

Pre Board Exam 2019-20

Class - 10th

Subject - Mathematics

Time - 3 Hours

Max Marks - 100

Instruction

- (i) All questions are compulsory.
- (ii) Question No. 1 to 5 are objective type questions.
- (iii) Internal options are given in Question Numbers 6 to 26 .
- (iv) Draw neat and clean labelled diagrams whenever required.

Q 1. Choose the correct option and write it. (1x5=5)

- (i) 9th term of the A.P: 10,7,4,....., is.
(a) 14 (b) -14 ✓ (c)17 (d) -17
- (ii) ABC and BDE are two equilateral triangles such that D is the mid-point of BC Ratio of the area of triangles ABC and BDE is.
(a) 2:1 (b) 1:2 a (c) 4:1 ✓(d) -17
- (iii) Condition for system of linear equations $a_1 x + b_1 y + c_1 = 0$ and $a_2 x + b_2 y + c_2 = 0$ has no solution is .
(a) $\frac{a_1}{a_2} = \frac{b_1}{b_2}$ (b) $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$ (c) $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$ (d) $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$ ✓
- (iv) From a point Q, the length of the tangent to a circle is 24cm and the distance of Q from the centre is 25cm then radius of the circle is.
(a) 7cm ✓(b) 12cm a (c) 15cm (d) 24-5cm
- (v) Total surface area of frustum of a cone is.
(a) $\pi l(r_1 + r_2) + \pi(r_1^2 + r_2^2)$ ✓ (b) $\pi l(r_1 + r_2) + \pi(r_1^2 - r_2^2)$
(c) $\pi l(r_1 - r_2) + \pi(r_1^2 + r_2^2)$ (d) $\pi l(r_1 - r_2) + \pi(r_1^2 - r_2^2)$

Q 2. Fill in the blanks (1x5=5)

- (i) $3\sqrt{2}$, is a ----- number
- (ii) Zero of a linear polynomial $ax + b$ is ----- .
- (iii) Any quadratic equation can have at most ----- roots.
- (iv) The distance of a point from the X-axis is called its ----- .
- (v) The probability of an event that is certain is ----- .

Q 3. Write true / False in the following. (1x5=5)

- (i) Any polynomial of degree 3 can have at most three zeros.
- (ii) The sum of roots of $ax^2+bx+c=0$ is $-\frac{b}{a}$.
- (iii) The general form of an AP is $a, a + d, a+2d, a+3d, \dots$

(iv) Formula of area of circle is πr^2 .

(v) The mean of first five natural numbers is 6.

Q 4. Match the correct

(1x5=5)

Column 'A'	Column 'B'
(i) $\sqrt{1 - \sin^2 \theta}$	(a) $\tan \theta$
(ii) $\cot \theta$	(b) $\operatorname{Cosec}^2 \theta$
(iii) $\cos (90 - \theta)$	(c) 1
(iv) $\tan 45^\circ$	(e) $\sin \theta$
(v) $1 + \cot^2 \theta$	(f) $\frac{\cos \theta}{\sin \theta}$
	(g) $\cos \theta$

Q 5. Write the answer in one-word / sentence of each.

(1x5=5)

(i) Write the standard form of a linear equation in two variables x and y.

(ii) Write definition of the angle of elevation.

(iii) How many tangents can a circle have?

(iv) Write the relation between mean, mode and median. 3

(v) Write the formula of circumference of a circle.

Q 6. Check whether 6^n can end with the digit 0 for any natural number n.

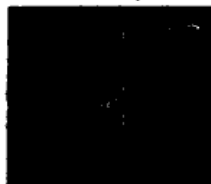
(2)

or

Without actually performing the long division, state whether the rational number $\frac{23}{2^3 5^2}$ will have a terminating decimal expansion or a non-terminating decimal expansion.

Q 7. The graphs of $y = p(x)$ are given in fig. below. find the number of zeroes of $p(x)$

(2)



or

Find the quadratic polynomial, the sum and product of whose zeroes are 4 and 1 respectively.

Q 8. Find the distance between two points (0,0) and (36, 15).

(2)

- or
- If the points A (6, 1), B (8, 2) C (9, 4) and D (P, 3) are vertices of a parallelogram, taken in order, find the value of P.
- Q 9. Two players, Mehul and Narayan, play a tennis match. It is known that the probability of Mehul winning the match is 0.43 what is the probability of Narayan winning the match? (2)

- or
- Harpreet tosses two different coins simultaneously what is the probability that she gets at least on head.
- Q10. One card is drawn from a well - shuffled deck of 52 cards. Calculate the probability that the card will be an ace. (2)

- or
- A bag contains a red ball, a blue ball and a yellow ball, all the balls being of the same size. Bhawana takes out a ball from the bag without looking into it. What is the probability that she takes out the red ball?
- Q 11. In a right triangle ABC, right - angled at B, if $\tan A = 1$, then verify that $2 \sin A \cos A = 1$ (3)

- or
- Show that $\cos 38^\circ \cos 52^\circ - \sin 38^\circ \sin 52^\circ = 0$
- Q 12 Find the coordinate of the point A, where AB is the diameter of a circle whose centre is (2, -3) and B is (1, 4). (3)

- or
- Find the area of a triangle whose vertices are (1, -1), (-4,6) and (-3, 5).
- Q 13 Prove that, the lengths of the tangents drawn from an external point to a circle are equal. (3)

- or
- Prove that the tangents drawn at the end of a diameter of a circle are parallel.
- Q 14 Find the area of a quadrant of a circle whose circumference is 22 cm. (3)

- or
- The radii of two circles are 19 cm and 9 cm respectively. Find the radius of the circles which has circumference equal to the sum of the circumferences of the two circles.
- Q 15 Show that any positive odd integer is of the form $6q+1$, or $6q+3$, or $6q+5$, where q is some integer. (4)

or

Prove that $3+2\sqrt{5}$, is irrational.

- Q 16 Find the zeroes of the quadratic polynomial $x^2 - 2x - 8$, and verify the relationship between the zeroes and the coefficients. (4)

Or

Obtain all the other zeroes $3x^2 + 6x^3 - 2x^2 - 10x - 5$, if two of its zeroes $\sqrt{\frac{5}{3}}$

and $-\sqrt{\frac{5}{3}}$

- Q 17 For what value of K will the following pair of linear equations have infinitely many solutions?

$$Kx + 3y - (K-3) = 0$$

$$12x + Ky - K = 0$$

or

The cost of 5 oranges and 3 apples is ₹35 and the cost of 2 oranges and 4 apples is ₹ 28. Find the cost of an oranges and an apple. (4)

- Q 18 The first term of an AP is 5, the last term is 45 and the sum is 400. Find the number of terms and the common difference. (4)

Or

How many multiples of 4 lie between 10 and 250?

- Q 19 The angle of elevation of the top of a tower from a point on the ground, which is 30 m away from the foot of the tower, is 30° . Find the Height of the tower. http://www.mpboardonline.com (4)

Or

From a point on the ground the angles of elevation of the bottom and the top of a transmission tower fixed at the top to a 20 m high building are 45° and 60° respectively. Find the height of the tower.

- Q 20 ABC is an isosceles triangle right angled at C. Prove that $AB^2 = 2AC^2$ (4)

Or

A ladder 10 m long reaches a window 8 m above the ground. Find the distance of the foot of the ladder from base of the wall.

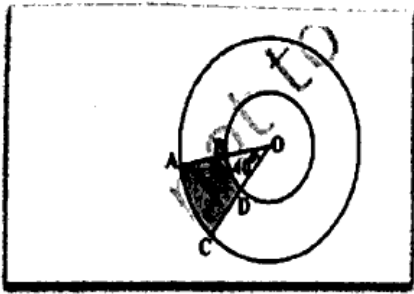
- Q 21 A horse is tied to a peg at one corner of a square shaped grass field of side 15 m by means of a 5 m long rope. Find

(i) The area of that part of the field in which the horse can graze.

(ii) The increase in the grazing area if the rope were 10 m long instead of 5 m

Or

Find the area of the shaded region in figure, if radii of the two concentric circles with centre O are 7 cm and 14 cm respectively and $\angle AOC = 40^\circ$ (4)



Q 22 Find the roots of the following equation

$$x - \frac{1}{x} = 3, x \neq 0$$

(5)

or

Find the value of K for the following quadratic equation, so that they have two equal roots

$$2x^2 + kx + 3 = 0$$

Q 23 Prove that

(5)

$$\frac{\cos A}{1 + \sin A} + \frac{1 + \sin A}{\cos A} = 2 \csc A$$

Or

Evaluate the following

$$2 \tan^2 45^\circ + \cos^2 30^\circ - \sin^2 60^\circ$$

Q 24 Construct a triangle of sides 4cm, 5cm, and 6 cm and then a triangle similar to it whose sides are $\frac{2}{3}$ of the corresponding sides of the first triangle. (5)

Or

Draw a circle of radius 6 cm. From a point 10 cm away from its centre, construct the pair of tangents to the circles and measure their lengths.

Q 25 A cone of height 24 cm and radius of base 6 cm is made up to modelling clay. A child reshaped it in the form of a sphere. Find the radius of the sphere. (5)

Or

A copper rod of diameter 1 cm and length 8 cm is drawn into a wire of length 18 m of uniform thickness. Find the thickness of the wire.

Q 26 The Table below shows the daily expenditure on food of 25 households in a locality

Daily expenditure (in rupee)	100 - 150	150 - 200	200 - 250	250 - 300	300 - 350
Number of	4	5	12	2	2

households					
------------	--	--	--	--	--

Find the mean daily expenditure on food by a suitable method.

(5)

Or

The following data gives the information on the observed life times (in hours) of 225 electrical components:

Lifetimes (in hours)	0 - 20	20 - 40	40 - 60	60 - 80	80 - 100	100 - 120
Frequency	10	35	52	61	38	29

Determine the model lifetimes of the components.

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