

# PAST QUESTION PAPERS

FOR

CLASS – X

**YEAR – 2018**

**MATHEMATICS**

Full Marks – 80

Pass Marks – 20

Time : Three hours

Attempt all questions.

The figures in the right margin indicate full marks for the questions.

For Question nos. 1 to 5, write the letter corresponding to correct answer.

1. If  $\sin(\theta + 55^\circ) = \cos(7 - 5^\circ)$ , then the value of  $\theta$  is : 1  
(A)  $5^\circ$  (B)  $10^\circ$   
(C)  $20^\circ$  (D)  $25^\circ$
2. Area of a circle is  $154\text{cm}^2$ , its perimeter in  $\text{cm}$  is 1  
(A) 22 (B) 44  
(C) 77 (D) 88
3. The line segment joining the points  $(-2, -3)$  and  $(5, 6)$  is divided by the x-axis in the ratio : 1  
(A) 3 : 2 (B) 2 : 3  
(C) 2 : 1 (D) 1 : 2
4.  $x^n + a^n$  is divisible by  $x + a$  only when  $n$  is : 1  
(A) even (B) odd  
(C) prime (D) composite
5. If D, E, F, are respectively the mid - points of the sides BC, CA, AB of a  $\Delta ABC$ , then the ratio of the area of  $\Delta DEF$  to the area of  $\Delta ABC$  is : 1  
(A) 1 : 2 (B) 1 : 3  
(C) 1 : 4 (D) 1 : 6
6. Find the canonical decomposition of 3528. 1
7. State division algorithm for polynomials. 1
8. What is meant by a sequence ? 1
9. Find the value of  $\sin 60^\circ \cos 30^\circ + \cos 60^\circ \sin 30^\circ$ . 1

10. Write the statement of Factor Theorem 1
11. Define a random experiment. 1
12. If two events  $A$  and  $B$  are such that  $P(A) + P(B) = 1$  write  $P(B)$  in terms of  $P(A)$ . 1
13. Write down the formula for the area of a sector of a circle in terms of the radius and the arc length. 1
14. Establish the formula  $S_n = \frac{n}{2}[2a + (n-1)d]$  for the sum of the first  $n$  terms of an AP. 2
15. When a polynomial  $p(x)$  is divided by  $3x - 1$ , the quotient and remainder are  $x^2 - 3x + 2$  and 5 respectively. Find  $p(x)$  2
16. Write down the roots of the quadratic equation  $ax^2 + bx + c = 0$ . If  $a + b + c = 0$ , what are the roots of the equation  $ax^2 + bx + c = 0$ ? 2
17. Show that any square number cannot be put in the form  $4k + 2$ . 2
18. A solid metallic cone is 24cm high and radius of its base is 6cm. If it is melted and recast into a solid sphere, find the radius of the sphere. 2
19. Prove that :  $a^3 + b^3 - c^3 - 3abc = (a + b + c)(a^2 + b^2 + c^2 - ab - bc - ca)$  3
20. If  $\alpha$  and  $\beta$  are the roots of the equation  $ax^2 + bx + b = 0$   
 prove that  $\sqrt{\frac{\alpha}{\beta}} + \sqrt{\frac{\beta}{\alpha}} + \sqrt{\frac{b}{a}} = 0$  3
21. Solve graphically 3  
 $2x = 3y$   
 $\frac{x}{6} + \frac{y}{4} = 1$
22. Prove that the lengths of the tangents drawn from an external point to a circle are equal. 3
23. Prove that :  $(\cos \theta - \sin \theta)(\sec \theta - \cos \theta) = \frac{1}{\tan \theta + \cot \theta}$  3
24. Given that  $p$  is the probability that a person aged  $x$  years will die in a year. If Mr.  $A$  is one of four persons all ages  $x$  years, find the probability that atleast one of the four persons will die in a year and Mr.  $A$  is the first person to die. 3
25. Prove that  $|x + y| \leq |x| + |y|$  for every  $x, y \in \mathbb{R}$  and hence deduce that  
 $|x - y| \geq |x| - |y|$ . 4

Or

Prove that :

(i) If  $x, y, z \in \mathbb{R}$ ,  $x \neq 0$  and  $xy = xz$  then  $y = z$ .

(ii)  $x \cdot 0 = 0$  for any  $x \in \mathbb{R}$

26. Find the coordinates of the point which divides the line segment joining the points  $(x_1, y_1)$  and  $(x_2, y_2)$  internally in the ratio  $m : n$ .
27. A rectangular garden is of the same area as another which is  $6m$  longer and  $4m$  narrower. It is also of the same area as a third garden which is  $8m$  longer and  $5m$  narrower. Find the cost of fencing the garden at the rate of Rs. 500/- per metre. 4
28. Construct a pair of tangents to a circle of radius  $2.5cm$  from an external point which is at a distance of  $6cm$  from the centre of the circle. Write the steps of construction. 5
29. From the top of a house of height  $h$ , the angle of elevation and depression of the top and bottom of a tower are  $\alpha$  and  $\beta$  respectively. Prove that the height of the tower is  $h(1 + \tan \alpha \cot \beta)$ .
30. The median the following distribution is 52.5. Find the value of  $x$  and  $y$  if the total frequency is 100. 5

Class	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
Frequency	2	5	$x$	12	17	20	$y$	9	7	4

31. State and prove Pythagoras Theorem. 6
32. From a cone of height  $24cm$ , a smaller cone is cut off by a plane parallel to the base. If the volumes of the cones are in the ratio  $8 : 27$ , find the height of the resulting frustum. 6