FOUNDATION COURSE EXAMINATION
DECEMBER 2024

SUBJECT: FUNDAMENTALS OF BUSINESS MATHEMATICS AND STATISTICS
(Notations and symbols used are as usual)

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

SECTION I: BUSINESS MATHEMATICS (*40 marks*)

1. The two numbers are in the ratio 2:3. If 4 is subtracted from each, they are in the ratio 3:5. The numbers are

- (A) (16, 24)
- (B) (4, 6)
- (C) (10, 15)
- (D) (12, 16)

2. How much pure milk (in ml) must be added to 300 ml of a solution containing 15% of milk to change the concentration of milk in that mixture to 50%?

- (A) 160
- (B) 190
- (C) 205
- (D) 210

3. If x varies inversely with y, then which of the following is correct?

- (A) $\dfrac{x_1}{y_1} = \dfrac{x_2}{y_2}$
- (B) $\dfrac{x_1}{x_2} = \dfrac{y_1}{y_2}$
- (C) $\dfrac{x_1}{x_2} = \dfrac{y_2}{y_1}$
- (D) $x_1 x_2 = y_1 y_2$

4. A given sum of money gives ₹ 50 as the simple interest for one year and ₹ 102 as compound interest for two years. Determine the rate of interest.

- (A) 8%
- (B) 12%
- (C) 4%
- (D) 12.5%

5. Find the present value of an annuity of ₹ 1000 received annually for 4 years at a discount ratio of 5%.

- (A) ₹ 3546
- (B) ₹ 4504
- (C) ₹ 2450
- (D) ₹ 3200

6. If $\left(\sqrt{3}\right)^x = 81$, then the value of a for $ax^2 - 10x + 16 = 0$ is

- (A) –1
- (B) 1
- (C) –2
- (D) 2

7. Ajay walks 4 kmph and 4 hours after his start, Badal cycles after him at 10 kmph. How far from the start Badal catches up with Ajay?

- (A) 16.67 km
- (B) 18.67 km
- (C) 21.25 km
- (D) 26.67 km

8. The 7th term of an AP, –20, –16, –12,... is

- (A) – 44
- (B) – 4
- (C) 4
- (D) 0

9. The first term and common ratio of a GP series are 4 and $\frac{1}{2}$ respectively. The fifth term is

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

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

   (C) 64

   (D) $\frac{1}{64}$

10. If A and B be two sets such that n (A) = 70, n(B) = 60 and n(A $\cup$ B) = 110, then n (A $\cap$ B) is

   (A) 240

   (B) 50

   (C) 40

   (D) 20

11. If A and B be any two sets, then (A $\cap$ B) $\cup$ (A $\cap$ B^c) is

   (A) A

   (B) B

   (C) Universal set

   (D) Null set

12. If $\log_a b + \log_a c = 0$, then

   (A) $b = -c$

   (B) $b = \frac{1}{c}$

   (C) $b = c$

   (D) $b = -\frac{1}{c}$

13. If $^nP_r = 720 \, ^nC_r$, then the value of r is

   (A) 5

   (B) 6

   (C) 4

   (D) 8

14. In how many ways 6 books can be equally distributed among 3 boys?

   (A) 30

   (B) 15

   (C) 90

   (D) 36

15. If α and β be the two roots of the equation $x^2 - 5x + 6 = 0$ and $\alpha > \beta$, then the equation with roots $(\alpha\beta + \alpha + \beta)$ and $(\alpha\beta - \alpha - \beta)$ is

   (A) $x^2 - 12x + 11 = 0$

   (B) $x^2 - 3x + 6 = 0$

   (C) $x^2 - 12x - 12 = 0$

   (D) $x^2 + 12x - 11 = 0$

16. If α and β be the roots of the quadratic equation $x^2 - 2x - 3 = 0$, then the value of $\alpha^3 + \beta^3$ is

   (A) 24

   (B) 22

   (C) –20

   (D) 26

17. If $y = \frac{1}{3 - 2x}$, find $\frac{dy}{dx}$.

   (A) $-\frac{2}{(3-2x)^2}$

   (B) $\frac{1}{(3-2x)^3}$

   (C) $\frac{2}{(3-2x)^2}$

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

18. The cost of producing x units of a product is ₹$300x - 10x^2 + \frac{1}{3}x^3$. Find the marginal cost (in ₹) for 12 units output.

   (A) 204

   (B) 240

   (C) 402

   (D) 420

19. The condition required for maximization of a function $f(x)$ is

(A) $f'(x) = 0, f''(x) = 0$

(B) $f'(x) = 0, f''(x) < 0$

(C) $f'(x) = 0, f''(x) > 0$

(D) $f'(x) < 0, f''(x) < 0$

20. If $\left(\dfrac{a}{b}\right)^{x-1} = \left(\dfrac{b}{a}\right)^{x-3}$, then the value of x is

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

(B) 1

(C) $\dfrac{7}{2}$

(D) 2

SECTION II: FUNDAMENTALS OF BUSINESS STATISTICS (*60 marks*)

21. In Pie diagram, 1% is equivalent to

(A) 3°

(B) 4°

(C) 3·6°

(D) 2·6°

22. Data collected on religion from the census reports are

(A) Primary data

(B) Secondary data

(C) Attribute data

(D) Both Primary and Secondary data

23. A variable which can take any value in a specified interval on a real line is called

(A) continuous variable

(B) discrete variable

(C) non-measurable variable

(D) attribute

24. The frequency density of a class and total frequency of a group frequency distribution with equal class width are 17 and 204 respectively. The width of a class is

(A) 8

(B) 10

(C) 9.5

(D) 12

25. If the mean of 7, $(n + 3)$, 10, $(n - 3)$ and $(n - 5)$ is 15, what will be the value of n?

(A) 19

(B) 20

(C) 16

(D) 21

26. The median of the numbers 21, 12, 49, 37, 88, 46, 74, 63, 55 is

(A) 49

(B) 88

(C) 12

(D) 74

27. The quartile deviation of the numbers 18, 12, 22, 15, 30, 5, 44 is

(A) 12

(B) 9

(C) 7

(D) 5

28. Given $n = 10$, $\sum x = 120, \sum x^2 = 1690$. The standard deviation is

(A) 8

(B) 6

(C) 5

(D) 7

29. If the means of sample 1 and sample 2 be 20 and 50 respectively and the mean of the combined sample be 30, find the percentage of observations in sample 1.

(A) 66.67%

(B) 33.33%

(C) 50%

(D) Can not be determined

30. For a frequency distribution, C.V. = 4% and S.D. = 6 and coefficient of skewness = 1.5, the mode of the distribution is

(A) 132

(B) 147

(C) 153

(D) 141

31. If $2y - 6x = 6$ and mode of x is 21, then what is the mode of y?

(A) 61

(B) 66

(C) 51

(D) 58

32. If $\text{cov}(x, y) = 12, b_{yx} = \dfrac{4}{3}$, then var($x$) is

(A) 9

(B) 16

(C) 3

(D) 4

33. The value of rank correlation lies between

(A) 0 and 1

(B) –1 and 1

(C) –1 and 0

(D) it will be equal to 1

34. Find the correlation co-efficient of the following pair of variables (x, y).

x: –3 –1 1 3
y: 9 1 1 9

(A) 0

(B) 1

(C) –1

(D) 0.5

35. If $\sum D^2 = 33$ and $n = 10$, find the rank correlation coefficient.

(A) 0·75

(B) 0.6

(C) 0.5

(D) 0.8

36. Which one of the following statements is true?

(A) Values of both bi-variate regression coefficients can be more than one.

(B) If values of bi-variate regression coefficients are negative, then correlation coefficient is positive.

(C) If values of bi-variate regression coefficients are positive, then correlation coefficient is positive.

(D) Values of bi-variate regression coefficients can be of opposite sign.

37. If two regression lines of two variables x and y intersect at a point (4, 5) and $b_{yx} = 2\cdot5$, find the value of y when $x = 6$.

(A) 25

(B) 15

(C) 10

(D) 20

38. If the variables x and y are independent, the correlation coefficient between them is

    (A) 1

    (B) 0

    (C) –1

    (D) ±1

39. If A, B, C are equally likely, mutually exclusive and exhaustive events, then P(A) equals to

    (A) 1

    (B) 0

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

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

40. The probability that a candidate passes in Accountancy and Economics are 0·5 and 0·6 respectively. What is the probability that the candidate passes only one of the two subjects?

    (A) 0.8

    (B) 0.4

    (C) 0.5

    (D) 0.75

41. The probability of getting 52 Sundays in a leap year is

    (A) $\dfrac{1}{7}$

    (B) $\dfrac{2}{7}$

    (C) $\dfrac{5}{7}$

    (D) $\dfrac{6}{7}$

42. If an unbiased coin is tossed 3 times, find the probability of getting at least 2 heads.

    (A) $\dfrac{3}{8}$

    (B) $\dfrac{1}{8}$

    (C) $\dfrac{5}{8}$

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

43. A box contains 5 red and 3 white balls. 2 balls are drawn at random simultaneously from the box. Find the probability of getting two same colour balls.

    (A) $\dfrac{13}{28}$

    (B) $\dfrac{5}{14}$

    (C) $\dfrac{3}{28}$

    (D) $\dfrac{15}{28}$

44. If $P(A) = \dfrac{2}{3}$, $P(B) = \dfrac{1}{2}$ and $P(B|A) = \dfrac{4}{9}$, find P(A|B).

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

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

    (C) $\dfrac{16}{27}$

    (D) $\dfrac{4}{27}$

45. An unbiased coin is tossed thrice. If the first toss gets head, what is the probability of getting only one more head?

(A) 0·8

(B) 0·5

(C) 0·25

(D) 0.4

46. Given $\sum p_0 q_0 = 196$, $\sum p_0 q_1 = 324$, $\sum p_1 q_0 = 256$, $\sum p_1 q_1 = 441$ (p_0, q_0: base price and quantity; p_1, q_1: current price and quantity). Fisher's price index number is

(A) 132·8

(B) 131·4

(C) 132·2

(D) 133·3

47. Delay in the production of a factory due to sudden break down of machine is

(A) secular trend

(B) cyclical variation

(C) seasonal variation

(D) irregular variation

48. Year : 2020 2021 2022 2023 2024
Sales (₹,000) : 5   4·5   6   5·5   5
Find the 3-year moving average for the year 2023.

(A) 5.33

(B) 5.5

(C) 5.16

(D) 5

49. Net monthly income of an employee was ₹ 10,000 per month in 2010. The consumer price index number was 80 in 2010 and became 240 in 2023. Calculate the additional D.A (in ₹) to be paid to the employee if he has to be compensated.

(A) 15,000

(B) 18,000

(C) 20,000

(D) 22,000

50. The price of a commodity in the years 2010 and 2020 were ₹ 40 and ₹ 50 respectively. Find the price relative taking 2010 as base year.

(A) 125

(B) 115

(C) 140

(D) 80

SUBJECT: FUNDAMENTALS OF BUSINESS ECONOMICS AND MANAGEMENT

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

SECTION A: FUNDAMENTALS OF BUSINESS ECONOMICS (70 marks)

51. _____ is the father of Economics.
- (A) Adam Smith
- (B) Alfred Marshall
- (C) Lionel Robbins
- (D) J. R. Hicks

52. According to Economics, means are _____.
- (A) endless
- (B) abundant
- (C) limited
- (D) unlimited

53. A piece of wood becomes a table. It is an example for _____ utility.
- (A) Time
- (B) Place
- (C) Possession
- (D) Form

54. _____ occurs when the price that consumers pay for a product or service is less than the price they are willing to pay.
- (A) Consumer Surplus
- (B) Total Utility
- (C) Marginal Utility
- (D) Market Price

55. Disguised unemployment is primarily traced in the _____ and unorganized sectors of the economy.
- (A) Agricultural sector
- (B) Industrial sector
- (C) Information Technology sector
- (D) Service sector

56. _____ is the second important factor of production.
- (A) Land
- (B) Labour
- (C) Capital
- (D) Organisation

57. In microeconomic theory, the _____ cost of a choice is the value of the best alternative foregone where, given limited resources, a choice needs to be made between several mutually exclusive alternatives.
- (A) opportunity
- (B) explicit
- (C) implicit
- (D) social

58. Which one of the following is not a factor in the market supply of a product?
- (A) Cost of production
- (B) Number of buyers
- (C) Market price of the product
- (D) Price of related products

59. Which of these will have highly inelastic supply?
- (A) Perishable goods
- (B) Consumer durable goods
- (C) Items of elite class consumption
- (D) All of the above

60. In the short-run, price is governed by _____.
- (A) cost of production
- (B) demand and supply forces
- (C) marginal utility
- (D) consumer surplus

61. A/an _____ is a market structure with a single seller or producer that assumes a dominant position in an industry or a sector.
- (A) Oligopoly
- (B) Duopoly
- (C) Monopolistic Competition
- (D) Monopoly

62. A firm can achieve equilibrium when its _____.
- (A) MC = MR
- (B) MC = AC
- (C) MR = AR
- (D) MR = AC

63. The equilibrium of a firm can be divided into _____ types.
- (A) 2
- (B) 3
- (C) 4
- (D) 5

64. In a competitive market, _____ is the price-maker.
- (A) firm
- (B) industry
- (C) consumer
- (D) trade association

65. Skimming pricing is a pricing strategy that sets new product prices _____.
- (A) high
- (B) neither high nor low
- (C) low
- (D) medium

66. _____ competition is a type of market structure where many firms are present in an industry and they produce similar but differentiated products.
- (A) Pure
- (B) Monopolistic
- (C) Perfect
- (D) Oligopolistic

67. _____ in 1926 concluded that, to fully understand microeconomics, it is necessary to leave aside perfect competition and move towards the opposite direction.
- (A) Piero Sraffa
- (B) Adam Smith
- (C) Peter Drucker
- (D) Joan Robinson

68. _____ occurs when a leading firm in a given industry is able to exert enough market influence in the said industry that it can effectively determine the price of goods or services for the entire market.
- (A) Price leadership
- (B) Differential pricing
- (C) Policy pricing
- (D) Skimming pricing

69. A _____ is a form of oligopoly, where only two companies dominate the market.
- (A) Duopoly
- (B) Monopoly
- (C) Monopsony
- (D) All of the above

70. The _____ states that bad money drives good money out of circulation.
- (A) Law of Demand
- (B) Law of Supply
- (C) Gresham's Law
- (D) Law of Self-interest

71. Money Market deals with _____ credit.

(A) medium-term
(B) long-term
(C) short-term
(D) None of the above

72. _____ is the instrument of quantitative credit control.

(A) Open market operations
(B) Credit rationing
(C) Moral suasion
(D) Licensing

73. Which of the following is the oldest system of money?

(A) Barter
(B) Plastic money
(C) Credit money
(D) Gold

74. _____ is a qualitative credit control instrument used by the Central Bank.

(A) Bank rate policy
(B) Rationing of credit
(C) Open market operations
(D) CRR

75. Manipulation in CRR enables the RBI to _____.

(A) influence the lending ability of the commercial banks
(B) check unemployment growth
(C) check poverty
(D) increase GDP

76. Fiscal Policy in India is formulated by the _____.

(A) RBI
(B) SEBI
(C) Finance Ministry
(D) NABARD

77. EXIM bank is authorised to raise loan from the _____.

(A) RBI
(B) Govt. of India
(C) international market
(D) trading activities

78. _____ is the mechanism for flow of funds from the surplus to the deficit units in the economy.

(A) Money Market
(B) Stock Market
(C) Regulated Market
(D) Bullion Market

79. Financial markets are classified into Money Market and _____.

(A) Bullion Market
(B) Capital Market
(C) Stock Market
(D) National Market

80. _____ environment is within the control of the business.

(A) Internal
(B) External
(C) Micro
(D) Macro

81. Select the internal components which influence business decisions.
- (A) Culture
- (B) Mission
- (C) Objectives
- (D) All of the above

82. The term "P" in PESTEL stands for _____.
- (A) Policy
- (B) Political
- (C) Power
- (D) Project

83. The term "W" in SWOT analysis stands for _____.
- (A) Work
- (B) Weather
- (C) Weaknesses
- (D) Will power

84. Opportunities and Threats are related to _____.
- (A) external environment
- (B) internal environment
- (C) micro environment
- (D) None of the above

85. Task environment is also known as _____ environment.
- (A) short-term
- (B) macro
- (C) internal
- (D) long-term

SECTION B: FUNDAMENTALS OF MANAGEMENT (30 marks)

86. There are _____ major functions of management.
- (A) two
- (B) three
- (C) four
- (D) five

87. The concept of Scientific Management has focused mainly on the _____ function.
- (A) sales
- (B) accounting
- (C) production
- (D) finance

88. The non-programmed decisions are mainly taken by the _____.
- (A) top-level management
- (B) middle-level management
- (C) lower-level management
- (D) supervisory-level management

89. _____ involves a system within an organization in which the top, middle, and lower levels of management participate in decision-making.
- (A) Centralisation of Authority
- (B) Delegation of Authority
- (C) Decentralisation of Authority
- (D) Responsibility

90. The first step in the process of staffing is _____.
- (A) procurement of personnel
- (B) development of personnel
- (C) compensation of personnel
- (D) placement of personnel

91. One who receives information in any communication process is known as _____.

    (A) communicator
    (B) sender
    (C) communicatee
    (D) None of the above

92. _____ involves the selection of language in which the message is to be given.

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

93. The Stewardship Theory states that a steward protects and maximises the shareholders' wealth through the firm's _____.

    (A) performance
    (B) production
    (C) profit
    (D) sales

94. Post-control is also known as _____.

    (A) Feedback control
    (B) Concurrent control
    (C) Pre-control
    (D) Feed-forward control

95. Effective _____ increases the interactions among the managers and the subordinates.

    (A) Centralisation of Authority
    (B) Decentralisation of Authority
    (C) Communication
    (D) Delegation of Authority

96. _____ flows from lower-level management to top-level management.

    (A) Authority
    (B) Responsibility
    (C) Centralisation of Authority
    (D) Decentralisation of Authority

97. The managerial function of directing the subordinates towards achievement of the organisational goals is known as _____.

    (A) Planning
    (B) Organizing
    (C) Leadership
    (D) Controlling

98. Encouraging someone to a particular course of action is known as _____.

    (A) Morale
    (B) Motivation
    (C) Communication
    (D) Co-ordination

99. The decision to purchase stationery is a _____ decision.

    (A) policy
    (B) routine
    (C) personal
    (D) non-programmed

100. _____ is an act of choice wherein an executive comes to a conclusion about what must not be done in a given situation.

    (A) Planning
    (B) Organising
    (C) Decision-making
    (D) Controlling