



The Times Secondary School

Dillibazar, Kathmandu

First Terminal Examination – 2076

Grade: - XII

Set – A

Full Marks:-100

Stream: Management (Day 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]

1. a. Rewrite using absolute value sign $-6 < x < 2$
 b. If $x - iy = \frac{2-3i}{2+3i}$ prove that $x^2 + y^2 = 1$
2. a. If $x = 2 - 3i$, $y = 3 + 2i$, find the value of $x^2 + y^2$
 b. 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?
3. a. Find the value of x and y if $(x + y, x - y) = (4, 2)$
 b. Let $A = \{1, 2, 3\}$ and $B = \{3, 4, 5\}$. Find the relation from A to B satisfying the conditions $x + y \leq 5$
4. a. In an A.P., the first term is 1, the last term 50 and the sum is 204. Find the common difference.
 b. Insert 4 A.M.'s between 8 and 43.
5. a. If 3rd and 8th terms of a series in G.P. are 8 and 256 respectively, find the first term, common ratio and the 6th term of the series.
 b. sum to n terms of the series $4 + 44 + 444 + \dots$
6. a. A football stadium has four entrance gates and nine exits. In how many different ways can a man enter and leave the stadium?
 b. How many license plates consisting of 3 different digits can be made out of given integers 1, 2, 3, 4, 5, 6?
7. a. A man has six friends. In how many ways can he invite one or more of them in a dinner?
 b. In how many ways can 6 players be selected from 7 men and 5 ladies consisting of 4 men and 2 ladies?
8. a. If $A = \begin{pmatrix} 1 & 2 \\ 3 & 1 \end{pmatrix}$, show that $A^2 - 2A - 5I = 0$
 b. Using Cramer's rule solve the equations $3x + 5y = 21$ & $2x + 3y = 13$
9. a. Show that the set of points (2,4), (6,4) (6,7) represent the vertices of a right angled triangle.
 b. Find the co-ordinates of a point of trisection of the line joining the points (-5,-5) & (25,10).

10. a. Obtain the equation of the locus of a point which moves so that its distance from x -axis is twice its distance from y -axis.
 b. Obtain the equations of the lines cutting off equal intercepts on the axes and passing through the point (3,8).

Group B [8 ×5 =40]

11. 30 men work 10 hours a day to complete a piece of work in 25 days. How many men will be required to complete a piece of work twice as great in 15 days working 8 hours a day?
12. In a race of one kilometer, Mr X beats Mr. Y by 70 meters, Mr. Y beats Mr. Z by 80 meters. By how much does Mr. X beats Mr. Z?
13. The marked price of a vacuum cleaner is Rs. 5400. What will be the sale price of the vacuum cleaner if 10% VAT was charged after 10% discount on it.
14. An article is sold for Rs 150 at a gain. Had it been sold for Rs. 135 there would have been a loss equal to $\frac{2}{3}$ of the original gain. Find the cost price and the original gain of the object.
15. A, B, C enter into a partnership. A putting in Rs. 2000 for the whole year, B putting Rs 3000 at first and increasing it to Rs 4000 at the end of 4 months while C puts in at first Rs. 4000 but withdraw Rs. 1000 at the end of 9 months. How should they divide a profit of Rs 8475 at the end of a year.?
16. Sukhi and Khusi entered into partnership investing Rs. 10000 and Rs 7500 respectively. They passed an agreement that after charging 6% interest on their respective capitals, the balance of the profit if any should be shared by them in equal ratio. Find the share of each partner if the business makes a profit of Rs 6400.
17. Prove that
$$\begin{vmatrix} a - b - c & 2a & 2a \\ 2b & b - c - a & 2b \\ 2c & 2c & c - a - b \end{vmatrix} = (a+b+c)^3$$
18. Solve the following system of equations by using Cramer's rule
 $2x + 3y = 4$; $4x - z = 5$; $4y + 3z = -5$

Best of Luck



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Attempt all questions.

Group A [10×2×3 =60]

- 1.a. Rewrite without absolute value sign $|3x + 5| \leq 4$
b. Find the value of $(1 + i)^3 - (1 - i)^3$
2. a. If $x = 3 + 2i$, $y = 2-3i$, find the values of x^2+xy+y^2
b. In a factory there are 100 workers, 45 workers operate flat machine while 52 workers operate dial machine . There are 17 workers who can operate both the machine. Find the number of workers who are operating neither of the two machines.
3. a. Find the values of x and y if $(2x-1, -3) = (1, y+3)$
b. Let $A = \{1,2,3\}$ and $B =\{2,3,4\}$. Find the relation from A to B satisfying the condition $x +y > 4$
4. a. Find the sum of the multiple of 4 from 4 to 100 inclusive .
b. A man is appointed on a salary of Rs 3100 per month. He gets an increment of Rs 80 every year. What is his monthly salary in the 10th year?
5. a. Insert 5 G.M. between 3 and 192.
b. Sum to n terms of the series $0.6+ 0.66 + 0.666 + \dots \dots \dots$
6. a. In how many ways can the letters of the word EXAMINATION be arranged?
b. How many license plates consisting of 3 different digits can be made out of given integers 3, 4, 5, 6 ,7?
7. a. From 10 persons in how many ways can a selection of 4 be made when one particular person is always included?
b. A person has 15 friends of whom 10 are relatives . In how many ways can he invite 9 guests so that 5 of them may be relatives?
8. a. If $A = \begin{pmatrix} 2 & 1 \\ 4 & 3 \end{pmatrix}$, show that $A^2-5A+2I = 0$, where I and 0 denotes the identity matrix and the null matrix of order 2.
b. Using Cramer's rule solve the equations $\frac{4}{x} + \frac{5}{y} = 58$ and $\frac{7}{x} + \frac{3}{y} = 67$

9. a. Show that the set of points (-1,0), (3,1) (2,2) and (-2,1) represent the vertices of a parallelogram.
b. In what ratio is the line joining the points (-1,8) and (5,2) divided by the point (3,4)?
- 10.a. Obtain the equation of the locus of a point which moves so that its distance from (2,3) is half the distance from x-axis.
b. Reduce the equation $4x-3y + 24 = 0$ in a) slope intercept form and b) double intercept form.

Group B [8×5=40]

11. 30 men can do a piece of work in 11 days, working 9 hours a day, how many hours a day have 55 men to work in order to finish another work thrice as great in 18 days?
12. If a railway carriage for 640 kg. for a distance of 50 km costs Rs 64. What will be the charge for conveying 750 kg for 125 km , calculating half the rate for the last 25 km?
13. A man bought an article for Rs. 68 and sold it gaining 15% on selling price . If the cost price is increased by 25% and the selling price is increased by 10%, find the total gain.
14. There is a profit of 25% when an article is sold at Rs 120. Find the gain or loss percent if the article is sold at Rs 104.
15. X , Y, Z form a business with capitals Rs 5000, Rs 4500, and Rs 6500 respectively. After 6 months X doubles his capital and after next 3 months Y triples his capital. If the profit at the end of the year amounted to Rs 8300, find the profits obtained by each of X, Y and Z .
16. Three friends Mana , Dhana and Jana have capitals of Rs 5700, Rs 6000 and Rs 6900 invested in a business. The first charge on the profit is 5% interest on the capitals; after this Rs 250 is paid to each of the partners for management and the remainder is divided proportionately between the partners. In a certain year the profit were Rs 4966; what did each partner receive?
17. Prove that $\begin{vmatrix} x & y & z \\ x^2 & y^2 & z^2 \\ yz & zx & xy \end{vmatrix} = (x-y)(y-z)(z-x)(xy+ yz + zx)$
18. Solve the following system of equations by using Cramer's rule
 $x - y - z = -2$; $5x+20z = 30$; $10y - 20z = 10$

Best of Luck