300897

JUNE 2024

FUNDAMENTALS OF BUSINESS MATHEMATICS AND STATISTICS

(Notations and Symbols used are as usual)

Time Allowed: 1 hour *Full Marks: 100 (2×50)*

Choose the correct option from the four alternatives given:

SECTION I: FUNDAMENTALS OF BUSINESS MATHEMATICS *(40 marks)*

1. In 30 litres of adulterated milk, the ratio of the volumes of milk and water is 7 : 3. What volume of water should be added to it to make the ratio of milk and water 3 : 7?

(A) 20
(B) 40
(C) 25
(D) 30

2. The mean proportional between 2 and 8 is

(A) 4
(B) 5
(C) 3
(D) 6

3. p varies directly with the cube root of q and p is 4 when the value of q is 8. Find the value of $(q+1)$ when the value of p is 6.

(A) 25
(B) 28
(C) 32
(D) 36

4. If the interest rate is 6% p.a., for what sum of money (in ₹) will the difference between compound interest and simple interest for 2 years is ₹ 13.5?

(A) 5730
(B) 5370
(C) 3750
(D) 3570

5. A bank offers 4% nominal interest with quarterly compounding. What is the effective rate of interest?

(A) 4.01%
(B) 4.02%
(C) 4.06%
(D) 4.08%

6. The sum of first 50 natural numbers is

(A) 1275
(B) 2550
(C) 2549
(D) 2500

7. A car travels some distance at a speed 8km/hour and return at a speed 12 km/hour. If the total time taken is 15 hours, what is the distance (in km)?

(A) 48
(B) 60
(C) 56
(D) 72

8. If product of the first three terms of a G.P. is 64, the middle term is

(A) 2
(B) 8
(C) 6
(D) 4

9. A and B are subsets of an universal set U such that $n(U) = 800$, $n(A) = 300$, $n(B) = 400$ and $n(A \cap B) = 100$. Then the number of elements in the set $(A^c \cap B^c)$ is

(A) 150
(B) 200
(C) 350
(D) 400

10. If $A = \{1, 2, 3, 4\}$ and $B = \{3, 5, 7\}$, then $(A - B) \cup (B - A)$ is

(A) $\{1, 2, 3\}$
(B) $\{3\}$
(C) $\{1, 2, 3, 4, 5, 7\}$
(D) $\{1, 2, 4, 5, 7\}$

11. If $(300)^8 = 65.61 \times 10^x$, then the value of x is

(A) 14
(B) 16
(C) 18
(D) 20

12. If $3^{x-y} = 27$ and $3^{x+y} = 243$, then x is equal to

(A) 0
(B) 2
(C) 4
(D) 6

13. If $\log_2 \log_3 \log_2 x = 0$, then x is

(A) 8
(B) 1
(C) 16
(D) 2

14. The LCM of {3!, 4!, 5!} is

(A) 6
(B) 24
(C) 120
(D) 60

15. A polygon of n sides has two diagonals. The value of n is

(A) 4
(B) 3
(C) 8
(D) 10

16. Express $5 \times 6 \times 7 \times 8 \times 9$ in factorial notation.

(A) 9! / 5!
(B) 9! – 5!
(C) 9! / 4!
(D) 10! – 4!

17. If the product of the roots of $ax^2 + 2x + 6 = 0$ is 3, then the sum of the roots is

(A) 1
(B) – 1
(C) 1/2
(D) – 1/2

18. If the equation $x^2 - (p+4)x + 2p + 5 = 0$ has two equal roots, then the value of p is

(A) ± 1
(B) 2
(C) – 2
(D) ± 2

19. A bottle manufacturing company manufactures and sells bottles. Each bottle costs ₹ 40 to make and the company's fixed cost is ₹ 5000. The price function is given by $P(x) = 300 - 2x$. Then the profit maximizing output is

(A) 65
(B) 56
(C) 60
(D) 62

20. If $y = (2x + 3)^4$, then $\frac{dy}{dx}$ is

(A) $4(2x + 3)^3$
(B) $8(2x + 3)^3$
(C) $32x^3$
(D) $8(2x + 3)$

Section II: Fundamentals of Business Statistics *(60 marks)*

21. Statistical data collected by the government agency for surveying some matter is

(A) attribute data
(B) primary data
(C) secondary data
(D) both primary and secondary data

22. Which of the following diagrams is used to find the value of the mode graphically?

(A) Pie chart
(B) Bar chart
(C) Histogram
(D) Ogive

23. The cumulative frequency table is required to find out which of the following?

(A) Mean
(B) Median
(C) Mode
(D) Range

24. The average of lower and upper class limits is called

(A) class-mark
(B) class-boundary
(C) class-width
(D) class frequency

25. The algebraic sum of the deviations of 10 observations measured from 30 is 20. The arithmetic mean of the observations is

(A) 28
(B) 36.5
(C) 42.4
(D) 32

26. If the harmonic mean of 2, a and 8 be $\frac{24}{7}$, then the value of a is

(A) 2
(B) 4
(C) 8
(D) 7

27. The variables x and y are related by $4x - 3y = 5$. If the median and mode of the variable x are 4 and 5 respectively, then the mean of y is

(A) 3
(B) 4
(C) 5
(D) 2

28. The range of first five prime numbers is

(A) 4
(B) 5
(C) 7
(D) 9

29. For a sample of 10 observations, $\Sigma x = 20$ and $\Sigma x^2 = 200$, then the standard deviation is

(A) 8
(B) 6
(C) 4
(D) 16

30. For a symmetrical distribution $Q_1 = 34$ and $Q_3 = 42$. Using Bowley's measure of skewness, find the median of the distribution.

(A) 30
(B) 33
(C) 36
(D) 38

31. If $\text{cov}(x,y) = 12$, $\text{var}(x) = 9$, $\text{var}(y) = 25$, then the correlation coefficient is

(A) 0.36
(B) 0.8
(C) 0.5
(D) 0.65

32. If $\text{var}(x) = 144$, $\text{s.d.}(y) = 18$ and $r(x,y) = 0.9$, then the value of b_{yx} is

(A) 1.86
(B) 2.47
(C) 0.82
(D) 1.35

33. Find the regression line y on x from the following data:

$n = 10$, $\Sigma x = 120$, $\Sigma y = 150$, $\Sigma(x-12)^2 = 125$, $\Sigma(y-15)^2 = 180$, $\Sigma(x-12)(y-15) = 90$. Then the value of the correlation coefficient between x and y is

(A) 0.6
(B) 0.8
(C) 0.57
(D) 0.68

34. The regression coefficients of x on y and y on x are -1.2 and -0.3 respectively. The correlation coefficient between x and y is

(A) 0.6
(B) -0.6
(C) 0.06
(D) -0.06

35. If $\bar{x} = 6$, $\bar{y} = 7$, $b_{yx} = 0.45$, $b_{xy} = 0.65$, then the regression equation of x on y is

(A) $y - 0.65x = 3.8$
(B) $y - 0.45x = 4.3$
(C) $x - 0.45y = 7.6$
(D) $x - 0.65y = 1.45$

36. The correlation coefficient between shoe size and intelligence of a person is

(A) positive
(B) negative
(C) non-sense correlation
(D) non-negative

37. The correlation coefficient of ranks of n students in two subjects of a test is 0.25 and the sum of squares of differences of the ranks is 63. The number of students appeared in the test is

(A) 8
(B) 9
(C) 10
(D) 12

38. If for the events A and A^c, $P(A) = P(A^c)$, then events A and A^c are

(A) mutually exclusive but not equally likely
(B) equally likely but not mutually exclusive
(C) mutually exclusive and equally likely both
(D) neither mutually exclusive nor equally likely

39. Two perfect dice are thrown simultaneously. The probability of getting a sum 8 is

(A) $\frac{7}{36}$

(B) $\frac{1}{36}$

(C) $\frac{4}{36}$

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

40. For the events A and B, if $P(A) = \frac{1}{2}$ and $P(B) = \frac{1}{3}$ and $P(A \cup B) = \frac{7}{12}$, then $P(A|B)$ is

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

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

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

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

41. Two events A and B are said to be independent if

(A) $P(A \mid B) = P(A)\, P(B)$

(B) $P(A \mid B) = P(A) / P(B)$

(C) $P(A \mid B) = P(A)$

(D) $P(A \mid B) = P(B)$

42. A card is drawn at random from a well-shuffled pack of 52 cards. The probability of drawing a king or queen of spade is

(A) $\frac{1}{52}$

(B) $\frac{1}{26}$

(C) $\frac{2}{13}$

(D) $\frac{1}{13}$

43. A perfect die is thrown. Then probability of getting an even number or a number multiple of 3 is

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

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

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

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

44. Using a 3-year weighted moving average with weights 1, 2, 1, find the trend value for the 4th year for the following series:

Year:	1	2	3	4	5	6	7
Values:	2	4	5	7	8	10	13

(A) 5

(B) 6.67

(C) 6.75

(D) 6.57

45. Calculate the weighted average of price relative index number from the following data:

Item	Weight (in %)	Base year price (in ₹)	Current year price (in ₹)
I	40	2	4
II	30	5	6
III	20	4	5
IV	10	2	3

(A) 156

(B) 148

(C) 165

(D) 140

46. If $\sum P_0 Q_0 = 1360$, $\sum P_n Q_0 = 1900$, $\sum P_0 Q_n = 1344$, $\sum P_n Q_n = 1880$, then Laspeyres' price index number is

(A) 139.70

(B) 138.24

(C) 98.95

(D) 98.82

47. If Laspeyres' price index = 147.28 and Paasche's price index = 143.26, then Bowley's price index number is

(A) 145.86

(B) 145.27

(C) 142.57

(D) 145. 25

48. If a perfect coin is tossed 3 times, then the probability of getting exactly 2 heads is

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

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

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

(D) $\frac{5}{8}$

49. Given: $P(B_1) = P(B_2) = \frac{1}{2}$, $P(A|B_1) = \frac{1}{3}$, $P(A|B_2) = \frac{2}{3}$. Using Bayes' theorem, find $P(B_1|A)$.

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

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

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

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

50. If A be an event, then which one of the following statements is TRUE?

(A) $P(A) > 0$

(B) $P(A) \geq 0$

(C) $0 \leq P(A) \leq 1$

(D) $-1 \leq P(A) \leq 1$

FUNDAMENTALS OF BUSINESS ECONOMICS AND MANAGEMENT

Full Marks: 100 (2×50)

Time Allowed: 1 hour

Choose the correct option from the four alternatives given:

SECTION A: FUNDAMENTALS OF BUSINESS ECONOMICS *(70 marks)*

51. Welfare definition of economics was given by _____.

(A) Alfred Marshall
(B) Adam Smith
(C) Robbins
(D) Jacob Viner

52. Which is not a characteristic of human wants?

(A) Wants are satiable.
(B) Wants are limited.
(C) Wants are recurring.
(D) Wants are competitive.

53. _____ elasticity refers to demand for a commodity in relationship with the price of a close substitute.

(A) Cross
(B) Income
(C) Price
(D) Unitary

54. Market potential is also known as _____ demand.

(A) market
(B) potential
(C) sales
(D) industry

55. The Law of Variable Proportions was not propounded by _____.

(A) Marshall
(B) Benham
(C) Samuelson
(D) Keynes

56. All factors of production become variable in the _____.

(A) short run
(B) medium run
(C) long run
(D) very short run

57. _____ cost is also known as variable cost.

(A) Product
(B) Fixed
(C) Historical
(D) Opportunity

58. _____ costs are irrelevant with regard to future business decisions.

(A) Product
(B) Fixed
(C) Variable
(D) Sunk

59. Under _____ competition, every firm will be of optimum size.

(A) pure
(B) perfect
(C) monopoly
(D) monopolistic

60. Imperfect market is classified into _____ types.

(A) 2
(B) 3
(C) 4
(D) 5

61. Oligopoly means _____.
(A) single seller
(B) few sellers
(C) large number of sellers
(D) no buyers

62. In _____, seller is the price maker.
(A) perfect competition
(B) monopoly
(C) oligopoly
(D) imperfect market

63. The Kinked Demand Curve model of oligopoly was developed by _____.
(A) Cornet
(B) Edgeworth
(C) Sweezy
(D) Sticker

64. The market state that satisfies all the essential features of a perfect competition market except identity of a product is known as _____.
(A) Oligopoly
(B) Duopoly
(C) Monopoly
(D) Monopolistic Competition

65. In _____ market, the firm has no definite demand curve.
(A) Oligopoly
(B) Duopoly
(C) Monopoly
(D) Monopolistic Competition

66. The act of selling the same commodity at different prices to different buyers is known as _____.
(A) price leadership
(B) differential pricing
(C) policy pricing
(D) skimming pricing

67. Penetration pricing is adopted by following a _____.
(A) low price
(B) high price
(C) dual price
(D) (A), (B) and (C)

68. Three degrees of price discrimination was described by _____.
(A) Robinson
(B) Pigou
(C) Adam Smith
(D) Sticker

69. In the long run, price is governed by _____.
(A) cost of production
(B) demand—supply forces
(C) marginal utility
(D) normal profit

70. Types of money may be of ____ groups.
(A) 2
(B) 3
(C) 4
(D) 5

71. Quantity Theory of Money was propounded by _____.
(A) Irving Fisher
(B) Gresham
(C) Keynes
(D) Adam Smith

72. Medium of exchange is one among the _____ functions of money.
(A) secondary
(B) primary
(C) contingent
(D) auxiliary

73. The money supply affects the rate of interest. When the money supply increases, rate of interest decreases. This has been stated by _____.
(A) Keynes
(B) Walker
(C) Robbins
(D) Crowther

74. Collection of cheque is one among the _____ functions.
(A) creation of credit
(B) agency
(C) loans and advances
(D) acceptance of deposits

75. The RBI was nationalised in _____.
(A) 1949
(B) 1950
(C) 1951
(D) 1935

76. IFCI was established in _____.
(A) 1949
(B) 1948
(C) 1947
(D) 1946

77. The main purpose of the _____ is regulating business in the stock market and other securities markets.
(A) SEBI
(B) IFCI
(C) LICI
(D) EXIM Bank

78. Commercial banks create money on the basis of _____.
(A) cash deposits
(B) number of customers
(C) statutory reserve
(D) debts

79. Monetary policy is formulated by the _____.
(A) RBI
(B) commercial banks
(C) RRBs
(D) Government of India

80. _____ environment is beyond the control of the business.
(A) Internal
(B) External
(C) Micro
(D) Human Resources

81. _____ environment does not form part of an organisation's micro environment.
(A) Intermediaries
(B) Customers
(C) Legal
(D) Suppliers

82. External business environment has been classified into _____ groups.
(A) 2
(B) 3
(C) 4
(D) 5

83. The term "T" in SWOT analysis stands for _____.
(A) Transparency
(B) Total Revenue
(C) Threat
(D) Transaction

84. The term "S" in PESTEL stands for _____.
(A) Strength
(B) Social
(C) Sustainability
(D) Safety

85. _____ Factors represent the demographic characteristics, norms, customs and values of the population within which the organisation operates.
(A) Political
(B) Social
(C) Economic
(D) Environmental

SECTION B: FUNDAMENTALS OF MANAGEMENT *(30 marks)*

86. Stewardship theory was developed in _____.
(A) 1997
(B) 1999
(C) 2001
(D) 2003

87. Which of the following is not an agency cost?
(A) Residual loss
(B) Bonding costs
(C) Concurrent loss
(D) Monitoring costs

88. _____is concerned with marshalling the human and other resources of the organisation.
(A) Planning
(B) Directing
(C) Controlling
(D) Organising

89. _____ stated that management is the art of getting things done through people.
(A) Louis Allen
(B) Mary Parker Follet
(C) Henri Fayol
(D) Peter Drucker

90. Determining the time sequence of a job is called _____.
(A) Planning
(B) Forecasting
(C) Scheduling
(D) Objective

91. _____ is the process of dividing the work of the organisation into various units or departments.

(A) Departmentation
(B) Delegation of Authority
(C) Decentralisation of Authority
(D) Responsibility

92. Which of the following is an 'on-the-job' training method?

(A) Conference
(B) Sensitivity Training
(C) Position Rotation
(D) Brainstorming

93. _____ is what a communicator is communicating.

(A) Message
(B) Medium
(C) Decoding
(D) Encoding

94. Under the _____ style of leadership, the policy is to leave things to take their own course, without interfering.

(A) Laissez-faire
(B) Autocratic
(C) Democratic
(D) Servant

95. _____ is the process of entrusting part of the work by the superior to his/her subordinates.

(A) Centralisation of Authority
(B) Responsibility
(C) Delegation of Authority
(D) Accountability

96. Management may force workers to call off a strike by giving an ultimatum that otherwise they will be suspended. This is the use of _____ power.

(A) Reward power
(B) Expert power
(C) Referent power
(D) Coercive power

97. _____ leadership is a leadership philosophy in which the goal of the leader is to serve.

(A) Laissez-faire
(B) Autocratic
(C) Democratic
(D) Servant

98. Maslow's theory explains about _____.

(A) human needs
(B) financial needs
(C) machinery needs
(D) technical needs

99. Programmed decisions are usually taken by the _____ managers.

(A) top level
(B) middle level
(C) lower level
(D) supervisory level

100. Decision-making is a part of the _____ function.

(A) Planning
(B) Organising
(C) Directing
(D) Controlling