

BOARD OF SECONDARY EDUCATION (TELANGANA)
SUMMATIVE ASSESSMENT – II
TENTH CLASS MATHEMATICS MODEL PAPER
PAPER – I (ENGLISH VERSION)

Time: 2 hrs. 45 mins.

PART – A & B

Maximum Marks: 40

INSTRUCTIONS:

- i) In the time duration of 2 hrs. 45 mins., 15 minutes of time is allotted to read and understand the question paper.
- ii) Answers the questions under PART – A in separate answer book.
- iii) Write the answers to the questions under PART – B on the question paper itself and attach it to the answer book of PART – A.

Time: 2 hrs.

PART – A

Marks: 35

INSTRUCTIONS:

- i) PART – A comprises of three Sections I, II, III.
- ii) All the questions are compulsory.
- iii) There is no overall choice. However, there is an internal choice to the questions under Section – III.

SECTION – I

INSTRUCTIONS:

- i) Answer ALL the questions.
 - ii) Each question carries ONE mark. $7 \times 1 = 7$
1. Find the value of $\frac{1}{2} \{ \log 16 + \log 625 \}$.
 2. How do you say about $A \cap B$, if $A = \{2, 4, 6, 8\}$, $B = \{1, 3, 5, 7\}$.
 3. Find the area of triangle whose vertices $A(0, 5)$, $B(4, 0)$ including origin.
 4. Write the Geometric Progression if $a = 128$, $r = \frac{1}{4}$.
 5. Check whether 0 & -2 are the zeroes of the polynomial $p(x) = 4x^2 + 8x$.
 6. 36 members of Tenth class students are participated in Mathematics quiz competition. If the number of girls is 10 more than the number of boys. Write the equations.
 7. Find two consecutive positive integers, sum of whose squares is 85.

SECTION - II

INSTRUCTIONS:

i) Answer ALL the questions.

ii) Each question carries TWO marks.

6 × 2 = 12

8. If a rectangular play ground breadth is 6 less than its length and half perimeter is 100 m. then find length & breadth.

9. Solve $\frac{4}{x} + x = 5$ ($x \neq 0$).

10. If $5x^2 + 10x + 15$ is divided by $5x + 6$ then remainder is 1? Is it true or false, Justify?

11. Ramya said that area of triangle is '0' whose vertices of a triangle is (7, -2) (5, 1) (3, 4). Justify your answer.

12. Is multiples of 5 from below 100 natural numbers is Arithmetic Progression? Find its sum.

13. Draw Venn Diagram $A - (A \cap B)$.

SECTION - III

INSTRUCTIONS:

i) Answer ALL the questions.

ii) Each question carries FOUR marks.

iii) Each question has Internal Choice.

4 × 4 = 16

14. A) Mid points of a triangle is D (2, 2) E (2, -3) & F (3, 4) then find the vertices of a triangle.

(OR)

B) If sum of 7 terms is 49 & sum of 17 terms is 289 in a Arithmetic Progression, then find the sum of 'n' terms.

15. A) Draw the graph of Linear equations $3x - y = 7$ & $2x + 3y = 1$.

(OR)

B) Draw the graph of the polynomial and find the zeros of $p(x) = x^2 - x - 12$.

16. A) If $(4.7)^x = (0.47)^y = 1000$ then find the value of $\frac{1}{x} - \frac{1}{y}$.

(OR)

B) If the roots are equal in a quadratic equation $ax^2 + (a + b)x + b = 0$ then show that $a = b$.

17. A) The sum of the digits of a two digit number is 8 and the difference between the numbers and that formed by reversing the digits is 18. Find the number.

(OR)

B) If α, β are the zero's of the quadratic polynomial $f(x) = Kx^2 + 4x + 4$ such that $\alpha^2 + \beta^2 = 24$ find the value of K?

INSTRUCTIONS:

- i) Answer ALL the questions.
 ii) Each question carries $\frac{1}{2}$ Mark.
 iii) Answers are to be written in question paper only.
 iv) Marks will not be awarded in any case of any over writing and rewriting or erased answers.
 v) Write the CAPITAL LETTER (A, B, C, D) showing the correct answer for the following questions in the brackets provided against them.

$$10 \times \frac{1}{2} = 5$$

18. If $A = \{1, 4, 9, 16, 25, 36, 49\}$ then set-builder form ()
 A) $\{x^2 : 1 < x < 7\}$ B) $\{x^2 : 1 \leq x \leq 7\}$
 C) $\{x^2 : 1 < x \leq 7\}$ D) $\{x^2 : 1 \leq x < 7\}$
19. 5.2598495417008790016195 is ()
 A) Whole number B) Natural number C) Rational number D) Irrational number
20. A thing is thrown x m/sec initial velocity. Then it goes the highest height $h = \frac{x^2}{20}$ m. If a thing goes the highest height is 20 m then initial velocity is ()
 A) 20 m B) 15 m C) 40 m D) 30 m
21. If $\frac{1}{2}$ is zero of a quadratic polynomial then p = ()
 A) -4 B) $\frac{4}{7}$ C) 12 D) -12
22. Distance between (0, 0) & (sin θ , cos θ) is ()
 A) 0 B) 1 C) sin θ D) cos θ
23. If two lines may be coincident then solutions ()
 A) unique B) not defined C) finite D) infinite
24. Which of the following equation is a linear equation? ()
 A) $x^2 + x + 1$ B) $2x = x + y + 3$ C) $\frac{1}{x} + x = y$ D) None of these
25. If $A \subset B$, A, B are not empty sets. $n(A) = 10$, $n(B) = 12$ then $n(A \cup B) =$ ()
 A) 10 B) 12 C) 22 D) 2
26. One rational number in between $\frac{4}{5}$ & 1 ()
 A) $\frac{7}{10}$ B) 7.5 C) $\frac{6}{10}$ D) $\frac{9}{10}$
27. a, b, c are consecutive natural numbers. Then $2^a, 2^b, 2^c$ is ()
 A) Arithmetic progression B) Geometric progression
 C) A & B D) None

ANSWERS

PART - A

SECTION - I

1. Find the value of $\frac{1}{2} \{ \log 16 + \log 625 \}$.

A: $\frac{1}{2} \{ \log 16 + \log 625 \}$

$\frac{1}{2} \{ \log 16 \times 625 \}$

$\log (16 \times 625)^{\frac{1}{2}} = \log (4^2 \times 25^2)^{\frac{1}{2}}$

$= \log 4 \times 25$

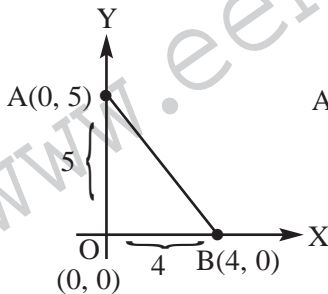
$= \log 100 = \log 10^2 = 2 \times \log 10 = 2 \times 1 = 2$

2. How do you say about $A \cap B$, if $A = \{2, 4, 6, 8\}$, $B = \{1, 3, 5, 7\}$.

A: $A \cap B = \phi$ (A, B are disjoint sets)

3. Find the area of triangle whose vertices A(0, 5), B(4, 0) including origin.

A:



Area of $\Delta OAB = \frac{1}{2} bh$

$= \frac{1}{2} \times 4 \times 5 = 10 \text{ sq. units}$

4. Write the Geometric Progression if $a = 128$, $r = \frac{1}{4}$.

A: $a = 128$, $r = \frac{1}{4}$

Geometric Progression: a, ar, ar^2, ar^3, \dots

$128, 128 \left(\frac{1}{4}\right), 128 \left(\frac{1}{4}\right)^2, 128 \left(\frac{1}{4}\right)^3, \dots$

$128, 64, 32, 16, \dots$

5. Check whether 0 & -2 are the zeroes of the polynomial $p(x) = 4x^2 + 8x$.

A: $f(x) = 4x^2 + 8x$

$f(0) = 4(0)^2 + 8(0) = 0$

$f(-2) = 4(-2)^2 + 8(-2) = 16 - 16 = 0$

$\therefore 0$ & -2 are the zeroes of polynomial $f(x)$

6. 36 members of Tenth class students are participated in Mathematics quiz competition. If the number of girls is 10 more than the number of boys. Write the equations.

A: Let Boys = x , Girls = y

$x + y = 36$ (1)

$y = x + 10$ (2)

7. Find two consecutive positive integers, sum of whose squares is 85.

A: Let Consecutive positive integers = $x, x + 1$

$$x^2 + (x + 1)^2 = 85$$

$$x^2 + x^2 + 1 + 2x - 85 = 0$$

$$2x^2 + 2x - 84 = 0$$

$$x^2 + x - 42 = 0$$

$$\begin{array}{c} \wedge \\ 7 - 6 \end{array}$$

$$x^2 + 7x - 6x - 42 = 0$$

$$\therefore x(x + 7) - 6(x + 7) = 0$$

$$x - 6 = 0$$

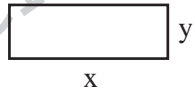
$$\therefore x = 6 \text{ \& } x + 1 = 6 + 1 = 7$$

SECTION - II

8. If a rectangular play ground breadth is 6 less than its length and half perimeter is 100 m. then find length & breadth.

A: Let $l = x, b = y$

$$\therefore y = x - 6$$



$$x + y = 100$$

$$x - 6 = 6$$

$$\frac{2x = 106}{2} \Rightarrow x = \frac{106}{2} = 53$$

$$\therefore y = 47$$

9. Solve $\frac{4}{x} + x = 5$ ($x \neq 0$).

A: $\frac{4}{x} + x = 5$ ($x \neq 0$)

$$\frac{4 + x^2}{x} = 5$$

$$4 + x^2 = 5x \Rightarrow x^2 - 5x + 4 = 0$$

$$\begin{array}{c} \wedge \\ -4 -1 \end{array}$$

$$x^2 - 4x - x + 4 = 0$$

$$x(x - 4) - 1(x - 4) = 0$$

$$(x - 4)(x - 1) = 0$$

$$\therefore x = 4 \text{ or } 1$$

10. If $5x^2 + 10x + 15$ is divided by $5x + 6$ then remainder is 1? Is it true or false, Justify?

A:
$$\begin{array}{r} 5x + 6 \overline{) 5x^2 + 10x + 15} \\ \underline{5x^2 + 6x} \\ 4x + 15 \\ \underline{4x + \frac{24}{5}} \\ \frac{51}{5} \end{array}$$

It is false, because remainder is not 1.

11. Ramya said that area of triangle is '0' whose vertices of a triangle is (7, -2) (5, 1) (3, 4). Justify your answer.

A: A(7, -2) B (5, 1) C (3, 4)

$$\begin{aligned} \text{Area of a triangle} &= \frac{1}{2} \left| x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2) \right| \\ &= \frac{1}{2} \left| 7(1 - 4) + 5(4 + 2) + 3(-2 - 1) \right| \\ &= \frac{1}{2} \left| 7(-3) + 30 - 9 \right| \\ &= \frac{1}{2} \left| -21 + 30 - 9 \right| = \frac{1}{2} \times 0 = 0 \end{aligned}$$

∴ Ramya said that Area of triangle $\neq 0$ is false.

12. Is multiples of 5 from below 100 natural numbers is Arithmetic Progression? Find its sum.

A: 5, 10, 15,, 95 (multiples of 5)

$$a = 5$$

$$d = 10 - 5 = 5$$

$$t_n = a + (n - 1)d$$

$$95 = 5 + (n - 1)5$$

$$95 - 5 = 5n - 5$$

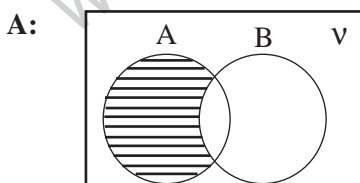
$$5n = 90 + 5$$

$$n = \frac{95}{5} = 19$$

$$\therefore S_n = \frac{n}{2} [a + l]$$

$$= \frac{19}{2} [5 + 95] = \frac{19}{2} \times 100 = 19 \times 50 = 950$$

13. Draw Venn Diagram A - (A ∩ B).



SECTION – III

14. A) Mid points of a triangle is D (2, 2) E (2, -3) & F (3, 4) then find the vertices of a triangle.

A:
$$\begin{matrix} D(2, 2) & E(2, -3) & F(3, 4) \\ x_1 & y_1 & x_2 & y_2 & x_3 & y_3 \end{matrix}$$

$$A = (x_1 + x_2 - x_3, y_1 + y_2 - y_3)$$

$$= (2 + 2 - 3, 2 - 3 - 4) = (1, -5)$$

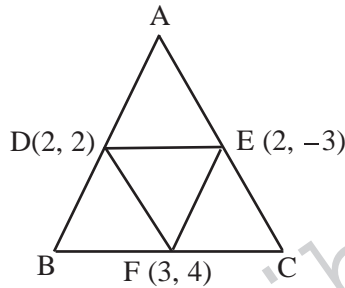
$$B = (x_1 + x_3 - x_2, y_1 + y_3 - y_2)$$

$$= (2 + 3 - 2, 2 + 4 - 3) = (3, 9)$$

$$C = (x_2 + x_3 - x_1, y_2 + y_3 - y_1)$$

$$= (2 + 3 - 2, -3 + 4 - 2) = (3, -1)$$

∴ Vertices of a triangle A(1, -5) B(3, 9) C(3, -1)



(OR)

B) If sum of 7 terms is 49 & sum of 17 terms is 289 in a Arithmetic Progression, then find the sum of 'n' terms.

A:
$$S_n = \frac{n}{2} [2a + (n - 1)d] \quad n = 7, S_n = 49$$

$$49 = \frac{7}{2} [2a + (7 - 1)d]$$

$$98 = 14a + 42d$$

$$7 = a + 3d$$

$$\therefore a + 3d = 7 \dots\dots (1)$$

$$n = 17, S_n = 289$$

$$289 = \frac{17}{2} [2a + (17 - 1)d]$$

$$578 = 34a + 272d$$

$$289 = 17a + 136d$$

$$17 \quad 1a \quad 8d$$

$$\therefore a + 8d = 17 \dots\dots (2)$$

$$(2) - (1)$$

$$a + 8d = 17$$

$$a + 3d = 7$$

$$\begin{array}{r} - \quad - \quad - \\ \hline 5d = 10 \end{array}$$

$$\therefore d = \frac{10}{5} = 2$$

Sub in (1)

$$a + 3(2) = 7$$

$$a = 7 - 6$$

$$a = 1$$

$$S_n = \frac{n}{2} [2a + (n - 1)d]$$

$$= \frac{n}{2} [2(1) + (n - 1)2]$$

$$= \frac{n}{2} [2 + 2n - 2] = \frac{2n^2}{2} = n^2$$

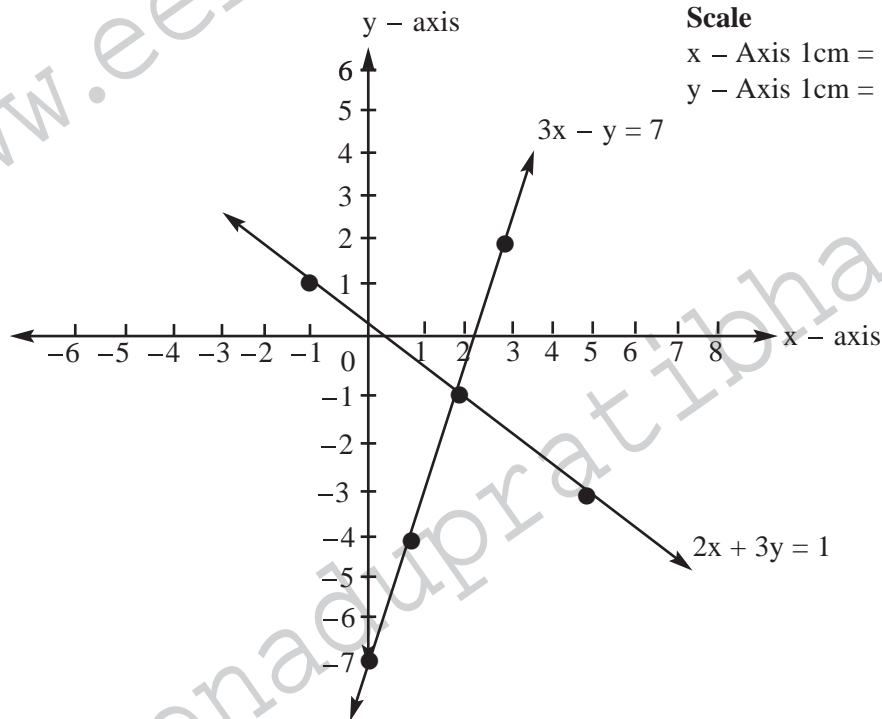
15. A) Draw the graph of Linear equations $3x - y = 7$ & $2x + 3y = 1$.

A: $3x - y = 7$

$2x + 3y = 1$

x	$y = 3x - 7$	(x, y)
0	$y = -7$	(0, -7)
1	$y = -4$	(1, -4)
2	$y = -1$	(2, -1)
3	$y = 2$	(3, 2)

x	$y = \frac{1 - 2x}{3}$	(x, y)
2	$y = -1$	(2, -1)
5	$y = -3$	(5, -3)
-1	$y = 1$	(-1, 1)

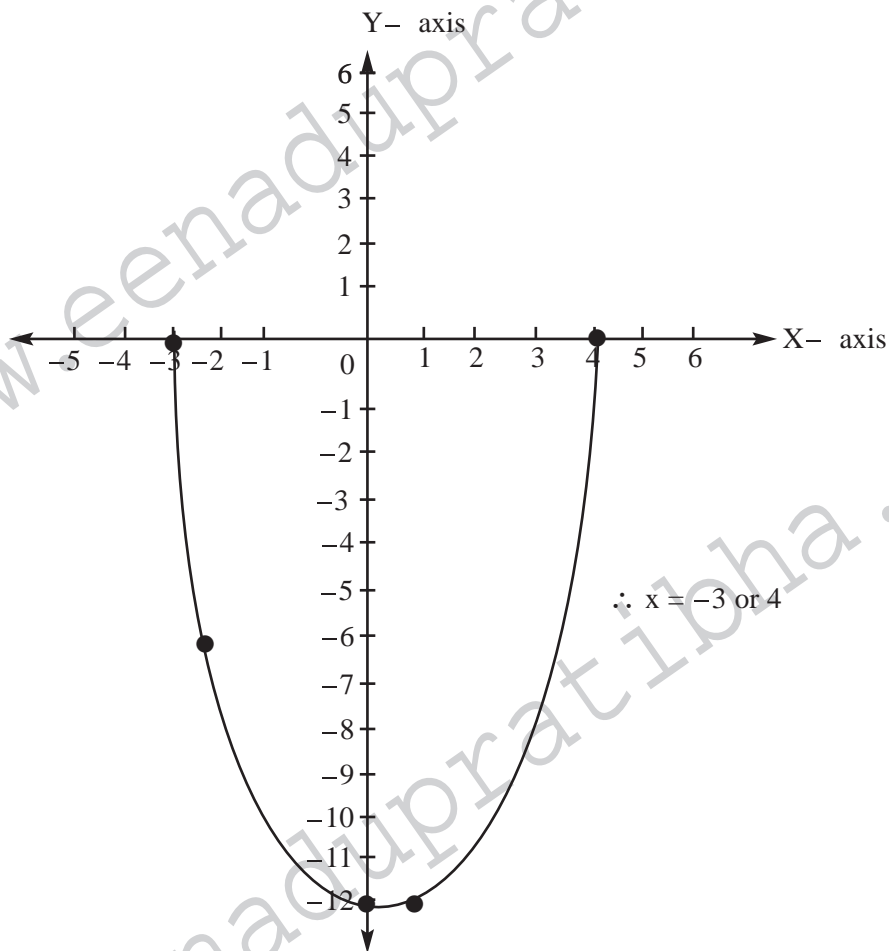


(OR)

B) Draw the graph of the polynomial and find the zeroes of $p(x) = x^2 - x - 12$.

A:

x	0	2	4	-3	-2
x^2	0	4	16	9	4
$-x$	0	-2	-4	+3	+2
-12	-12	-12	-12	-12	-12
$y = p(x)$	-12	-12	0	0	-6
(x, y)	(0, -12)	(2, -12)	(4, 0)	(-3, 0)	(-2, 6)



16. A) If $(4.7)^x = (0.47)^y = 1000$ then find the value of $\frac{1}{x} - \frac{1}{y}$.

A: $(4.7)^x = 10^3$

$\log (4.7)^x = \log 10^3$

$x \log (4.7) = 3 \log 10 = 3 \times 1 = 3$

$\therefore \frac{1}{3} \log (4.7) = \frac{1}{x} \dots\dots\dots (1)$

$(0.47)^y = 10^3$

$$\log (0.47)^y = \log 10^3$$

$$y \cdot \log (0.47) = 3 \log 10 = 3 \times 1 = 3$$

$$\frac{1}{3} \log (0.47) = \frac{1}{y} \dots\dots\dots (2)$$

$$\begin{aligned} \therefore \frac{1}{x} - \frac{1}{y} &= \frac{1}{3} [\log (4.7) - \log (0.47)] \\ &= \frac{1}{3} \log \left[\frac{4.7}{0.47} \right] \\ &= \frac{1}{3} \log \left[\frac{470}{47} \right] \\ &= \frac{1}{3} \times \log_{10} 10 = \frac{1}{3} \times 1 = \frac{1}{3} \end{aligned}$$

(OR)

B) If the roots are equal in a quadratic equation $ax^2 + (a + b)x + b = 0$ then show that $a = b$.

A: (If $ax^2 + (a + b)x + b = 0$ roots are equal then $b^2 - 4ac = 0$)

$$\therefore [a + b]^2 - 4(a)b = 0$$

$$a^2 + b^2 + 2ab - 4ab = 0$$

$$a^2 + b^2 - 2ab = 0$$

$$(a - b)^2 = 0$$

$$\therefore a - b = 0$$

$$\therefore a = b$$

17. A) The sum of the digits of a two digit number is 8 and the difference between the numbers and that formed by reversing the digits is 18. Find the number.

A: Let unit place value = x, 10's place value = y

$$\therefore \text{Number} = 10y + x$$

$$\text{But } x + y = 8 \dots\dots\dots (1)$$

Reversing the digits then number = $10x + y$

\therefore Difference

$$(10y + x) - (10x + y) = 18$$

$$9(y - x) = 18$$

$$y - x = 2 \dots\dots\dots (2)$$

$$(1) + (2)$$

$$x + y = 8$$

$$\frac{-x + y = 2}{\hline}$$

$$2y = 10 \Rightarrow y = \frac{10}{2} = 5$$

$$\therefore x = 3$$

\therefore Number is 35.

(OR)

B) If α, β are the zero's of the quadratic polynomial $f(x) = Kx^2 + 4x + 4$ such that $\alpha^2 + \beta^2 = 24$ find the value of K?

A: $f(x) = Kx^2 + 4x + 4$

$$\alpha + \beta = \frac{-b}{a} = \frac{-4}{K}, \quad \alpha\beta = \frac{c}{a} = \frac{4}{K}$$

But

$$\alpha^2 + \beta^2 = 24$$

$$(\alpha + \beta)^2 - 2\alpha\beta = 24$$

$$\left(\frac{-4}{K}\right)^2 - 2\left(\frac{4}{K}\right) = 24$$

$$\frac{16}{K^2} - \frac{8}{K} = 24$$

$$\frac{16 - 8K}{K^2} = 24$$

$$\Rightarrow 16 - 8K = 24K^2$$

$$24K^2 + 8K - 16 = 0$$

$$3K^2 + K - 2 = 0$$

$$\quad \quad \quad \wedge$$

$$\quad \quad \quad \begin{matrix} 3 & -2 \\ - & + \end{matrix}$$

$$3K^2 + K - 2 = 0$$

$$3K^2 + 3K - 2K - 2 = 0$$

$$3K(K + 1) - 2(K + 1) = 0$$

$$(3K - 2)(K + 1) = 0$$

$$K = \frac{2}{3} \quad K = -1$$

PART - B

ANSWERS

18-B; 19-D; 20-A; 21-B; 22-B; 23-D; 24-B; 25-B; 26-D; 27-B.

Writer: P. Venugopal