



# The Times Secondary School

Dillibazar, Kathmandu

First Terminal Examination – 2076

Grade: - XII

Set – A

Full Marks:-100

Stream: Management (Morning Shift)

Pass Marks:-40

Subject: - Business Math

Time : 3hrs

Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate the full marks.

Attempt all questions.

### Group A (10×2×3 = 60)

- Rewrite the following inequality with absolute value sign  $-4 \leq x \leq -1$
  - If  $x + iy = \frac{a+ib}{a-ib}$ , prove that  $x^2 + y^2 = 1$
- Let  $A = \{1, 2, 3\}$ . Find the relation R in  $A \times A$  satisfying the condition  $x > y$  for all  $(x, y) \in A \times A$ . Find the domain of the relation.
  - In a survey of 500 families, 325 families use filter water and 230 families use boiled water. How many families use both type of water?
- A firm produced 100 calculator sets during its first year. The total number of calculator sets produced at the end of five years is 4500. Assume that the production increases uniformly each year. Estimate the increase in production each year.
  - Insert 5 G.M's between 3 and 192
- Express the complex number  $\frac{3 - \sqrt{-4}}{2 + \sqrt{-1}}$  in the form  $A + iB$ .
  - If  $A = \{0, 2, 4, 6, 8, 10\}$  and  $f: A \rightarrow Q$  be a function defined by  $f(x) = \frac{x}{2}$ . Find the range of f.
- Find the value of x, y and z if  $\begin{pmatrix} x+y & 2y-z \\ 3y+z & z \end{pmatrix} = \begin{pmatrix} 4 & 3 \\ 7 & 1 \end{pmatrix}$
  - The sum of a series in G.P., whose common ratio is 3, is 728 and the last term is 486. Find the first term.
- In how many ways can the letters of the word 'MATHEMATICS' be arranged?
  - In how many ways can a committee of 5 members be selected from 6 men and 5 ladies consisting of 3 men and 2 ladies?
- Construct a  $3 \times 3$  matrix whose element  $a_{ij}$  are given by  $a_{ij} = 2i + 3j$
  - If  $A = \begin{pmatrix} 4 & 2 & -1 \\ 3 & -7 & 1 \end{pmatrix}$  and  $B = \begin{pmatrix} 2 & 3 \\ -3 & 0 \\ -1 & 5 \end{pmatrix}$ , find the products AB and BA. Comment on the result.
- Find the equation of the locus of the point which moves so that it is always equidistant from the points (1,3) and (-2,6).

b. Prove that following three lines are concurrent

$$x+2y=0, 3x-4y-10=0, 5x+3y-7=0.$$

9. a. Using 4 figure log table, evaluate  $\frac{23.1 \times 2.56}{\sqrt[3]{52.89}}$ .

b. Find the upper and lower quartile from the following data.

Income in Rs	400	500	625	700	900	1000
No. of workers	15	20	6	25	9	4

10. a. Compute the mean deviation from mean of the following data

Marks	10	15	20	25	30
No. of students	2	4	6	8	5

b. Compute standard deviation of the following individual series: 35, 52, 53, 56, 58, 52, 50, 51, 49

### Group B (8×5 = 40)

11. Find the sum of the series:  $5+55+555+5555+\dots$  to n terms.

12. Solve the following equations using Cramer's Rule:

$$x + 2y + 3z = 13$$

$$2x + 4y + z = 11$$

$$3x + 2y + 2z = 14$$

13. Prove that  $\begin{vmatrix} a+b+2c & c & c \\ a & c+2a+b & a \\ b & b & a+c+2b \end{vmatrix} = 2(a+b+c)^3$ .

14. Obtain the quartile deviation and coefficient of quartile deviation from the following distribution:

Class	0-10	10-20	20-30	30-40	40-50	50-60
Frequency:	15	18	25	32	19	16

15. Prove that the points A (-2, 6), B (5, 3), C (-1,-11) and D (-8,-8) are the vertices of parallelogram. Is ABCD a rectangle?

16. Find the equation of the line through the point of intersection of  $x + 2y = 5$ ,  $x - 3y = 7$  and passing through the point (0, 0).

17. Calculate mean and standard deviation of the following data

Marks	0-10	10-20	20-30	30-40	40-50
No. of students	7	12	24	10	7

18. Find the value of r when

$$\log\left(1 - \frac{r}{100}\right) = \frac{\log 3843 - \log 55550}{20}$$

**The End**



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### Group A (10×2×3=60)

- Rewrite without using modulus sign:  $|4x + 3| \leq 9$
  - If  $x + iy = \frac{a+ib}{a-ib}$ , prove that  $x^2 + y^2 = 1$
- If  $A = \{a, b, c\}, B = \{b, c\}$  then show that  $A - (A - B) = A \cap B$ .
  - If  $A = \left\{-1, -\frac{1}{2}, 0, \frac{1}{2}, 1, \frac{3}{2}, 2\right\}$  and  $f: A \rightarrow R$  be a function defined by  $f(x) = 2x + 1$ . Find the range of  $f$ .
- In a statistical investigation of 500 families in a certain town, it was found that 40 families had neither a radio nor a TV and 320 families had a radio and 190 a TV. How many families in that group had both radio and TV?
  - How much salary does a man receive in 9<sup>th</sup> years and also find total salary for 9 years if his salary was Rs. 2,000 with an increment of Rs. 200 each year?
- In how many ways can the letters of the word 'COMMERCE' be arranged?
  - A college has 8 good badminton players. A team of 4 has to be sent to a tournament. In how many ways can the team be selected?
- Find  $5AB$ , If  $A = \begin{bmatrix} 2 & 1 \\ -3 & 0 \end{bmatrix}$  and  $B = \begin{bmatrix} 0 & 2 & 3 \\ 1 & -1 & 0 \end{bmatrix}$ .
  - Show that:  $\begin{vmatrix} b-c & b+c & b \\ c-a & c+a & c \\ a-b & a+b & a \end{vmatrix} = 0$ .
- Show that the points A(1,2), B(3,4) and C(-3,-2) are collinear.
  - Construct a  $3 \times 3$  matrix whose element  $a_{ij}$  are given by  $a_{ij} = 2i + 3j$
- Where does the straight line through (3, 4) and (5, 6) intersect y-axis?
  - There are 8 varieties of monkey in a certain zoo. The variety form a G.P. If 4<sup>th</sup> and 6<sup>th</sup> variety consist 54 and 486 monkey respectively, find the number of first and last variety.
- Find the value of  $(1 + i)^4 \left(1 + \frac{1}{i}\right)^4$

- Find the equation of a straight line passing through the point (5, -3) and having slope  $-\frac{3}{4}$ .

- Calculate mean deviation from mean 40,44,54,60,62
  - Using log table, evaluate  $3.142 \times \sqrt{\frac{98.1}{32.2}}$

- Find the standard deviation of the following frequency distribution.

Marks:	10	15	20	25	30
No. of students:	2	4	6	8	5

- What will be the median of a distribution if mean = 30 and mode is 24?

### Group B (8×5 = 40)

- Solve the following equations using Cramer's Rule:

$$9y - 5x = 3$$

$$X + z = 1$$

$$Z + 2y = 2$$

- Find the sum of the series:  $3 + 33 + 333 + 3333 + \dots$  to  $n$  terms.

- Find the value of  $k$ , if the lines  $2x - 3y + k = 0$ ,  $3x - 4y - 13 = 0$  and  $8x - 11y - 33 = 0$  are concurrent.

- Prove that the points A(1,3), B(2,3), C(7,5) and D(6,5) are the vertices of parallelogram. Is ABCD a rectangle?

- Obtain the mean deviation from mean and its coefficient from the following distribution:

Class	0-10	10-20	20-30	30-40	40-50	50-60
Frequency:	8	12	20	40	12	8

- Find the value of  $x$ ,  $340 \times \left(1 + \frac{x}{100}\right)^7 = 621$

$$17. \text{ Prove that: } \begin{vmatrix} 1+a_1 & a_2 & a_3 \\ a_1 & 1+a_2 & a_3 \\ a_1 & a_2 & 1+a_3 \end{vmatrix} = 1 + a_1 + a_2 + a_3$$

- Calculate mean and the standard deviation from the following data

Profit in Rs.	0-10	10-20	20-30	30-40	40-50
No. of shop	8	13	16	8	5

The End