

BOARD OF SECONDARY EDUCATION (TELANGANA)
SUMMATIVE ASSESSMENT – II
TENTH CLASS MATHEMATICS MODEL PAPER
PAPER – II (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) Answer 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 Hours

PART – A

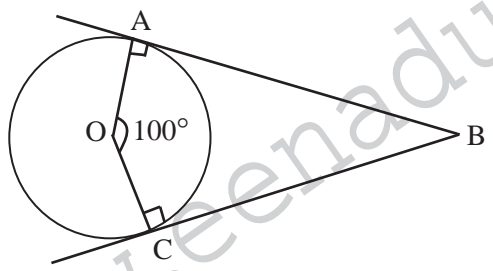
Marks: 35

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. If a side of a rhombus is 5 cm. length of the one diagonal is 6 cm. Then find the another diagonal.
2. Namitha tell that the tangent at any point of a circle is not perpendicular to the radius. Are you accept this argument?
3.  Find the $\angle ABC = ?$
4. Find the value $\cot^2\theta - \frac{1}{\sin^2\theta}$
5. Volume of a cylinder is 1078 cm^3 , area of a base of cylinder is 154 cm^2 . Are you find height of a cylinder.
6. If a number x is chosen its random from the numbers $-3, -2, -1, 0, 1, 2, 3$ what is the probability that $x^2 < 5$?

7. Rakesh said that, if average of a data is 55 & total numbers in that data is 50. Then find the sum of that data. Do you accept? write answer.

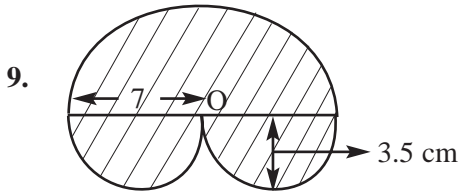
SECTION - II

INSTRUCTIONS:

- i) Answer ALL the questions.
 ii) Each question carries TWO Marks.

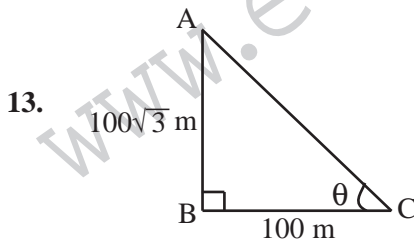
$6 \times 2 = 12$

8. A man goes 6 km towards east and then 8 km towards north. Find the distance between starting point to ending point.



Find the area of the figure.

10. If $\cos\theta + \sin\theta = \sqrt{2} \cos\theta$ then show that $\cos\theta - \sin\theta = \sqrt{2} \sin\theta$.
 11. Cards numbered 1 to 30 are put in a bag. A card is drawn at random from this bag. Find the probability that the numbers on the drawn card is not divisible by 5?
 12. In a frequency distribution table, $l = 24.5$, $h = 4$, $f = 14$, $f_1 = 14$, $f_2 = 15$ then find the mode.



From figure, can we find 'θ'?

SECTION - III

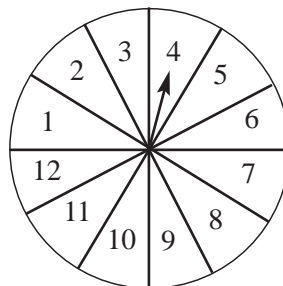
INSTRUCTIONS:

- i) Answer ALL the questions.
 ii) Each question carries FOUR Marks.
 iii) Each question has Internal Choice.

$4 \times 4 = 16$

14. A) A game of chance consists of spinning an arrow which is equally likely to come to rest pointing to one of the numbers 1, 2, 3, ..., 12. What is the probability that it will point to

- i) 7
 ii) an odd number
 iii) A number which is multiple of 4
 iv) A number which is even prime



(OR)

- B) A person, standing on the bank of a river, observed that the angle subtended by a tree on the opposite bank is 60° . When he retreats 30 m from the bank, he find the angle to be 30° . Find the height of the tree and the breadth of the river.

15. A) A paper is in the form of rectangle ABCD in which AB = 13 cm & BC = 7 cm. A semicircular portion with BC as diameter is cutoff. Find the area of remaining part?

(OR)

- B) How many spherical bullets can be made out of solid cube of lead whose edge measures 66 cm, each bullet being 6 cm in diameter.

16. A) Prove that $\frac{\cos A}{1 - \tan A} + \frac{\sin A}{1 - \cot A} = \cos A + \sin A$.

(OR)

- B) Find the Arithmetic mean of a given table.

CI	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60
f	7	10	23	51	6	3

17. A) Construct a triangle whose measures AB = 6 cm, $\angle B = 50^\circ$, $\angle A = 60^\circ$ and construct a triangle similar to a given triangle ABC which its sides equal to $\frac{3}{4}$ th of corresponding sides of ΔABC .

(OR)

- B) Draw a circle of radius 4.5 cm. From a point 10 cm away from its centre, construct the pair of tangents to the circle.

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 $\triangle ABC \sim \triangle DEF$ & $\angle B + \angle F = 130^\circ$ then $\angle A =$ ()
 A) 65° B) 50° C) 60° D) 100°
19. If two chords in a circle subtend an angle 50° in the centre. If one chord length is 3 cm. Then second chord length = ()
 A) 3 cm B) 6 cm C) 1.5 cm D) 5 cm
20. If $\tan A = \cot B$ then $A + B =$ ()
 A) 180° B) 360° C) 45° D) 90°
21. If base area of a cone is 30 cm^2 , height is 10 cm then volume = ()
 A) 100 cm^3 B) 100 cm^2 C) 300 cm^3 D) 300 cm^2
22. If perimeters of a circle and square are equal then ()
 A) Areas are equal B) Area of a square is big
 C) Area of a circle is big D) None of the above
23. Median of a first 10 odd numbers = ()
 A) 11 B) 10 C) 10.5 D) 11.5
24. Which of the following is not a Pythagorean numbers ()
 A) 3, 4, 5 B) 5, 12, 13 C) 9, 12, 15 D) 5, 12, 15
25. If $\sin \theta \times \operatorname{cosec} \theta = x$ then $x + 5 =$ ()
 A) 1 B) 6 C) 5 D) 0
26. If a die is thrown, then the sum of the probability of getting 2 & 3 ()
 A) $\frac{1}{6}$ B) $\frac{1}{2}$ C) $\frac{1}{3}$ D) $\frac{1}{5}$
27. If 17 numbers are arranged in an ascending order then Median of that ()
 A) 9 B) 10 C) 8 D) 11

ANSWERS

PART - A

SECTION - I

1. If a side of a rhombus is 5 cm. length of the one diagonal is 6 cm. Then find the another diagonal.

A: $(AC)d_1 = 6 \text{ cm}$ $AD = 5 \text{ cm}$

$$\therefore AO = \frac{AC}{2} = \frac{6}{2} = 3 \text{ cm}$$

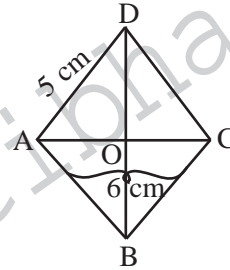
$$AD^2 = AO^2 + OD^2 \quad (\because \Delta AOD \text{ is Right angle triangle})$$

$$5^2 = 3^2 + OD^2$$

$$\Rightarrow OD^2 = 25 - 9$$

$$\therefore OD = \sqrt{16} = 4 \text{ cm}$$

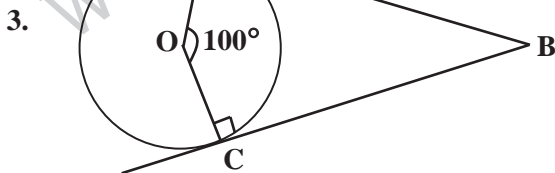
$$\therefore BD = 2 \times OD = 2 \times 4 = 8 \text{ cms}$$



2. Namitha the tell that the tangent at any point of a circle is not perpendicular to the radius. Are you accept this argument?

A: The tangent at any point of a circle is perpendicular to the radius.

\therefore I do not accept the argument of Namitha



Find the $\angle ABC = ?$

A: $\angle ABC + \angle OCB + \angle OAB + \angle AOC = 360^\circ$

$$\angle ABC + 90^\circ + 90^\circ + 100^\circ = 360^\circ$$

$$\therefore \angle ABC = 360^\circ - 280^\circ = 80^\circ$$

4. Find the value $\cot^2\theta - \frac{1}{\sin^2\theta}$

A:
$$\begin{aligned} \cot^2\theta - \frac{1}{\sin^2\theta} &= \cot^2\theta - \operatorname{cosec}^2\theta \\ &= -(\operatorname{cosec}^2\theta - \cot^2\theta) \\ &= -1 \end{aligned}$$

5. Volume of a cylinder is 1078 cm^3 . Area of a base of cylinder is 154 cm^2 . Are you find height of a cylinder.

A: Volume of cylinder $V = \pi r^2 h = 1078 \text{ cm}^3$

$$\text{Area of base cylinder } A = \pi r^2 = 154 \text{ cm}^2$$

$$\therefore \frac{V}{A} = \frac{\pi r^2 h}{\pi r^2} = \frac{1078}{154} = 7 \text{ cm} \quad \therefore h = 7 \text{ cm}$$

6. If a number x is chosen its random from the numbers $-3, -2, -1, 0, 1, 2, 3$ what is the probability that $x^2 < 5$?

A: Numbers which are $x^2 < 5$ is $-2, -1, 0, 1, 2$

Total possibilities = 7

$$\therefore P(x^2 < 5) = \frac{\text{No. of Possibilities}}{\text{Total Possibilities}} = \frac{5}{7}$$

7. Rakesh said that, if average of a data is 55 & total numbers in that data is 50. Then find the sum of that data. Are you accept? write answer.

A: Yes, it is possible to find the sum of that data

$$\therefore \text{Average} = \frac{\text{Sum of the values of observations}}{\text{No. of observations}}$$

$$55 = \frac{\text{Sum}}{50}$$

$$\therefore \text{Sum} = 55 \times 50 = 2750$$

SECTION – II

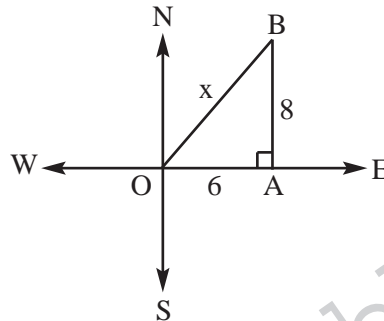
8. A man goes 6 km forwards east and then 8 km forwards north. Find the distance between starting point to ending point.

A: $OB^2 = OA^2 + AB^2$

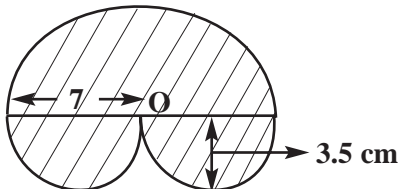
$$= 6^2 + 8^2$$

$$= 36 + 64 = 100$$

$$\therefore OB = X = \sqrt{100} = 10 \text{ km}$$



9.



Find the area of a figure.

A: Area of the bigger semi circle = $\frac{1}{2} \pi r^2$
 $= \frac{1}{2} \times \frac{22}{7} \times 7 \times 7 = 77 \text{ cm}^2$

Radius of each of the smaller circle = 3.5 cm

$$\text{Area of 2 smaller semi circles} = 2 \left[\frac{1}{2} \times \frac{22}{7} \times 3.5 \times 3.5 \right]$$

$$= 38.5 \text{ cm}^2$$

$$\therefore \text{Required area} = 77 + 38.5 = 115.5 \text{ cm}^2$$

10. If $\cos\theta + \sin\theta = \sqrt{2} \cos\theta$ then show that $\cos\theta - \sin\theta = \sqrt{2} \sin\theta$.

A: $\sin\theta + \cos\theta = \sqrt{2} \cos\theta$

$$\sin\theta = \sqrt{2} \cos\theta - \cos\theta = (\sqrt{2} - 1) \cos\theta$$

$$\sin\theta = \frac{(\sqrt{2} - 1)(\sqrt{2} + 1)}{(\sqrt{2} + 1)} \cos\theta \quad (\because \text{on Rationalizing})$$

SECTION – III

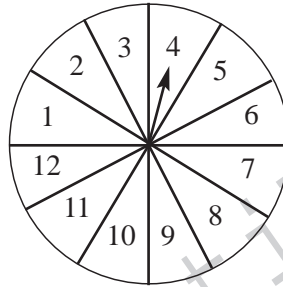
14. A) A game of chance consists of spinning an arrow which is equally likely to come to rest pointing to one of the numbers 1, 2, 3, ..., 12. What is the probability that it will point to

i) 7

ii) an odd number

iii) A number which is multiple of 4

iv) A number which is even prime



Odd numbers = 1, 3, 5, 7, 9, 11

Multiples of 4 = 4, 8, 12

A: Total possibilities = 12

(i) $P(7) = \frac{1}{12}$

(ii) $P(\text{odd}) = \frac{6}{12} = \frac{1}{2}$

(iii) $P(\text{multiples of 4}) = \frac{3}{12} = \frac{1}{4}$

(iii) $P(\text{Even Prime}) = \frac{1}{12}$

(OR)

B) A person, standing on the bank of a river observed that the angle subtended by a tree on the opposite bank is 60°. When he retreats 30 m from the bank, he find the angle to be 30°. Find the height of the tree and the breadth of the river.

A: In ΔABC

$\tan 60^\circ = \frac{h}{x}$

$\sqrt{3} = \frac{h}{x}$

$\therefore h = \sqrt{3}x$ (1)

In ΔABD

$\tan 30^\circ = \frac{h}{x + 30}$

$\frac{1}{\sqrt{3}} = \frac{\sqrt{3}x}{x + 30}$

$\sqrt{3}(\sqrt{3}x) = x + 30$

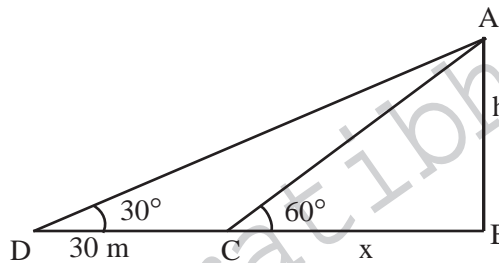
$3x - x = 30$

$2x = 30$

$x = \frac{30}{2} = 15 \text{ m (width of the river)}$

$\therefore h = \sqrt{3}x = 15\sqrt{3} \text{ m} = 15 \times 1.732$

$\therefore \text{Height of the tree} = 25.98 \text{ m}$



15. A) A paper is in the form of rectangle ABCD in which AB = 13 cm & BC = 7 cm. A semicircular portion with BC as diameter is cutoff. Find the area A reaming part?

A: Length of the rectangle ABCD

$$AB = 13 \text{ cm}$$

Breadth of the rectangle ABCD

$$BC = 7 \text{ cm}$$

Area of rectangle ABCD = $l \times b$

$$= 13 \times 7 = 91 \text{ cm}^2$$

Diameter of the semi-circle = BC = 7 cm

$$\text{Radius of the semi circle} = \frac{7}{2} \text{ cm}$$

Area of the semi-circular portion cut of from the

$$\text{rectangle ABCD} = \frac{1}{2} (\pi r^2)$$

$$= \frac{1}{2} \left(\frac{22}{7} \times \frac{7}{2} \times \frac{7}{2} \right) = 19.25 \text{ cm}^2$$

$$\therefore \text{Area of the remaining part} = 91 - 19.25 = 71.75 \text{ cm}^2.$$

(OR)

- B. How many spherical bullets can be made out of solid cube of lead whose edge measures 66 cm, each bullet being 6 cm in diameter.

A: Side of lead cube = 66 cm

$$\text{Radius of spherical ball} = \frac{6}{2} \text{ cm} = 3 \text{ cm}$$

$$\text{Now volume of spherical bullet} = \frac{4}{3} \pi r^3$$

$$= \frac{4}{3} \times \frac{22}{7} \times 3 \times 3 \times 3 \text{ cm}^3$$

$$\therefore \text{Volume of 'x' spherical bullet} = 4 \times \frac{22}{7} \times 3 \times 3 \times x \text{ cm}^3$$

\therefore Volume of x spherical bullets = Volume of lead cube

$$\frac{4}{3} \times \frac{22}{7} \times 3 \times 3 \times x = 66 \times 66 \times 66$$

$$\therefore x = 66 \times 66 \times 66 \times \frac{7}{22} \times \frac{1}{4} \times \frac{1}{3} \times \frac{1}{3}$$

$$\therefore x = 2541.$$

16. A) Prove that $\frac{\cos A}{1 - \tan A} + \frac{\sin A}{1 - \cot A} = \cos A + \sin A$.

A: LHS: $\frac{\cos A}{1 - \tan A} + \frac{\sin A}{1 - \cot A}$

$$= \frac{\cos A}{1 - \frac{\sin A}{\cos A}} + \frac{\sin A}{1 - \frac{\cos A}{\sin A}}$$

$$= \frac{\cos^2 A}{\cos A - \sin A} + \frac{\sin^2 A}{\sin A - \cos A}$$

$$= \frac{\cos^2 A - \sin^2 A}{\cos A - \sin A} = \frac{(\cos A + \sin A)(\cos A - \sin A)}{\cos A - \sin A}$$

$$= \cos A + \sin A \text{ RHS}$$

(OR)

B. Find the Arithmetic mean of a given table.

CI	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60
f	7	10	23	51	6	3

A:

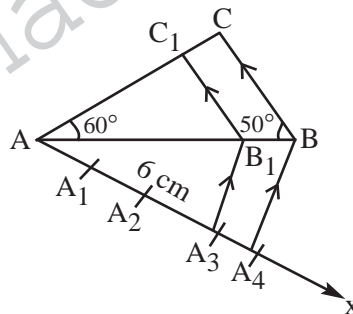
CI	f	x	fx
0 - 10	7	5	35
10 - 20	10	15	150
20 - 30	23	25	575
30 - 40	51	35	1785
40 - 50	6	45	270
50 - 60	3	55	165

$$\Sigma fi = 100 \quad \Sigma fx = 2980$$

$$\therefore AM = \frac{\Sigma fx}{\Sigma f} = \frac{2980}{100} = 29.8$$

17. A) Construct a triangle whose measures $AB = 6 \text{ cm}$, $\angle B = 50^\circ$, $\angle A = 60^\circ$ and construct a triangle similar to a given triangle ABC which its sides equal to $\frac{3}{4}$ of corresponding sides of ΔABC .

A:



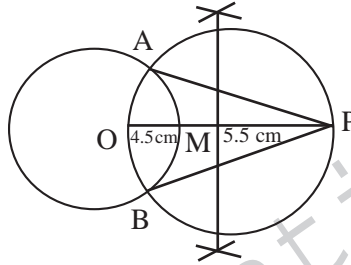
Steps:

- ★ Draw a triangle with $AB = 6 \text{ cm}$, $\angle A = 60^\circ$ & $\angle B = 50^\circ$
- ★ Draw a ray Ax making acute angle with AB on the side opposite to vertex C .
- ★ Locate 4 points A_1, A_2, A_3 & A_4 on Ax , so that $AA_1 = A_1A_2 = A_2A_3 = A_3A_4$.

- ★ Join A_4B and draw a line through A_3 Parallel to A_3B_1 intersecting AB at B_1 .
- ★ Draw a line through B_1 Parallel to BC to intersect AC at C_1 . So ΔAB_1C_1 is the required triangle.

(OR)

- B) Draw a circle of radius 4.5 cm. From a point 10 cm away from its centre, construct the pair of tangents to the circle.



Steps:

- ★ Draw a circle radius 4.5 cm from centre 'O'.
- ★ Take point P which is $OP = 10$ cm
- ★ Draw a perpendicular bisector of it. Let 'M' be the mid point of OP.
- ★ Taking M as centre and PM or MO as radius, draw a circle. Let it intersect the given circle at the points A & B.
- ★ Join PA and PB. Then PA and PB are the required two tangents.

PART – B

ANSWERS

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

Writer: P. Venu Gopal