# FIRST REVISION EXAMINATION – 2023
## BUSINESS MATHS AND STATISTICS

**Class: 11** **Marks: 90**
**Time: 3 Hrs**

## PART – A

**I. Choose the most appropriate answer:** **20 x 1 = 20**

1. The value of $\begin{bmatrix} 2x+y & x & y \\ 2y+z & y & z \\ 2z+x & z & x \end{bmatrix}$ is

(a) xyz (b) x+y+z (c) 2x+2y+2z (d) 0

2. adj(AB) is equal to

(a) adj A adj B (b) adj $A^T$ adj $B^T$ (c) adj B adj A (d) adj $B^T$ adj $A^T$

3. The value of n, when $np_2 = 20$ is

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

4. The possible outcomes when a coin is tossed five times

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

5. The x intercept of the straight line $3x + 2y - 1 = 0$ is

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

6. (1, -2) is the centre of the circle $x^2+y^2+ax+by-4 = 0$ then its radius.

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

7. The degree measure of $\frac{\pi}{8}$ is

(a) 20°60' (b) 22°30' (c) 22°60' (d) 20°30'

8. The value of sin 28° cos 17° + cos 28° sin 17° is

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

9. If $f(x) = \frac{1-x}{1+x}$, $x>1$, then $f(-x)$ =

(a) –f(x) (b) $\frac{1}{f(x)}$ (c) $\frac{-1}{f(x)}$ (d) f(x)

10. The minimum value of the function f(x) = 1x1 is

(a) 0 (b) -1 (c) +1 (d) -∞

11. Average fixed cost of the cost function $c(x) = 2x^3+5x^2-14x+21$ is

(a) $\frac{2}{3}$ (b) $\frac{5}{x}$ (c) $\frac{-14}{x}$ (d) $\frac{21}{x}$

12. The elasticity of demand for the demand function $x = \frac{1}{p}$ is

(a) 0 (b) 1 (c) $\frac{-1}{p}$ (d) ∞

13. A man purchases a stock of Rs. 20,000 of face value Rs. 100 at a premium of 20%, then investment is

(a) Rs. 20,000 (b) Rs. 25,000 (c) Rs. 24,000 (d) Rs. 30,000

14. A invested some money in 10% stock at Rs. 96. If B wants to invest in an equally good 12% stock, he must purchase a stock worth of

(a) Rs. 80 (b) Rs. 115.20 (c) Rs. 120 (d) Rs. 125.40

15. The first quartile is also known as

(a) Median (b) lower quartite (c) mode (d) third decile

16. Probability that atleast one of the events A, B occur

(a) P(A∪B) (b) P(A∩B) (c) $P(A/B)$ (d) A∪B

17. Example for positive correlation is

(a) Income and expenditure (b) Price and demand

(c) Repayment period & EMI (d) Weight and Income

18. Correlation Co-efficient lies between

(a) 0 to ∞ (b) -1 to +1 (c) -1 to 0 (d) -1 to ∞

19. One of the conditions for the activity (i,j) to lie on the critical path is

(a) Ej – Ei = Lj – Li = tij (b) Ei – Ej = Lj – Li = tij

(c) Ej – Ei = Li – Lj = tij (d) Ej – Ei = Lj – Li ≠ tij

20. The critical path analysis, the word CPM mean

(a) Critical path Method (b) Crash project management

(c) Critical project Management (d) Critical Path management

## PART – B

**II. Answer any 7 questions. Question no. 30 is compulsory.** **7x2 = 14**

21. Solve: $\begin{bmatrix} x-1 & x & x-2 \\ 0 & x-2 & x-3 \\ 0 & 0 & x-3 \end{bmatrix} = 0$

22. If each objective type questions having 4 choices, then find the total number of ways of answering the 4 questions.

23. Find the angle between the lines whose slope are $\frac{1}{2}$ and 3

24. Prove that $\frac{\sin(-\theta)\tan(90°-\theta)\sec(180°-\theta)}{\sin(180°+\theta)\cot(360-\theta)cosec(90°-\theta)} = 1$

25. Determine whether the following function is odd or even? $f(x) = x+x^2$

26. Show that the function $f(x) = x^3-3x^2+4x$, $x \in R$ is strictly increasing function on R.

27. Find the market value of 62 shares available at Rs. 132 having the par value of Rs. 100.

28. let $P(A) = \frac{3}{5}$ and $P(B) = \frac{1}{5}$. Find P(A∩B) if A and B are independent events.

29. From the following data calculate the correlation co-efficient: $\sum xy = 120$, $\sum x^2 = 90$, $\sum y^2 = 640$

30. Draw the network for the project whose activities with their relationships are given below: Activities A, D, E can start simultaneously; B, C > A; G, F > D, C; H > E, F.

## PART – C

**Answer any 7 questions. Q. No. 40 is compulsory.** **7x3 = 21**

31. Find the mirror and cofactor of all the elements $\begin{bmatrix} 1 & -2 \\ 4 & 3 \end{bmatrix}$

32. A question paper has two parts namely part A and part B. Each part contains 10 questions. If the student has to choose 8 from part A and 5 from part b, in how many ways can he choose the questions?

33. Show that the straight lines x+y-4 = 0, 3x+2 = 0 and 3x-3y+16 = 0 are concurrent?

34. Find sin 105° + cos 105°

35. If $\lim_{x \to a} \frac{x^9+a^9}{x+a} = \lim_{x \to 3} (x+6)$ then find the values of a.

36. The average cost function associated with producing and marketing x units of an item is given by AC = $2x-11+\frac{50}{x}$, Find the range of values of the output x, for which AC is increasing.

37. A person buys 20 shares of par values of Rs. 10 of a company which pays 9% dividend at such a price that he gets 12% on his money. Find the market value of a share?

38. A die is thrown twice and the sum of the number appearing is observed to be 6. What is the conditional probability that the number 4 has appeared at least once?

39. Calculate rank correlation co-efficient of the following data.

| Subject 1 | 40 | 46 | 54 | 60 | 70 | 80 | 82 | 85 | 87 | 90 | 95 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Subject 2 | 45 | 46 | 50 | 43 | 40 | 75 | 55 | 72 | 65 | 42 | 70 |

40. Draw a network diagram for the project whose activities and their predecessor relationships are given below:

| Activity | A | B | C | D | E | F | G | H | I | J | K |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Predecessor Activity | - | - | - | A | B | B | C | D | F | H, I | F, G |

## PART – IV

**Answer all the questions:**

41. (a) If A = $\begin{pmatrix} 3 & 7 \\ 2 & 5 \end{pmatrix}$ and B = $\begin{pmatrix} 6 & 8 \\ 7 & 9 \end{pmatrix}$ then verify that $(AB)^{-1} = B^{-1} A^{-1}$.

**(OR)**

(b) Using mathematical induction method, P.T. $1+2+3+ \ldots..+n = \frac{n(n+1)}{2}$, $n \in N$

42. (a) The following inter-industry transactions table was constructed for an economy of the year 2016.

| Industry | 1 | 2 | Final consumption | Total output |
|---|---|---|---|---|
| 1 | 500 | 1600 | 400 | 2500 |
| 2 | 1750 | 1600 | 4650 | 8000 |
| Labours | 250 | 4800 | - | - |

construct technology co-efficient matrix showing direct requirements. Does a solution exist for this system.

**(OR)**

(b) A manufacturer produces 80 TV sets at a cost of Rs. 2,20,000 and 125 TV sets at a cost of Rs. 2,87,500. Assuming the cost curve to be linear, find the linear expression of the given information. Also estimate the cost of 95 TV sets.

43. (a) Show that the point (7, -5) lies on the circle $x^2+y^2-6x+4y-12 = 0$ and find the co-ordinates of the other end of the diameter through this point.

**(OR)**

(b) If sin(y+z-x), sin (z+x-y), sin (x+y-z) are in AP, then prove that tan x, tan y and tan z are in A.P.

44. (a) Verify the continuity of the function f(x) given by $f(x) = \begin{cases} 2-x, if\ x < 2 \\ 2+x, if\ x \geq 2 \end{cases}$ at x = 2

**(OR)**

(b) Find the elasticity of supply for the supply function $x = 2P^2 - 5P+12$, P>3

45. (a) The following table gives the annual demand and unit price of 3 items.

| Items | Annual demand (units) | Unit price (Rs.) |
|---|---|---|
| A | 800 | 0.02 |
| B | 400 | 1.00 |
| C | 13,800 | 0.20 |

ordering cost is Rs. 5 per order and annual holding cost is 10% of unit price. Determine the following. i) EOQ in units. ii) Minimum inventory cost iii) EOQ in rupees
iv) EOQ in years of supply v) Number of orders per year.

**(OR)**

(b) Babu sold some Rs. 100 shares at 10% discount and invested his sales proceeds in 15% of Rs. 50 shares at Rs. 33. Had he sold his shares at 10% premium instead of 10% discount, he would have earned Rs. 450 more. Find the number of shares sold by him.

46. (a) The capital of a company is made up of 50,000 preferences shares with a dividend of 16% and 25,000 ordinary shares. The par value of each of preference and ordinary shares is Rs. 10. The company had a total profit of Rs. 1,60,000. If Rs. 20,000 were kept in reserve and Rs. 10,000 in depreciation, what percent of dividend is paid to the ordinary share holders.

**(OR)**

(b) Compute Quartile deviation from the following data.

| CI | 10 – 20 | 20 – 30 | 30 – 40 | 40 – 50 | 50 – 60 | 60 – 70 | 70 – 80 |
|---|---|---|---|---|---|---|---|
| f | 12 | 19 | 5 | 10 | 9 | 6 | 6 |

47. (a) Calculate karl Pearson's co efficient of correlation from the following data.

| X | 6 | 8 | 12 | 15 | 18 | 20 | 24 | 28 | 31 |
|---|---|---|---|---|---|---|---|---|---|
| Y | 10 | 12 | 15 | 15 | 18 | 25 | 22 | 26 | 28 |

**(OR)**

(b) Draw the network and calculate the earliest start time, earliest finish time, latest start time and latest finish time of each activity and determine the critical path of the project and duration to complete the project.

| Jobs | 1 – 2 | 1 – 3 | 2 – 4 | 3 – 4 | 3 – 5 | 4 – 5 | 4 – 6 | 5 – 6 |
|---|---|---|---|---|---|---|---|---|
| Duration | 6 | 5 | 10 | 3 | 4 | 6 | 2 | 9 |

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