

**SUBJECT: FUNDAMENTALS OF BUSINESS MATHEMATICS AND STATISTICS**

Time Allowed: 1 hour

Full Marks: 100 (2×50)

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

1. The age of two persons are in the ratio 4:3. If the age of the younger person is 8 years less than the other, then the age of the elder person is

- (A) 40
- (B) 32
- (C) 44
- (D) 36

2. If 15 men working 8 hours a day can complete a piece of work in 25 days, find how many days will be taken by 12 men working 10 hours a day to complete it.

- (A) 20
- (B) 30
- (C) 25
- (D) 15

3. Mean proportional between 0.20 and 0.05 is

- (A) 0.1
- (B) 0.2
- (C) 0.3
- (D) 0.12

4. A person deposited ₹ 1,000 in a bank at 4% p.a. simple interest. What will be the amount after 10 years?

- (A) ₹ 1,500
- (B) ₹ 1,400
- (C) ₹ 1,300
- (D) ₹ 1,600

5. A sum of ₹ 10,000 deposited C.I. becomes double after 5 years. After 20 years it will become

- (A) ₹ 1,20,000
- (B) ₹ 2,00,000
- (C) ₹ 1,50,000
- (D) ₹ 1,60,000

6. The 7th term of an A.P. 2, 5, 8, 11, ... is

- (A) 18
- (B) 14
- (C) 20
- (D) 15

7. Find 8th term of the series, 128, 64, 32, ...

- (A)  $\frac{1}{4}$
- (B) -1
- (C)  $-\frac{1}{2}$
- (D) 1

8. A takes 4 hours to cover a distance 80 km and B takes 5 hours to cover the same distance. How much distance would A cover more than B in 15 hours?

- (A) 40 km
- (B) 60 km
- (C) 55 km
- (D) 45 km

9. If  $P$  and  $Q$  are two sets then  $P \Delta Q$  is equal to

- (A)  $P \cap Q$
- (B)  $P - Q$
- (C)  $(P - Q) \cup (Q - P)$
- (D)  $(P - Q) \cap (Q - P)$

10. If the sets  $A = \{2, 4, 6\}$ ,  $B = \{2, 3, 5\}$  and  $C = \{1, 2, 5, 6\}$ , then  $A \cup (B \cap C)$  is

- (A)  $\{2, 4, 5, 6\}$
- (B)  $\{2, 5\}$
- (C)  $\{2\}$
- (D)  $\{1, 2, 3, 4, 5, 6\}$

11. If  $3^{2x+4} = 3^{3x}$ , then the value of  $x$  is

- (A) 1
- (B) 2
- (C) 3
- (D) 4

12. If  $\log_{10} 7 = a$ , then  $\log_{10} \frac{1}{70}$  is equal to

- (A)  $\frac{a}{10}$
- (B)  $\frac{1}{10a}$
- (C)  $-(1 + a)$
- (D)  $(1 + a)^{-1}$

13. If  $\log_2 (\log_3 (\log_2 x)) = 1$ , find the value of  $x$ .

- (A) 512
- (B) 624
- (C) 484
- (D) 496

14. If  ${}^{10}P_r$  is 720, then the value of  $r$  is

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

15. In how many ways can the colours of the rainbow be arranged so that the red and blue colours are always separated?

- (A) 3000
- (B) 4000
- (C) 4200
- (D) 3600

16. There are 7 questions in an examination, out of which 2 are difficult. In how many ways a student can select 4 questions so that 2 difficult questions are included?

- (A) 5
- (B) 10
- (C) 35
- (D) 20

17. The roots of the equation  $x^2 - 5x + 6 = 0$  are

- (A) (6, -1)
- (B) (-2, 3)
- (C) (1, -6)
- (D) (2, 3)

18. If the sum of two roots of the quadratic equation  $(a+1)x^2 + (2a+3)x + (3a+7) = 0$  be -1, then the value of  $a$  is

- (A) 0
- (B) 1
- (C) -2
- (D) -3

19. If  $y = xe^x$ , then  $\frac{dy}{dx}$  is

- (A)  $e^x$
- (B)  $(x+1)e^x$
- (C)  $x + e^x$
- (D)  $1 + e^x$

20. If  $C(x)$  and  $R(x)$  be the cost function and the revenue function respectively, the break-even point can be found out when ( $x$  being the output)

- (A)  $C(x) = R(x)$
- (B)  $C(x) > R(x)$
- (C)  $C(x) < R(x)$
- (D)  $R(x) = 0$

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

21. Fill in the gap : The \_\_\_\_\_ of a class is the frequency obtained by adding the frequencies of all classes preceding the given class.

- (A) relative frequency
- (B) cumulative frequency (greater than)
- (C) average frequency
- (D) cumulative frequency (less than)

22. The numbers of Science, Arts and Commerce graduates in a company are 30, 70 and 50 respectively. If these figures are represented by a pie-chart, then what is the angle corresponding to Science graduates?

- (A)  $36^\circ$
- (B)  $72^\circ$
- (C)  $120^\circ$
- (D)  $168^\circ$

23. The arithmetic mean for the series 2, 3, 5, 7, 9, 4 is

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

24. The median of the data 13, 16, 19, 15, 20, 17 is

- (A) 16.5
- (B) 16
- (C) 15.5
- (D) 17

25. If the mean and median of a certain set of observations be ₹ 26.25 and ₹ 32.50 respectively, then the approximate value of mode is

- (A) ₹ 45.50
- (B) ₹ 44
- (C) ₹ 45
- (D) ₹ 46

26. The sum of deviations of 24 observations measured from 4 is 276. Mean of the observations is

- (A) 12.8
- (B) 15.5
- (C) 12
- (D) 14

27. The A.M. of 100 observations is 40. Later on, it was found that the two observations 52 and 28 were wrongly copied as 44 and 86. Find the correct mean.

- (A) 39.5
- (B) 40.2
- (C) 39.7
- (D) 40.6

28. The mean deviation of the numbers 95, 33, 88, 68, 32, 80, 48, 70 from the median is

- (A) 21
- (B) 24
- (C) 19
- (D) 16



29. For a skewed distribution mean = 100, median = 98.5 and s.d. = 9. Then the coefficient of skewness is

- (A) -0.50
- (B) 0.17
- (C) 0.33
- (D) 0.50

30. If the sum of squares of the deviations of 10 observations taken from mean 50 is 250, then C.V. is

- (A) 10%
- (B) 12%
- (C) 20%
- (D) 15%

31. If  $\text{var}(x) = 6.25$ ,  $\text{var}(y) = 4$  and  $\text{cov}(x, y) = 0.9$ , then the coefficient of correlation between  $x$  and  $y$  is

- (A) 0.25
- (B) 0.18
- (C) 0.32
- (D) 0.29

32. For 10 sets of ranks of two variables  $x$  and  $y$  the sum of squares of differences between the ranks is 30. Find the rank correlation coefficient.

- (A)  $\frac{7}{13}$
- (B)  $\frac{9}{17}$
- (C)  $\frac{5}{7}$
- (D)  $\frac{9}{11}$

33. If the two regression lines corresponding to two variables  $x$  and  $y$  meet at a point (2, 3),  $\text{var}(x) = 4$ ,  $\text{var}(y) = 1$  and correlation coefficient between  $x$  and  $y$  is  $\frac{1}{2}$ , find the estimated value of  $y$  for  $x = 6$ .

- (A) 8
- (B) 10
- (C) 4
- (D) 12

34. If the regression lines are perpendicular to each other, then the correlation coefficient between the variables is

- (A) 0
- (B) -1
- (C) 1
- (D) 0.5

35. Which one of the following statements is TRUE?

- (A) The scatter diagram gives precise degree of correlation.
- (B) The scatter diagram is amenable to further mathematical treatment.
- (C) The scatter diagram is the graphical representation of the relation between two variables.
- (D) All points in a scatter diagram lie on a straight line when the correlation coefficient is zero.

36. The slope of the regression line  $y$  on  $x$  is

- (A)  $b_{xy}$
- (B)  $b_{xx}$
- (C)  $b_{yy}$
- (D)  $b_{yx}$



37. The correlation coefficient between two variables lies between

- (A) 0 and 1
- (B) -1 and 1
- (C) -1 and 0
- (D) 0 and 0.5

38. What is the probability of getting a sum 3 if two dice are thrown together?

- (A)  $\frac{1}{18}$
- (B)  $\frac{1}{9}$
- (C)  $\frac{2}{3}$
- (D)  $\frac{1}{36}$

39. Two unbiased coins are tossed. The probability of getting at most one head is

- (A)  $\frac{1}{2}$
- (B)  $\frac{1}{3}$
- (C)  $\frac{3}{4}$
- (D)  $\frac{1}{6}$

40. The probability of A hitting the target is  $\frac{1}{5}$  and the probability of B not hitting the target is  $\frac{3}{4}$ . The probability of hitting the target is

- (A)  $\frac{3}{5}$
- (B)  $\frac{2}{3}$
- (C)  $\frac{1}{4}$
- (D)  $\frac{2}{5}$

41. Two cards are drawn from a well shuffled pack of cards. The probability of getting two hearts is

- (A)  $\frac{2}{17}$
- (B)  $\frac{1}{17}$
- (C)  $\frac{3}{17}$
- (D)  $\frac{5}{17}$

42. Given  $P(B) = \frac{1}{3}$ ,  $P(AB) = \frac{1}{4}$ , then  $P(A|B)$  is

- (A)  $\frac{1}{2}$
- (B)  $\frac{3}{4}$
- (C)  $\frac{1}{4}$
- (D)  $\frac{1}{3}$

43. The probability of an impossible event is

- (A) -1
- (B) 1
- (C) 0.5
- (D) 0

44. If X and Y be two independent events, then  $P(XY)$  is equal to

- (A)  $P(X)P(Y)$
- (B)  $P(X) + P(Y)$
- (C)  $P(X) - P(Y)$
- (D)  $P(X)/P(Y)$

45. The chances of getting a defective screw from two boxes A and B are  $\frac{1}{5}$  and  $\frac{1}{6}$  respectively. A box is selected at random and a screw is drawn at random from the selected box. It is found to be defective. Find the probability that it came from box A.

- (A)  $\frac{5}{11}$
- (B)  $\frac{2}{11}$
- (C)  $\frac{6}{11}$
- (D)  $\frac{4}{11}$

46. Given  $\sum p_1 q_0 = 162.6$ ,  $\sum p_0 q_0 = 110.4$ ,  $\sum p_1 q_1 = 140.4$ . Find the Laspeyres' price index number.

- (A) 147.28
- (B) 86.34
- (C) 127.17
- (D) 115.81

47. Consider the following:

Year	2001	2002	2003	2004	2005	2006
Annual sales (₹ '0000)	3.6	4.3	4.3	3.4	4.4	5.4

5-year moving average for the year 2004 is

- (A) 3.80
- (B) 4.36
- (C) 4.00
- (D) 4.18

48. Given: Laspeyres' quantity index number = 120.69 and Paasche's quantity index number = 120.62. The Fisher's quantity index number is

- (A) 100.05
- (B) 99.94
- (C) 145.57
- (D) 120.65

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

- (A) 80
- (B) 120
- (C) 125
- (D) 100

50. The component of a time series associated with the "long term increase in sale of TV sets" is

- (A) secular trend
- (B) seasonal variation
- (C) cyclical fluctuation
- (D) irregular component



**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. Human wants are \_\_\_\_\_.  
(A) unlimited  
(B) undefined  
(C) limited  
(D) none of the above
52. If an economy is working at the point to the left of the PPF curve, that indicates \_\_\_\_\_.  
(A) excess production  
(B) unemployment  
(C) full employment  
(D) none of the above
53. Luxury goods have \_\_\_\_\_ degree of elasticity.  
(A) moderate  
(B) low  
(C) high  
(D) none of the above
54. Which one of the following is not a factor in the market supply of a product?  
(A) Number of buyers  
(B) Price of related products  
(C) Cost of production  
(D) Market price of the product
55. \_\_\_\_\_ is the functional relationship between physical inputs and physical outputs.  
(A) Cost Function  
(B) Production Function  
(C) Demand-Supply Function  
(D) Input-Output Function
56. Internal economies and diseconomies arise due to \_\_\_\_\_.  
(A) overall industry-level changes  
(B) changes at the firm level  
(C) both (A) and (B)  
(D) neither (A) nor (B)
57. The labour surplus is the difference between the value of output and the \_\_\_\_\_.  
(A) values of capital used  
(B) values of fixed land used  
(C) values of material used  
(D) none of the above
58. Which of the following is associated with a monopolistic competitive market?  
(A) Single buyer  
(B) Homogeneous product  
(C) Product differentiation  
(D) Few firms
59. In the long run, a firm in perfect competition earns \_\_\_\_\_.  
(A) average profits of the past 5 years  
(B) 12.33% profits on capital employed  
(C) normal profits only  
(D) abnormal profits
60. In a competitive market, \_\_\_\_\_ is the price-maker.  
(A) industry  
(B) trade association  
(C) firm  
(D) consumer

61. When  $MC=MR$ , the firm will get \_\_\_\_\_ profits.  
(A) minimum  
(B) maximum  
(C) zero  
(D) normal
62. The demand curve of a monopoly firm is the \_\_\_\_\_.  
(A) same as its supply curve  
(B) same as its average revenue curve  
(C) same as its demand curve  
(D) none of the above
63. Price rigidity is the feature of \_\_\_\_\_ market.  
(A) Oligopoly  
(B) Duopoly  
(C) Monopoly  
(D) Monopolistic Competitive
64. Average revenue curve is also known as \_\_\_\_\_.  
(A) Supply curve  
(B) Demand curve  
(C) Average cost curve  
(D) None of the above
65. Price discrimination is possible in the \_\_\_\_\_ market only.  
(A) perfectly competitive  
(B) duopoly  
(C) monopoly  
(D) oligopoly
66. The demand for a monopoly product is \_\_\_\_\_ elastic.  
(A) more  
(B) less  
(C) neither more nor less  
(D) sometimes more sometimes less
67. In the short-run, if the price is above the average total cost, in a monopolistic competitive market, the firm makes \_\_\_\_\_.  
(A) losses and exits the market  
(B) quick profits and disappears  
(C) profits and new firms join the market  
(D) profits and bars entry to new firms
68. Which of the following affects the demand for money?  
(A) Rate of interest  
(B) Price level  
(C) Real income  
(D) Both (A) and (C)
69. Optional money is a \_\_\_\_\_.  
(A) non-legal tender money  
(B) legal tender money  
(C) limited legal tender money  
(D) full-bodied money
70. The EXIM Bank of India is wholly-owned by the \_\_\_\_\_.  
(A) Government of India  
(B) RBI  
(C) SBI  
(D) IDBI



71. The RBI checks inflation by \_\_\_\_\_.  
(A) increasing the CRR  
(B) increasing the bank rate  
(C) both (A) and (B)  
(D) none of the above
72. Money market includes \_\_\_\_\_.  
(A) Bills of Exchange  
(B) Treasury Bills  
(C) Government Securities  
(D) All the above
73. Money market is controlled by the \_\_\_\_\_.  
(A) SBI  
(B) RBI  
(C) Government of India  
(D) IDBI
74. Manipulation in CRR enables the RBI to \_\_\_\_\_.  
(A) increase GDP  
(B) check poverty  
(C) check unemployment growth  
(D) influence the lending ability of the commercial banks
75. The IDA is affiliated to the \_\_\_\_\_.  
(A) IMF  
(B) World Bank  
(C) RBI  
(D) Asian Development Bank
76. The ICICI is a \_\_\_\_\_ sector bank.  
(A) private  
(B) public  
(C) joint  
(D) none of the above
77. Special Drawing Right is the special currency issued by the \_\_\_\_\_.  
(A) IDBI  
(B) IMF  
(C) World Bank  
(D) IFCI
78. The macro-business environment does not include \_\_\_\_\_.  
(A) technological environment  
(B) global environment  
(C) economic environment  
(D) marketing intermediaries
79. The term PESTEL does not include \_\_\_\_\_.  
(A) employment factors  
(B) legal factors  
(C) socio-cultural factors  
(D) political factors
80. SWOT analysis does not include \_\_\_\_\_.  
(A) strengths  
(B) workers  
(C) opportunities  
(D) threats



81. \_\_\_\_\_ is not a dimension of the VUCAFU world.

- (A) Volatility
- (B) Uncertainty
- (C) Conformity
- (D) Ambiguity

82. Porter's Five Forces Model does not include \_\_\_\_\_.

- (A) bargaining power of buyers
- (B) new entrants
- (C) bargaining power of suppliers
- (D) bargaining power of workers

83. The internal business environment does not include \_\_\_\_\_.

- (A) role of competitors
- (B) management structure
- (C) business philosophy
- (D) capital structure

84. Economic environment includes \_\_\_\_\_.

- (A) money market
- (B) labour market
- (C) availability of raw materials
- (D) all the above

85. Which of the following institutions has been pivotal to the emergence of the digital payment ecosystem in India?

- (A) Reserve Bank of India
- (B) National Payments Corporation of India
- (C) State Bank of India
- (D) Industrial Credit and Investment Corporation of India

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

86. "Management is a multi-purpose organ that manages a business and manages managers and manages workers and work". This definition of management was given by \_\_\_\_\_.

- (A) Schulze
- (B) Drucker
- (C) Massie
- (D) Wheeler

87. The idea of 'Management as an Art' focuses on \_\_\_\_\_.

- (A) observation
- (B) individual skill
- (C) cause-effect relationship
- (D) none of the above

88. Leader's stewardship choice can facilitate reciprocal stewardship behaviour from the employee. Who made this observation?

- (A) Jensen & Meckling
- (B) Koontz
- (C) Pearson & Marler
- (D) Clough

89. \_\_\_\_\_ developed the Agency Theory.

- (A) Follett
- (B) Jensen & Fama
- (C) Hicks & Gullet
- (D) Mayo

90. \_\_\_\_\_ is a limitation of planning.

- (A) Goal-orientation
- (B) Rigidity
- (C) Flexibility
- (D) Pervasiveness



91. Which one of the following is off-the-job training?

- (A) Job-rotation
- (B) Role playing
- (C) Apprenticeship
- (D) None of the above

92. Which one of the following is involved in the process of organising?

- (A) Identifying alternatives
- (B) Analysing opportunities
- (C) Forecasting
- (D) Delegation of Authority

93. Which one of the following is the carrier of message sent by one person to another?

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

94. In the entire process of management, coordination must be there from \_\_\_\_\_.

- (A) planning to leadership
- (B) organising to control
- (C) planning to control
- (D) none of the above

95. For the \_\_\_\_\_ executives, decentralisation of authority helps in reduction of the workload.

- (A) top level
- (B) middle level
- (C) lower level
- (D) none of the above

96. \_\_\_\_\_ represents the maximum number of subordinates which can be supervised by a supervisor.

- (A) Scalar Chain
- (B) Unity of Objective
- (C) Unity of Command
- (D) Span of Control

97. The concept of Managerial Grid was developed by \_\_\_\_\_.

- (A) Bernard
- (B) Tannenbaum & Schmidt
- (C) Blake & Mouton
- (D) Fiedler

98. Achievement Motivation model was developed by \_\_\_\_\_.

- (A) McGregor
- (B) McClelland
- (C) Herzberg
- (D) Vroom

99. PERT and CPM are \_\_\_\_\_ techniques.

- (A) Linear Programming
- (B) Network
- (C) Queuing Theory
- (D) Simulation

100. \_\_\_\_\_ level managers take non-programmed decisions.

- (A) Middle
- (B) Top
- (C) Lower
- (D) None of the above