SPECTRA CLASSES

PRACTICE PAPER CLASS 10TH (2024-25)

MATHEMATICS

Time Allowed : 3hr   **Maximum Marks : 80**

General Instructions:

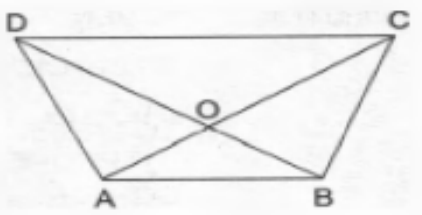Read the following instructions carefully and follow them:

1. This question paper contains 38 questions
2. This question paper is divided into 5 sections A, B, C, D and E.
3. In section A, Questions number 1 - 18 are multiple choice questions (MCQs) and questions number 19 and 20 are Assertion - Reason based questions of 1mark each.
4. In section B, Questions number 21 - 25 are very short answer type questions, carrying 2 marks each.
5. In section C, Questions number 26 - 31 are short answer type questions, caring 3 marks each.
6. In section D, Questions number 32 - 34 are long answer type questions, carrying 4 marks each with sub parts of the values of 1, 1 and 2 marks each respectively.
7. In section D, Questions number 35 - 38 are case study based questions, carrying 5 marks.
8. All Questions are compulsory.
9. Draw neat and clean figures wherever required.
10. Take pie equal to 22/7 wherever required if not stated.
11. Use of calculators is not allowed.

	Section A	
1	If a is a non - zero rational and $\sqrt{b}$ is irrational, then $a\sqrt{b}$ is: a) an integer b) a natural number c) an irrational number d) a rational number	**[1]**
2	The largest number that will divide 398,436 and 542 leaving remainders 7,11 and 15 respectively is (a) 17 (b) 11 (c) 34 (d) 45	**[1]**
3	The zeroes of the polynomial $p(x) = x^2 + 4x + 3$ are given by: a) - 1, 3 b) 1, - 3 c) 1, 3 d) - 1, - 3	**[1]**
4	The pair of linear equations $4x + 6y = 9$ and $2x + 3y = 6$ has a) no solution b) two solutions c) one solution d) many solutions	**[1]**
5	The product of two consecutive integers is 240. The quadratic representation of the above situation is a) $x(x + 1) = 240$ b) $x(x + 1)^2 = 240$ c) $x + (x + 1) = 240$ d) $x^2 + (x + 1) = 240$	**[1]**
6	If $\dfrac{5+9+13+\ldots to\ n\ terms}{7+9+11+\ldots to\ (n+1)\ terms} = \dfrac{17}{16}$ then, n = a) 10 b) 8 c) 7 d) 11	**[1]**
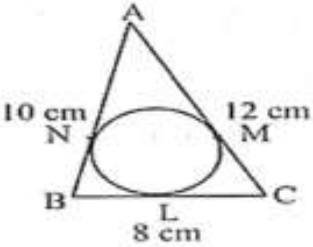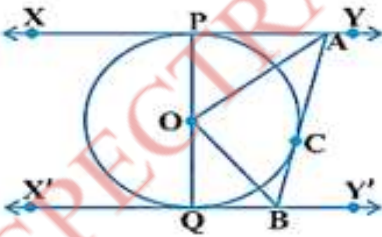
7	If $x \neq y$ and the sequences x, a_1, a_2, y and x, b_1, b_2, y each are in A.P., then $\left(\frac{a_2-a_1}{b_2-b_1}\right)$ is _____.	[1]

a) $\frac{3}{4}$ b) 1   c) $\frac{2}{3}$ d) $\frac{3}{2}$

8	In a$\triangle$ ABC, perpendicular AD from A on BC meets BC at D. If BD = 8 cm, DC = 2 cm and AD = 4 cm, then:	[1]

a) $\triangle$ ABC is right - angled at A.   b) AC = 2 AB

c) $\triangle$ ABC is isosceles   d) $\triangle$ ABC is equilateral

9	In $\triangle ABC$, if DE $\|$ BC, AD = x, DB = x – 2, AE = x + 2 and EC = x – 1, then value of x is	[1]

(a) 3   (b) 4   (c) 5   (d) 3.5

10	The end - points of a diameter of a circle are (2, 4) and (- 3, - 1). The radius of the circle is	[1]

a) $5\sqrt{2}$ b) $2\sqrt{5}$ c) $\frac{5}{2}\sqrt{5}$ d) $\frac{5}{2}\sqrt{2}$

11	If x is a positive integer such that the distance between points P (x, 2) and Q (3, - 6) is 10 units, then x =	[1]

a) 3   b) 9   c) - 9   d) - 3

12	$\cos^4 A - \sin^4 A$ is equal to	[1]

a) $2\sin^2 A - 1$ b) $2\sin^2 A + 1$

c) $2\cos^2 A + 1$ d) $2\cos^2 A - 1$

13	If the area of a sector of a circle is $\frac{1}{8}$ of the area of the circle, then the central angle of the sector is:	[1]

a) 45° b) 90° c) 60° d) 30°

14	A solid consists of a circular cylinder with an exact fitting right circular cone placed at the top. The height of the cone is h. If the total volume of the solid is 3 times the volume of the cone, then the height of the circular cylinder is	[1]

a) 4h   b) 2h   c) h d) $\frac{2h}{3}$

15	Consider the following frequency distribution:	[1]

Class	0-5	6-11	12-17	18-23	24-29
Frequency	13	10	15	8	11

The upper limit of the median class is

a) 18.5   b) 17.5   c) 18   d) 17

| 16	Which of the following is not probability of an event?	[1]
	a) $\frac{1}{13}\%$ b) 52% c) $\frac{1}{0.89}$ d) 0.89	
17	The radii of two concentric circles are 13 cm and 8 cm. AB is a diameter of the bigger circle. BD is a tangent to the smaller circle touching it at D. Find the length AD. a) 20 cm b) $\sqrt{105}$ cm c) 19 cm d) 16 cm	[1]
18	The length of the tangent from an external point A to a circle, of radius 3 cm, is 4 cm. The distance of A from the centre of the circle is: a) 7 cm b) 5 cm c) 25 cm d) $\sqrt{7}$ cm	[1]
19	Directions : In the following questions, a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as: (a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A). (b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A). (c) Assertion (A) is true but reason (R) is false. (d) Assertion (A) is false but reason (R) is true. Assertion : $x^2 + 7x + 12$ has no real zeroes. Reason: A quadratic polynomial can have at the most two zeroes.	[1]
20	Directions : In the following questions, a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as: (a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A). (b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A). (c) Assertion (A) is true but reason (R) is false. (d) Assertion (A) is false but reason (R) is true. Assertion (A): The point (0, 4) lies on y-axis. Reason (R): The x-coordinate on the point on y-axis is zero.	[1]
	Section B	
21	Two tanks contain 504 and 735 liters of milk. Find the capacity of a container which can measure the milk of either tank in exact number of times.	[2]
22	In the given figure, ABCD is a trapezium in which AB||DC and its diagonals intersect at O. If AO = (3x - 1) cm, OC = (5x - 3) cm, BO = (2x + 1) cm and OD = (6x - 5) cm, find the value of x. 	[2]

23	Prove that: $\dfrac{1}{cosec\theta - cot\theta} - \dfrac{1}{sin\theta} = \dfrac{1}{sin\theta} - \dfrac{1}{cosec\theta + cot\theta}$	[2]
24	The radius and height of a solid right - circular cone are in the ratio of 5 : 12. If its volume is 314 cm^3, find its total surface area. [Take π = 3.14.]	[2]
25	In Fig., a circle is inscribed in a$\triangle$ ABC having sides BC= 8 cm, AB= 10 cm and AC= 12 cm. Find the lengths BL,CM and AN.	[2]
	Section C	
26	Solve 2x +3y = 11 and 2x - 4y =- 24 and hence find the value of 'm' for which y = mx +3.	[3]
27	The product of Ramu's age (in years) five years ago with his age (in years) 9 years later is 15. Find Ramu's present age.	[3]
28	A chord of a circle of radius 30 cm makes an angle of 60° at the centre of the circle. Find the areas of the minor and major segments. [Take π =3.14 and $\sqrt{3}$ = 1.732.]	[3]
29	Find the mean of the following data.	[3]

Class	Less than 20	Less than 40	Less than 60	Less than 80	Less than 100
Frequency	15	37	74	99	120

30	In Figure, XY and X'Y' are two parallel tangents to a circle with centre O and another tangent AB with point of contact C intersects XY at A and X'Y' at B. Prove that $\angle AOB = 90°$.	[3]
31	The angle of elevation of the top of a tower at a point on the level ground is 30°. After walking a distance of 100 m towards the foot of the tower along the horizontal line through the foot of the tower on the same level ground the angle of elevation to the top of the tower is 60°, find the height of the tower.	[3]
	Section D	

32	**Read the following text carefully and answer the questions that follow:**Students of a school thought of planting trees in and around the school to reduce air pollution. It was decided that the number of trees, that each section of each class will plant, will be the same as the class, in which they are studying, e.g., a section of class I will plant 1 tree, a section of class II will plant 2 trees and so on till class XII. There are three sections of each class.	[4]

1. Find total number of trees planted by primary 1 to 5 class students? (1)

2. Find the total number of trees planted by the students of the school. (1)

3. Find the total number of trees planted by class 10th student. (2)

OR

Find the total no of trees planted by class 12th students. (2)

33	**Read the following text carefully and answer the questions that follow:**	[4]

Ashish is a Class IX student. His class teacher Mrs Verma arranged a historical trip to great Stupa of Sanchi. She explained that Stupa of Sanchi is great example of architecture inIndia. Its base part is cylindrical in shape. The dome of this stupa is hemispherical in shape, known as Anda. It also contains a cubical shape part called Hermika at the top. Path around Anda is known as Pradakshina Path.

1. Find the volume of the Hermika, if the side of cubical part is 10m. (1)

2. Find the volume of cylindrical base part whose diameter and height 48 m and 14 m. (1)

3. If the volume of each brick used is 0.01 m^3, then find the number of bricks used to make the cylindrical base. (2)

OR

If the diameter of the Anda is 42 m, then find the volume of the Anda. (2)

34	**Read the following text carefully and answer the questions that follow:**	[4]

In a survey on holidays, 120 people were asked to state which type of transport they used on their last holiday. The following pie chart shows the results of the survey.
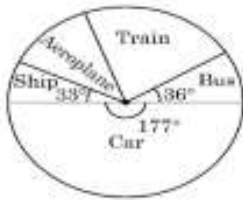
Observe the pie chart and answer the following questions:

1. If one person is selected at random, find the probability that he/she traveled by bus or ship. **(1)**

2. Which is most favorite mode of transport and how many people used it? **(1)**

3.

    a. A person is selected at random. If the probability that he did not use train is $\frac{4}{5}$, find the number of people who used train.

    (2)

OR

    b. The probability that randomly selected person used aeroplane is $\frac{7}{60}$. Find the revenue collected by air company at the rate of ₹ 5,000 per person. **(2)**

	Section E	

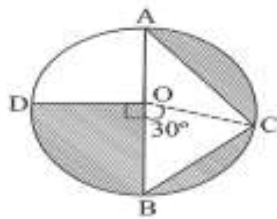| 35	In the given figure, DEFG is a square and $\angle BAC = 90°$.	[5]

Prove that

1. $\triangle AGF \sim \triangle DBG$
2. $\triangle AGF \sim \triangle EFC$
3. $\triangle DBG \sim \triangle EFC$
4. $DE^2 = BD \times EC$
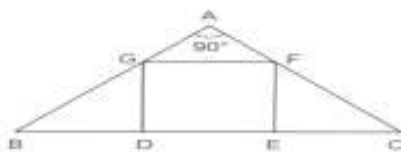
36	O is the centre of the circle. If AC = 28 cm, BC = 21 cm,∠ BOD = 90° and ∠ BOC = 30°, then find the area of the shaded region given in the figure.	[5]

37	The table shows the daily expenditure on food of 25 households in a locality:	[5]

Daily Expenditure (₹)	100-150	150-200	200-250	250-300	300-350
Number of Households	4	5	12	2	2

Find the mean daily expenditure on food. Also, find the modal expenditure.

38	A circle touches the side BC of a△ ABC at a point P and touches AB and AC when produced at Q and R respectively. Show that AQ = $\frac{1}{2}$ (Perimeter of △ ABC.	[5]