



DELHI PUBLIC SCHOOL

SAIL TOWNSHIP, RANCHI

PRE- BOARD-II EXAMINATION (2017-18)

Class:-X
Time- 3 Hrs.

Subject:- Mathematics
M.M-80

General Instructions:-

1. All questions are compulsory.
2. The question paper consists of 30 questions divided into four sections A,B,C and D.
3. Section A contains 6 questions of 1 mark each. Section B contains 6 questions of 2 marks each. Section C contains 10 questions of 3 marks each. Section D contains 8 questions of 4 marks each.
4. There is no overall choice. However, an internal choice has been provide in 2 questions of 3 marks each and 2 questions of 4 marks each. You have to attempt only one of the alternatives in all such questions.
5. Use of calculators is not permitted.

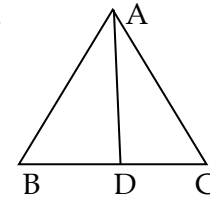
Section - A

- Q.1 Which term of the sequence 114, 109, 104 is the first negative term?
- Q.2 Find the distance between the points $(-\frac{8}{5}, 2)$ & $(\frac{2}{5}, 2)$
- Q.3 If $\tan \theta = \cot (30+ \theta)$, find θ .
- Q.4 What is the distance between two parallel tangents to a circle of radius 4 cm ?
- Q.5 If the quadratic equation $px^2 - 2\sqrt{5} px + 15 = 0$ has two equal real roots , then find p.
- Q.6 Write the polynomial whose zeroes are $(2+\sqrt{3})$ & $(2-\sqrt{3})$.

Section - B

- Q.7 Determine the values of m and n so that the following system of linear equation has infinite number of solutions.
- $$(2m - 1)x + 3y = 5;$$
- $$3x + (n-1)y = 0$$
- Q.8 Find the middle term (s) of A.P 213 , 205 , 197 , 37
- Q.9 For any natural number 'n', check whether 6^n end with digit 0.
- Q.10 The centre of a circle is $(2a, a-7)$. Find 'a' if the circle passes through the point $(11, -9)$ and has diameter $10\sqrt{2}$ units.
- Q.11 If A, B and C are the interior angles of triangle ABC , show that
- $$\sin \frac{B+C}{2} = \cos \frac{A}{2}$$

Q.12 In the figure , $\angle A = 90^\circ$, $AD \perp BC$, If $BD = 2$ cm $CD = 8$ cm . Find AD.



Section - C

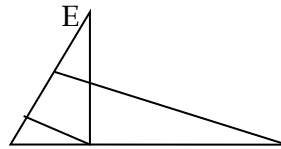
Q.13 Find the points on the x - axis whose distances from the points $(2,3)$ and $(\frac{3}{2}, -1)$ are in the ratio 2:1

Q.14 $A(6,1)$, $B(8,2)$ & $C(9,4)$ are the three vertices of a parallelogram ABCD. If E is the mid-point of DC , find the area of ΔADE .

Q.15 In the adjoining figure , $EB \perp AC$, $BG \perp AE$ & $CF \perp AE$. Prove that

(i) $\Delta ABG \sim \Delta DCB$

(ii) $\frac{BC}{BD} = \frac{BE}{AB}$



Q.16 Solve for x & Y

$$(a - b)x + (a + b)y = a^2 - 2ab - b^2$$

$$(a + b)(x + y) = a^2 + b^2$$

OR

$$7^x + 5^y = 74$$

$$7^{x+1} + 5^{y+1} = 218$$

Q.17 In a single throw of a pair of different dice , what is the probability of getting

(a) a prime number on each dice?

(b) a total of 9 or 11 ?

Q.18 A bucket is in the form of a frustum of a cone & holds 28.490 liter of water. The radii of top and bottom are 28 cm and 21 cm respectively. Find the height of the bucket.

Q.19 Prove that

$$\sqrt{\frac{1+\sin\theta}{1-\sin\theta}} + \sqrt{\frac{1-\sin\theta}{1+\sin\theta}} = 2 \sec\theta$$

OR

Evaluate :

$$\frac{\operatorname{cosec}^2(90-\theta) - \tan^2\theta}{5(\cos^2 48^\circ + \sin^2 48^\circ)} + \frac{2}{5} \sin 48^\circ \sec 42^\circ$$

Q.20 In an equilateral triangle ABC , a point D is taken on base BC such that $BD : DC = 2:1$.

Prove that $9AD^2 = 7AB^2$

Q.21 Show that square of any positive integer cannot be of the form $5m+2$, or $5m+3$ for some integer m.

Q.22 State and prove converse of Pythagoras Theorem.

Section - D

- Q.23 Given that the zeroes of polynomial $x^3 - 6x^2 + 3x + 10$ are of the form $a, a+b, a+2b$ for some real number a & b , find a and b as well the zeroes of the given polynomial.
- Q.24 Draw the graphs of the equation $x - y + 1 = 0$ and $3x + 2y - 12 = 0$. Determine the co-ordinates of the vertices of the triangle formed by these lines and x -axis.
- Q.25 Draw right triangle in the sides other than hypotenuse are of length 3 cm and 4 cm. Then construct another similar triangle whose sides are $\frac{5}{3}$ times the corresponding sides of the given triangle.

OR

Draw a circle of radius 3 cm. Take two points P and Q on one of its extended diameter each at a distance of 7 cm from its centre. Draw tangent to the circle from these two points P and Q.

- Q.26 If the mean of the following frequency distribution is 65.6, find f_1 and f_2 .

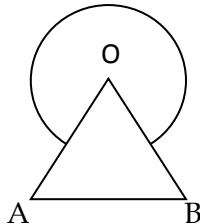
C.I	10-30	30-50	50-70	70-90	90-110	110-130	
Frequency	5	8	f_1	20	f_2	2	50

- Q.27 A ladder rests against a vertical wall at an inclination α to the horizontal. Its foot is pulled away from the wall through a distance 'p' so that its upper end slides a distance 'q' down the wall and then the ladder makes an angle β to the horizontal. Prove that $\frac{p}{q} = \frac{\cos \beta - \cos \alpha}{\sin \alpha - \sin \beta}$
- Q.28 Sushant has vessel of the form of an inverted cone, open at the top, of height 11cm and radius of top as 2.5 cm and is full of water. Metallic spherical balls each of diameter 0.5 cm are put in the vessel due to which $\frac{2}{5}$ th of water flows out. Find how many balls were put in vessel. Sushant made the arrangement so that the water that flows out irrigate the flower beds. What value has been shown by Sushant?

OR

A wooden article was made by scooping out a hemi-sphere from one end of a cylinder and cone from the other end. If the height of cylinder is 40 cm, radius of cylinder is 7 cm and height of the cone is 24 cm, then find the volume and total surface area of the article.

- Q.29 Find the area of the shaded region in the given figure. Where a circular arc of radius 6cm has been drawn with vertex 'O' of an equilateral ΔOAB of side 12 cm as center.



- Q.30 Prove that the tangents drawn at the mid-point of an arc of a circle is parallel to chord joining the end point of the arc.