# Sri Raghavendra Tuition Center

### HALF YEARLY QUESTION PAPER - TYPE B

**10th Standard**

**Maths**

Date : 16-12-24

Reg.No. :

Exam Time : 03:00 Hrs

Total Marks : 100

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**Centum Book Available**

## PART - I

14 x 1 = 14

## Multiple Choice Question.

1) If n(A x B) = 6 and A = {1,3} then n(B) is

   (a)  1    (b)  2    (c)  3    (d)  6

2) Graph of a linear equation is a _____

   (a)  straight line    (b)  circle    (c)  parabola    (d)  hyperbola

3) If the ordered pairs (a + 2, 4) and (5, 2a + b) are equal then (a, b) is

   (a)  (2,-2)    (b)  (5,1)    (c)  (2,3)    (d)  (3,-2)

4) $\frac{3y-3}{y} \div \frac{7y-7}{3y^2}$ is

   (a)  $\frac{9y}{7}$    (b)  $\frac{9y^2}{(21y-21)}$    (c)  $\frac{21y^2-42y+21}{3y^2}$    (d)  $\frac{7(y^2-2y+1)}{y^2}$

5) Find the matrix X if $2X + \begin{pmatrix} 1 & 3 \\ 5 & 7 \end{pmatrix} = \begin{pmatrix} 5 & 7 \\ 9 & 5 \end{pmatrix}$

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

6) If △ABC is an isosceles triangle with ∠C = 90º and AC = 5 cm, then AB is

   (a)  2.5 cm    (b)  5 cm    (c)  10 cm    (d)  $5\sqrt{2}$cm

7) If in △ABC, DE || BC, AB = 3.6 cm, AC = 2.4 cm and AD = 2.1 cm then the length of AE is

   (a)  1.4 cm    (b)  1.8 cm    (c)  1.2 cm    (d)  1.05 cm

8) The area of triangle formed by the points (−5, 0), (0, −5) and (5, 0) is

   (a)  0 sq. units    (b)  25 sq. units    (c)  5 sq. units    (d)  none of these

9) The probability of getting a job for a person is $\frac{x}{3}$. If the probability of not getting the job is $\frac{2}{3}$ then the value of x is

   (a)  2    (b)  1    (c)  3    (d)  1.5

10) If a letter is chosen at random from the English alphabets {a, b,...,z}, then the probability that the letter chosen precedes x

    (a)  $\frac{12}{13}$    (b)  $\frac{1}{13}$    (c)  $\frac{23}{26}$    (d)  $\frac{3}{26}$

11) The condition for px² + qx + r = 0 to be a pure quadratic equation is then the second root is _____

    (a)  p = 0    (b)  q = 0    (c)  r = 0    (d)  p = q = 0

12) S and T are points on sides PQ and PR respectively of PQR. If PS = 3 cm, SQ = 6 cm, PT = 5 cm and TR = 10 cm, then QR = _____

    (a)  4ST    (b)  5ST    (c)  3ST    (d)  3QR

13) Find the slope and the y-intercept of the line $3y - \sqrt{3x} + 1 = 0$ is _____

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

14) If the smallest value and co-efficient of range a data are 25 and 0.5 respectively. Then the largest value is _____

(a) 25    (b) 75    (c) 100    (d) 12.5

## PART - II

10 x 2 = 20

## Answer ANY FIVE questions in which Question No.28 is compulsory.

15) If A x B = {(3,2), (3, 4), (5,2), (5, 4)} then find A and B.

16) If B x A = {(-2,3), (-2,4),(0,3), (0,4),(3,3),(3,4)} find A and B.

17) If A = $\begin{bmatrix} 5 & 2 & 2 \\ -\sqrt{17} & 0.7 & \frac{5}{2} \\ 8 & 3 & 1 \end{bmatrix}$ then verify $(A^T)^T = A$

18) Let A = {1, 2, 3, 4,..., 45} and R be the relation defined as "is square of a number" on A. Write R as a subset of A x A. Also, find the domain and range of R.

19) If f(x) = 3x - 2, g(x) = 2x + k and if f o g = f o f, then find the value of k..

20) If a matrix has 16 elements, what are the possible orders it can have?

21) Find the values of x, y and z from the following equations

$\begin{bmatrix} 12 & 3 \\ x & \frac{3}{2} \end{bmatrix} = \begin{bmatrix} y & z \\ 3 & 5 \end{bmatrix}$

22) Find the range and coefficient of range of the following data: 25, 67, 48, 53, 18, 39, 44.

23) A and B are two candidates seeking admission to IIT. The probability that A getting selected is 0.5 and the probability that both A and B getting selected is 0.3. Prove that the probability of B being selected is allmost 0.8.

24) Find the equation of a straight line which has Slope $\frac{-5}{4}$ passing through the point (–1, 2).

25) Two coins are tossed together. What is the probability of getting different faces on the coins?

26) If P(A) = 0.37, P(B).= 0.42, P(A∩B) = 0.09 then find P(AUB).

27) Let f(x) = 2x + 5. If x ≠ 0 then find $\frac{f(x+2)-f(2)}{x}$.

28) Find the standard deviation of first 21 natural numbers.

## PART - III

10 x 5 = 50

## Answer ANY FIVE questions in which Question No. 42 is compulsory.

29) Let A = The set of all natural numbers less than 8, B = The set of all prime numbers less than 8, C = The set of even prime number. Verify that

(A ∩ B) x C = (A x C) ∩ (B x C)

30) Let A = {1,2,3,4} and B = { 2, 5, 8, 11,14} be two sets. Let f: A → B be a function given by f(x) = 3x − 1. Represent this function

(i) by arrow diagram

(ii) in a table form

(iii) as a set of ordered pairs

(iv) in a graphical form

31) If the function f is defined by

$f(x) = \begin{cases} x + 2 & \text{if } x > 1 \\ 2 & \text{if } -1 \le x \le 1 \\ x - 1 & \text{if } -3 < x < -1 \end{cases}$

find the values of

i) f(3)

ii) f(0)

iii) f(-1.5)

iv) f(2) + f(-2)

32) Consider the functions f(x), g(x), h(x) as given below. Show that (f o g) o h = f o (g o h) in each case.

(i) f(x) = x - 1, g(x) = 3x + 1 and h(x) = $x^2$

(ii) f(x) = $x^2$, g(x) = 2x and h(x) = x + 4

(iii) f(x) = x - 4, g(x) = $x^2$ and h(x) = 3x - 5

33) Solve for x, y : $\begin{bmatrix} x^2 \\ y^2 \end{bmatrix} + 2 \begin{bmatrix} -2x \\ -y \end{bmatrix} = \begin{bmatrix} -5 \\ 8 \end{bmatrix}$

34) If $A = \begin{bmatrix} 5 & 2 & 9 \\ 1 & 2 & 8 \end{bmatrix}, B = \begin{bmatrix} 1 & 7 \\ 1 & 2 \\ 5 & -1 \end{bmatrix}$ verify that $(AB)^T = B^T A^T$

35) If A = $\begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$ show that $A^2 - 5A + 7I_2 = 0$

36) Find the area of the quadrilateral formed by the points (8, 6), (5, 11), (-5, 12) and (-4, 3).

37) A bag contains 12 blue balls and x red balls. If one ball is drawn at random (i) what is the probability that it will be a red ball? (ii) If 8 more red balls are put in the bag, and if the probability of drawing a red ball will be twice that of the probability in (i), then find x.

38) Two unbiased dice are rolled once. Find the probability of getting

(i) a doublet (equal numbers on both dice)

(ii) the product as a prime number

(iii) the sum as a prime number

(iv) the sum as 1

39) Three fair coins are tossed together. Find the probability of getting

(i) all heads

(ii) atleast one tail

(iii) at most one head

(iv) at most two tails

40) Given that A = $\begin{bmatrix} 1 & 3 \\ 5 & -1 \end{bmatrix}$, B = $\begin{bmatrix} 1 & -1 & 2 \\ 3 & 5 & 2 \end{bmatrix}$, C = $\begin{bmatrix} 1 & 3 & 2 \\ -4 & 1 & 3 \end{bmatrix}$ verify that A(B + C) = AB + AC.

41) If A = $\begin{bmatrix} a & b \\ c & d \end{bmatrix}$ and I = $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ show that $A^2 - (a + d) A = (bc - ad)I_2$

42) Find the sum to n terms of the series

3 + 33 + 333 + ...to n terms

## PART - IV

2 x 8 = 16

## Answer ALL questions.

43) a)

Construct a $\triangle$PQR in which QR = 5 cm, ∠P = 40° and the median PG from P to QR is 4.4 cm. Find the length of the altitude from P to QR.

**(OR)**

b)

Draw a circle of diameter 6 cm from a point P, which is 8 cm away from its centre. Draw the two tangents PA and PB to the circle and measure their lengths.

44) a)

Draw the graph of y = $x^2$ - 4 and hence solve $x^2 + 1 = 0$

**(OR)**

b)

The following table shows the data about the number of pipes and the time taken to till the same tank.

| No of pipes (x) | 2 | 3 | 6 | 9 |
|---|---|---|---|---|
| Time Taken (in min) (y) | 45 | 30 | 15 | 10 |

Draw the graph for the above data and hence

(i) find the time taken to fill the tank when five pipes are used

(ii) Find the number of pipes when the time is 9 minutes.

**ALL THE BEST**

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**10th Standard**

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Exam Time : 01:30 Hrs

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Total Marks : 50

**EACHER NAME: P.DEEPAK M.Sc.,M.A.,B.Ed.,DCA.,TET-1.,TET-2.,**

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**PART -1**

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7 x 1 = 7

**Multiple Choice Question.**

1) If n(A x B) = 6 and A = {1,3} then n(B) is

   (a) 1    (b) 2    (c) 3    (d) 6

2) Euclid's division lemma states that for positive integers a and b, there exist unique integers q and r such that a = bq + r , where r must satisfy

   (a) 1 < r < b    (b) 0 < r < b    (c) $0 \le r < b$    (d) $0 < r \le b$

3) If (x - 6) is the HCF of $x^2$ - 2x - 24 and $x^2$ - kx - 6 then the value of k is

   (a) 3    (b) 5    (c) 6    (d) 8

4) Graph of a linear equation is a _____

   (a) straight line    (b) circle    (c) parabola    (d) hyperbola

5) The area of triangle formed by the points (−5, 0), (0, −5) and (5, 0) is

   (a) 0 sq. units    (b) 25 sq. units    (c) 5 sq. units    (d) none of these

6) The range of the data 8, 8, 8, 8, 8. . . 8 is

   (a) 0    (b) 1    (c) 8    (d) 3

7) Which of the following is incorrect?

   (a) P(A) > 1    (b) $0 \le P(A) \le 1$    (c) P(ϕ) = 0    (d) P(A) + P($\bar{A}$) = 1

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**PART -2**

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5 x 2 = 10

**Answer ANY FIVE questions in which Question No.18 is compulsory**

8) If A x B = {(3,2), (3, 4), (5,2), (5, 4)} then find A and B.

9) Let f(x) = 2x + 5. If x ≠ 0 then find $\frac{f(x+2)-f(2)}{x}$.

10) Represent the function f(x) =$\sqrt{2x^2 - 5x + 3}$ as a composition of two functions.

11) ' a ' and ' b ' are two positive integers such that $a^b$ x $b^a$ = 800. Find ' a ' and ' b'

12) If a matrix has 16 elements, what are the possible orders it can have?

13) Show that the points (-2, 5), (6, -1) and (2, 2) are collinear

14) prove that $\sqrt{\frac{1+cos\theta}{1-cos\theta}}$ = cosec $\theta$ + cot$\theta$

15) Find the range and coefficient of range of the following data: 25, 67, 48, 53, 18, 39, 44.

16) The range of a set of data is 13.67 and the largest value is 70.08. Find the smallest value.

17) If P(A) = 0.37, P(B).= 0.42, P(A∩B) = 0.09 then find P(AUB).

18) If A = $\begin{bmatrix} 5 & 2 & 2 \\ -\sqrt{17} & 0.7 & \frac{5}{2} \\ 8 & 3 & 1 \end{bmatrix}$ then verify $(A^T)^T = A$

<center>**PART -3**                                     5 x 5 = 25</center>

**Answer ANY FIVE questions in which Question No.29 is compulsory.**

19) Let A = The set of all natural numbers less than 8, B = The set of all prime numbers less than 8, C = The set of even prime number.

Verify that

(A ∩ B) x C = (A x C) ∩ (B x C)

20) A function f: [-5,9] → R is defined as follows:

$f(x) = \begin{bmatrix} 6x + 1 & \text{if } -5 \le x < 2 \\ 5x^2 - 1 & \text{if } 2 \le x < 6 \\ 3x - 4 & \text{if } 6 \le x \le 9 \end{bmatrix}$

Find

i) f(-3) + f(2)

ii) f(7) - f(1)

iii) 2f(4) + f(8)

iv) $\frac{2f(-2) - f(6)}{f(4) + f(-2)}$

21) If f(x) = x², g(x) = 3x and h(x) = x - 2, Prove that (f o g) o h = f o (g o h).

22) Find the sum to n terms of the series 5 + 55 + 555 +...

23) If $A = \begin{bmatrix} 5 & 2 & 9 \\ 1 & 2 & 8 \end{bmatrix}, B = \begin{bmatrix} 1 & 7 \\ 1 & 2 \\ 5 & -1 \end{bmatrix}$ verify that $(AB)^T = B^T A^T$

24) If A = $\begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$ show that $A^2 - 5A + 7I_2 = 0$

25) Find the area of the quadrilateral formed by the points (8, 6), (5, 11), (-5, 12) and (-4, 3).

26) Two ships are sailing in the sea on either sides of a lighthouse as observed from the ships are 30° and 45° respectively. if the lighthouse is 200 m high, find the distance between the two ships. $\left(\sqrt{3} = 1.732\right)$

27) A kite is flying at a height of 75m above the ground, the string attached to the kite is temporarily tied to a point on the ground. The inclination of the string with the ground is 60°.find the length of the string ,assuming that there is no slack in the string.

28) The number of televisions sold in each day of a week are 13, 8, 4, 9, 7, 12, 10. Find its standard deviation.

29) Two unbiased dice are rolled once. Find the probability of getting

(i) a doublet (equal numbers on both dice)

(ii) the product as a prime number

(iii) the sum as a prime number

(iv) the sum as 1

<center>**PART -4**                                     1 x 8 = 8</center>

**Answer ANY ONE question.**

30) a) Draw a circle of diameter 6 cm from a point P, which is 8 cm away from its centre. Draw the two tangents PA and PB to the circle and measure their lengths.

<center>(OR)</center>

b) Draw the graph xy = 24, x, y > 0, Using the graph find,

(i) y when x = 3  and

(ii) x when y = 6.

31) a) Varshika drew 6 circles with different sizes. Draw a graph for the relationship between the diameter and circumference of each circle as shown in the table and use it to find the circumference of a circle when its diameter is 6 cm.

| Diameter ($x$)cm | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Circumference ($y$)cm | 3.1 | 6.2 | 9.3 | 12.4 | 15.5 |

**(OR)**

b) Construct a $\triangle$ABC such that AB = 5.5 cm, $\angle$C = 25º and the altitude from C to AB is 4 cm.

**All The Best**

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