EVERWIN MATRIC. HR. SEC. SCHOOL

STD: XI (E-I) Business Mathematics – One Word Test Marks: 100

Time:1 Hr

1. If $A = \begin{vmatrix} 1 & 2 & 3 \\ 3 & 1 & 2 \\ 2 & 3 & 1 \end{vmatrix}$ then $\begin{vmatrix} 3 & 1 & 2 \\ 1 & 2 & 3 \\ 2 & 3 & 1 \end{vmatrix}$ is:

(a) Δ (b) $-\Delta$ (c) 3Δ (d) -3Δ

2. adj (AB) is equal to:

(a) adjA adjB (b) $\text{adjA}^T\ \text{adjB}^T$ (c) adjB adjA (d) $\text{adjB}^T\ \text{adjA}^T$.

3. For all $n > 0$, $nC_1 + nC_2 + nC_3 + \ldots nC_n$ is equal to:

(a) 2^n (b) $2^n - 1$ (c) n^2 (d) $n^2 - 1$

4. Sum of the binomial coefficients is:

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

5. The focus of the parabola $x^2 = 16y$ is:

(a) (4, 0) (b) (−4, 0) (c) (0, 4) (d) (0, −4)

6. Combined equation of co-ordinate axes is:

(a) $x^2 - y^2 = 0$ (b) $x^2 + y^2 = 0$ (c) $xy = c$ (d) $xy = 0$

7. If $\sin A + \cos A = 1$ then sin2A is equal to:

(a) 1 (b) 2 (c) 0 (d) $\frac{1}{2}$

8. The value of $4\cos^3 40° - 3\cos 40°$ is:

(a) $\frac{\sqrt{3}}{2}$ (b) $-\frac{1}{2}$ (c) $\frac{1}{2}$ (d) $\frac{1}{\sqrt{2}}$

9. If $f(x) = 2^x$ and $g(x) = \frac{1}{2^x}$ then $(fg)(x)$ is:

(a) 1 (b) 0 (c) 4^x (d) $\frac{1}{4^x}$

10. If $f(x) = x^2$ and $g(x) = 2x + 1$ then $(fg)(0)$ is:

(a) 0 (b) 2 (c) 1 (d) 4

11. Average cost is minimum when:

(a) Marginal cost = marginal revenue

(b) Average cost = marginal cost

(c) Average cost = marginal revenue

(d) Average revenue = marginal cost

12. If R = 5000 units / year, C_1 = 20 paise, C_3 = ₹ 20 then EOQ is:

(a) 5000 (b) 100

(c) 1000 (d) 200

13. A person brought a 9% stock of face value ₹ 100, for 100 shares at a discount of 10%, then the stock purchased is:

(a) ₹ 9000 (b) ₹ 6000 (c) ₹ 5000 (d) ₹ 4000

14. Example of contingent annuity is:

(a) Life insurance premium

(b) An endowment fund to give scholarships to a students

(c) Personal loan from a bank

(d) All the above

15. If Q_1 = 30 and Q_3 = 50, the coefficient of quartile deviation is:

(a) 20 (b) 40 (c) 10 (d) 0.25

16. The probability of drawing a spade from a pack of card is:

(a) $\frac{1}{52}$ (b) $\frac{1}{13}$ (c) $\frac{4}{13}$ (d) $\frac{1}{4}$

17. The variable whose value is influenced or is to be predicted is called:

(a) dependent variable (b) independent variable

(c) regressor (d) explanatory variable

18. If regression co-efficient of Y on X is 2, then the regression co-efficient of X on Y is:

(a) $\leq \frac{1}{2}$ (b) 2 (c) $> \frac{1}{2}$ (d) 1

19. The minimum value of the objective function $z = x + 3y$ subject to the constraints $2x + y \leq 20, x + 2y \leq 20, x > 0$ and $y > 0$ is:

(a) 10 (b) 20 (c) 0 (d) 5

20. The objective of network analysis is to:

(a) Minimize total project cost

(b) Minimize total project duration

(c) Minimize production delays, interruption and conflicts

(d) All the above.

21. The value of x if $\begin{vmatrix} 0 & 1 & 0 \\ x & 2 & x \\ 1 & 3 & x \end{vmatrix} = 0$ is:

(a) 0, –1 (b) 0, 1 (c) –1, 1 (d) –1, –1

22. If $A = \begin{pmatrix} a & b \\ c & d \end{pmatrix}$ such that $ad - bc \neq 0$:

(a) $\frac{1}{ad-bc}\begin{pmatrix} d & b \\ -c & a \end{pmatrix}$ (b) $\frac{1}{ad-bc}\begin{pmatrix} d & b \\ c & a \end{pmatrix}$

(c) $\frac{1}{ad-bc}\begin{pmatrix} d & -b \\ -c & a \end{pmatrix}$ (d) $\frac{1}{ad-bc}\begin{pmatrix} d & -b \\ c & a \end{pmatrix}$

23. The possible out comes when a coin is tossed five times:

(a) 2^5 (b) 5^2 (c) 10 (d) $\frac{5}{2}$

24. The number of parallelograms that can be formed from a set of four parallel lines intersecting another set of three parallel lines is:

(a) 18 (b) 12 (c) 9 (d) 6

25. The centre of the circle $x^2 + y^2 - 2x + 2y - 9 = 0$ is:

(a) (1, 1) (b) (-1, –1) (c) (–1, 1) (d) (1, –1)

26. The equation of the circle with centre (3, – 4) and touches the x - axis is:

(a) $(x-3)^2 + (y-4)^2 = 4$ (b) $(x-3)^2 + (y+4)^2 = 16$

(c) $(x-3)^2 + (y-4)^2 = 16$ (d) $x^2 + y^2 = 16$

27. The radian measure of 37° 30' is:

(a) $\frac{5\pi}{24}$ (b) $\frac{3\pi}{24}$ (c) $\frac{7\pi}{24}$ (d) $\frac{9\pi}{24}$

28. If $\tan A = \frac{1}{2}$ and $\tan B = \frac{1}{3}$ then $\tan(2A + B)$ is equal to:

(a) 1 (b) 2 (c) 3 (d) 4

29. A function $f(x)$ is continuous at $x = a$ if $\lim_{x \to a} f(x)$ is equal to:

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

30. If $y = e^{2x}$ then $\frac{d^2y}{dx^2}$ at $x = 0$ is:

(a) 4 (b) 9 (c) 2 (d) 0

31. Instantaneous rate of change of $y = 2x^2 + 5x$ with respect to x at $x = 2$ is:

(a) 4 (b) 5 (c) 13 (d) 9

32. A company begins to earn profit at:

(a) Maximum point (b) Breakeven point

(c) Stationary point (d) Even point

33. The Income on 7% stock at 80 is:

(a) 9% (b) 8.75% (c) 8% (d) 7%

34. If 'a' is the annual payment, 'n' is the number of periods and 'i' is compound interest for ₹ 1 then future amount of the annuity is:

(a) $A = \frac{a}{i}(1+i)[(1+i)^n - 1]$ (b) $A = \frac{a}{i}[(1+i)^n - 1]$

(c) $P = \frac{a}{i}$ (d) $P = \frac{a}{i}(1+i)[1-(1+i)^{-n}]$

35. The mean of the values 11, 12, 13, 14 and 15 is:

(a) 15 (b) 11 (c) 12.5 (d) 13

36. Harmonic mean is better than other means if the data are for:

(a) Speed or rates (b) Heights or lengths

(c) Binary values like 0 and 1 (d) Ratios or proportions

37. The correlation coefficient from the following data N = 25, $\Sigma X = 125$, $\Sigma Y = 100$, $\Sigma X^2 = 650$, $\Sigma Y^2 = 436$, $\Sigma XY = 520$:

(a) 0.667 (b) – 0.006 (c) – 0.667 (d) 0.70

38. The regression coefficient of X on Y:

(a) $b_{xy} = \dfrac{N\Sigma dxdy - (\Sigma dx)(\Sigma dy)}{N\Sigma dy^2 - (\Sigma dy)^2}$

(b) $b_{yx} = \dfrac{N\Sigma dxdy - (\Sigma dx)(\Sigma dy)}{N\Sigma dy^2 - (\Sigma dy)^2}$

(c) $b_{xy} = \dfrac{N\Sigma dxdy - (\Sigma dx)(\Sigma dy)}{N\Sigma dx^2 - (\Sigma dx)^2}$

(d) $b_{xy} = \dfrac{N\Sigma xy - (\Sigma x)(\Sigma y)}{\sqrt{N\Sigma x^2 - (\Sigma x)^2} \times \sqrt{N\Sigma y^2 - (\Sigma y)^2}}$

39. In constructing the network which one of the following statement is false?

(a) Each activity is represented by one and only one arrow. (i.e.,) only one activity can connect any two nodes.

(b) Two activities can be identified by the same head and tail events.

(c) Nodes are numbered to identify an activity uniquely. Tail node (starting point) should be lower than the head node (end point) of an activity.

(d) Arrow should not cross each other.

40. Which of the following is not correct?

(a) Objective that we aim to minimize or minimize.

(b) Constraints that we need to specify.

(c) Decision variables that we need to determine.

(d) Decision variables are to be unrestricted.

41. If $A = \begin{pmatrix} -1 & 2 \\ 1 & -4 \end{pmatrix}$ then A (adj A) is:

(a) $\begin{pmatrix} -4 & -2 \\ -1 & -1 \end{pmatrix}$ (b) $\begin{pmatrix} 4 & -2 \\ -1 & 1 \end{pmatrix}$ (c) $\begin{pmatrix} 2 & 0 \\ 0 & 2 \end{pmatrix}$ (d) $\begin{pmatrix} 0 & 2 \\ 2 & 0 \end{pmatrix}$

42. If A is an invertible matrix of order 2 then det (A^{-1}) be equal to:

(a) det (A) (b) $\dfrac{1}{\det(A)}$ (c) 1 (d) 0

43. The value of n, when $nP_2 = 20$ is:

(a) 3 (b) 6 (c) 5 (d) 4

44. The total number of a digit number which have all different digit is:

(a) 10! (b) 9! (c) $9 \times 9!$ (d) $10 \times 10!$

45. The slope of the line $7x + 5y - 8 = 0$ is:

(a) $\frac{7}{5}$ (b) $-\frac{7}{5}$ (c) $\frac{5}{7}$ (d) $-\frac{5}{7}$

46. The double ordinate passing through the focus is:

(a) focal chord (b) latus rectum (c) directrix (d) axis

47. The value of $\sin 15^\circ \cos 15^\circ$ is:

(a) 1 (b) $\frac{1}{2}$ (c) $\frac{\sqrt{3}}{2}$ (d) $\frac{1}{4}$

48. $\tan\left(\frac{\pi}{4} - x\right)$ is:

(a) $\dfrac{1 + \tan x}{1 - \tan x}$ (b) $\dfrac{1 - \tan x}{1 + \tan x}$ (c) $1 - \tan x$ (d) $1 + \tan x$

49. Which of the following function is neither even nor odd?

(a) $f(x) = x^3 + 5$ (b) $f(x) = x^5$

(c) $f(x) = x^{10}$ (d) $f(x) = x^2$

50. $\lim\limits_{\theta \to 0} \dfrac{\tan\theta}{\theta} =$

(a) 1 (b) ∞ (c) $-\infty$ (d) θ

51. The maximum value of $f(x) = \sin x$ is:

(a) 1 (b) $\frac{\sqrt{3}}{2}$ (c) $\frac{1}{\sqrt{2}}$ (d) $\frac{-1}{\sqrt{2}}$

52. If $u = x^3 + 3xy^2 + y^3$ then $\frac{\partial^2 u}{\partial y \partial x}$ is:

(a) 3 (b) 6y (c) 6x (d) 2

53. ₹ 5000 is paid as perpetual annuity every year and the rate of C.I 10%. Then present value P of immediate annuity is:

(a) ₹ 60,000 (b) ₹ 50,000 (c) ₹ 10,000 (d) ₹ 80,000

54. An annuity in which payments are made at the beginning of each payment period is called:

(a) Annuity due (b) An immediate annuity

(c) Perpetual annuity (d) None of these

55. When an observation in the data is zero, then its geometric mean is:

(a) Negative (b) Positive

(c) Zero (d) Cannot be calculated

56. Let a sample space of an experiment be $S = \{E_1, E_2, E_3, \ldots E_n\}$ then $\sum_{i=1}^{n} P(E_i)$ is equal to:

(a) 0 (b) 1 (c) $\frac{1}{2}$ (d) $\frac{1}{3}$

57. The lines of regression of X on Y estimates:

(a) X for a given value of Y (b) Y for a given value of X

(c) X from Y and Y from X (d) None of these

58. If two variables moves in decreasing direction then the correlation is:

(a) positive (b) negative

(c) perfect negative (d) no correlation

59. In a network while numbering the events which one of the following statement is false?

(a) Event numbers should be unique.

(b) Event numbering should be carried out on a sequential basis from left to right.

(c) The initial event is numbered 0 or 1

(d) The head of an arrow should always bear a number lesser than the one assigned at the tail of the arrow.

60. Network problems have advantage in terms of project:

(a) Scheduling (b) Planning (c) Controlling (d) All the above

61. If A is square matrix of order 3 then $|kA|$ is:

(a) $k|A|$ (b) $-k|A|$ (c) $k^3|A|$ (d) $-k^3|A|$

62. Matrix A is of order (2×3), B is of order (3×2), then the order of BA is:

(a) (3×3) (b) (2×2) (c) (6×6) (d) (5×5)

63. If ${}^nC_3 = {}^nC_2$ then the value of ${}^nC_4$ is:

(a) 2 (b) 3 (c) 4 (d) 5

64. If $x! = 24$ then x is:

(a) 4 (b) 3 (c) 4! (d) 1

65. The angle between the pair of straight lines $x^2 - 7xy + 4y^2 = 0$ is:

(a) $\tan^{-1}\left(\frac{1}{3}\right)$ (b) $\tan^{-1}\left(\frac{1}{2}\right)$ (c) $\tan^{-1}\left(\frac{\sqrt{33}}{5}\right)$ (d) $\tan^{-1}\frac{5}{\sqrt{33}}$

66. When $h^2 = ab$ the angle between pair of straight lines $ax^2 + 2hxy + by^2 = 0$ is:

(a) $\frac{\pi}{4}$ (b) $\frac{\pi}{6}$ (c) $\frac{\pi}{2}$ (d) 0°

67. The radian measure of 37° 30′ is:

(a) $\frac{5\pi}{24}$ (b) $\frac{3\pi}{24}$ (c) $\frac{7\pi}{24}$ (d) $\frac{9\pi}{24}$

68. $\sin(90^\circ + \theta)\sec(360^\circ - \theta) =$

(a) $\operatorname{cosec}\theta$ (b) 1 (c) −1 (d) $\cos\theta$

69. Let $f(x) = \begin{cases} x^2 - 4x, & \text{if } x \geq 2 \\ x + 2, & \text{if } x < 2 \end{cases}$ then $f(5)$ is:

(a) -1 (b) 2 (c) 5 (d) 7

70. $\frac{d}{dx}(\log \sec x) =$

(a) $\sec x$ (b) $\frac{1}{\sec x}$ (c) $\tan x$ (d) $\sec x \tan x$

71. Marginal revenue of the demand function $p = 20 - 3x$ is:

(a) $20 - 6x$ (b) $20 - 3x$

(c) $20 + 6x$ (d) $20 + 3x$

72. If $q_1 = 2000 + 8p_1 - p_2$, then $\frac{\partial q_1}{\partial p_1}$ is:

(a) 8 (b) -1 (c) 2000 (d) 0

73. A person brought a 9% stock of face value ₹ 100, for 100 shares at a discount of 10% then the stock purchased is :

(a) ₹ 9000 (b) ₹ 6000 (c) ₹5000 (d) ₹ 4000

74. ₹ 8,100 is invested to purchase a stock at 108. The amount of stock purchased is:

(a) ₹ 7,500 (b) ₹ 6000 (c) ₹ 5000 (d) ₹ 4000

75. Median is same as:

(a) Q_1 (b) Q_2 (c) Q_3 (d) Q_4

76. An urn contains 10 black ball and 10 white balls. The probability of drawing two balls of the same colour is:

(a) $\frac{8}{19}$ (b) $\frac{6}{19}$ (c) $\frac{9}{19}$ (d) $\frac{5}{19}$

77. Correlation co-efficient lies between:

(a) 0 to ∞ (b) -1 to $+1$

(c) -1 to 0 (d) -1 to ∞

78. Example for negative correlation is:

(a) Price and demand

(b) Price and supply

(c) The income expenditure

(d) Rainfall and yield of crops

79. In the context of network, which of the following is not correct?

(a) A network is a graphical representation.

(b) A project network cannot have multiple initial and final nodes.

(c) An arrow diagram is essentially a closed network.

(d) An arrow representing an activity may not have a length and shape.

80. The maximum value of the objective function $Z = 3x + 5y$ subject to the constraints $x > 0, y > 0$ and $2x + 5y \leq 10$ is:

(a) 6 (b) 15

81. Inverse of $\begin{pmatrix} 3 & 1 \\ 5 & 2 \end{pmatrix}$ is:

(a) $\begin{pmatrix} 2 & -1 \\ -5 & 3 \end{pmatrix}$ (b) $\begin{pmatrix} -2 & 5 \\ 1 & -3 \end{pmatrix}$ (c) $\begin{pmatrix} 3 & -1 \\ -5 & -3 \end{pmatrix}$ (d) $\begin{pmatrix} -3 & 5 \\ 1 & -2 \end{pmatrix}$

82. If $A = \begin{vmatrix} 3 & 1 & 4 \\ 2 & 6 & 2 \\ 0 & 2 & -1 \end{vmatrix}$, then cofactor of 0 is:

(a) -22 (b) 22 (c) 6 (d) none

83. The possible out comes when a coin is tossed five times:

(a) 2^5 (b) 5^2 (c) 10 (d) $\frac{5}{2}$

84. The value of $3! + 2! + 1! + 0!$ is:

(a) 10 (b) 6 (c) 7 (d) 9

85. The slope of the line $7x + 5y - 8 = 0$ is:

(a) $\frac{7}{5}$ (b) $-\frac{7}{5}$ (c) $\frac{5}{7}$ (d) $-\frac{5}{7}$

86. The slope of a line is -1, then the angle of inclination is:

(a) 135° (b) 120° (c) 180° (d) 15°

87. If $\tan\theta = \frac{1}{\sqrt{5}}$ and θ lies in the first quadrant then $\cos\theta$ is:

(a) $\frac{1}{\sqrt{6}}$ (b) $\frac{-1}{\sqrt{6}}$ (c) $\frac{\sqrt{5}}{\sqrt{6}}$ (d) $\frac{-\sqrt{5}}{\sqrt{6}}$

88. $\sin^{-1}\left(3\frac{x}{2}\right) + \cos^{-1}\left(3\frac{x}{2}\right)$:

(a) $3\frac{\pi}{2}$ (b) $6x$ (c) $3x$ (d) $\frac{\pi}{2}$

89. The minimum value of the function $f(x) = |x|$ is:

(a) 0 (b) -1 (c) $+1$ (d) $-\infty$

90. If $f(x) = \dfrac{x^2 - 36}{x - 6}$, then $f(x)$ is defined for all real values of x except whe is equal to:

(a) 36 (b) 6 (c) 0 (d) none of these

91. If the average revenue of a certain firm is ₹ 50 and its elasticity of demand is 2, then their marginal revenue is:

(a) ₹ 50 (b) ₹ 25 (c) ₹ 100 (d) ₹ 75

92. The maximum value of $f(x) = \cos x$ is:

(a) 0 (b) $\dfrac{\sqrt{3}}{2}$ (c) $\dfrac{1}{2}$ (d) 1

93. Market price of one share of face value 100 available at a discount of 9½% with brokerage ½% is:

(a) ₹ 89 (b) ₹ 90 (c) ₹ 91 (d) ₹ 95

94. Hari invested ₹ 32,400 in 8% stock at 90. Hari's income is:

(a) ₹ 2880 (b) ₹ 3800 (c) ₹ 4800 (d) ₹ 5000

95. If the mean of 1, 2, 3, ..., n is $\dfrac{6n}{11}$; then the value of n is:

(a) 10 (b) 12 (c) 11 (d) 13

96. Two dice are thrown. The probability of getting an odd number on the first die and a multiple of 3 on the other is:

(a) $\dfrac{1}{6}$ (b) $\dfrac{3}{5}$ (c) $\dfrac{5}{6}$ (d) $\dfrac{2}{5}$

97. The lines of regression intersect at the point:

(a) (X, Y) (b) $(\overline{X}, \overline{Y})$

(c) (0, 0) (d) (σ_x, σ_y)

98. If $\Sigma xy = 168$, $\Sigma x^2 = 396$, $\Sigma y^2 = 320$ then r is:

(a) 0.472 (b) 0.427

(c) 0.724 (d) 0.274

99. The minimum value of the objective function $Z = x + 3y$ subject to the constraints $2x + y \leq 20$, $x + 2y \leq 20$, $x > 0$ and $y > 0$ is:

(a) 10 (b) 20

(c) 0 (d) 5

100. In linear programming, diet mix model's main objective is:

(a) minimizing profit on meals

(b) minimizing cost of meal

(c) satisfying nutritional requirement

(d) both (b) and (c)