INDIAN SCHOOL SOHAR
PRE-BOARD (2018-19)
MATHEMATICS

CLASS: X   **MAX. MARKS: 80**
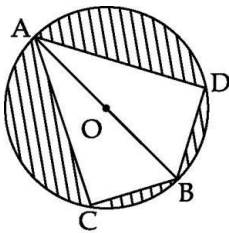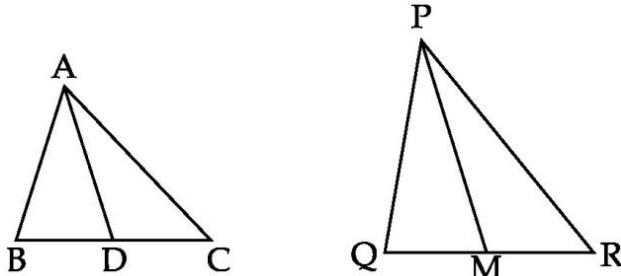**DATE: 03 /02 /2019**   **DURATION: 3 HRS**
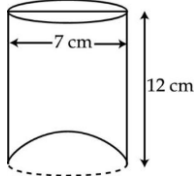
General Instructions:
1. All questions are compulsory
2. The question paper consists of 30 questions divided into 4 sections A, B, C and D.
3. Section A comprises of 6 questions of 1 mark each. Section B comprises of 6 questions of 2 marks each. Section C comprises of 10 questions of 3 marks each. Section D comprises of 8 questions of 4 marks each.
4. There is no overall choice. However, an internal choice has been provided in two questions of 1 mark each, two questions of 2 marks each, four questions of 3 marks each and three questions of four marks each .You have to attempt only one of the alternatives in all such questions.
5. Use of calculators is not permitted.

	Section-A	
1.	Find the values of k for each of the following quadratic equations, so that the equation $2x^2 + kx + 3 = 0$ have two equal roots.	**1**
	OR	
	If the discriminant of the equation $6x^2 - bx + 2 = 0$ is 1, then find the value of 'b'	
2.	If the common difference of an A.P is - 6, find $a_{16} - a_{12}$	**1**
3.	If sin A = $\frac{1}{2}$, then find the value of cot A	**1**
	OR	
	If sin θ = $\frac{1}{5}$, then find the value of $\frac{1}{5} \cot^2 \theta + \frac{1}{5}$	
4.	The mid-point of line segment AB is the point P (0, 4). If the coordinates of B are (-2, 3) then find the coordinates of A .	**1**
5.	Write decimal expansion of $\dfrac{23}{2^3 \times 5^2}$	**1**
6.	In figure below if DE ∥ BC then find the value of x:	**1**

		Section-B	
7.	Find the LCM of 72, 80 and 120 using the fundamental theorem of arithmetic.		2
		OR	
	Find the HCF of 96 and 404 by the prime factorisation method. Hence, find their LCM.		
8.	Given the linear equation $2x + 3y - 8 = 0$, write another linear equation in two variables such that the geometrical representation of the pair so formed is: (i) intersecting lines (ii) parallel lines		2
9.	Find the sum of the first n odd natural numbers.		2
		OR	
	Which term of the AP 32, 29, 26.....is its first negative term.		
10.	A jar contains blue and green marbles. The number of green marbles is 5 more than twice the no. of blue. If probability of drawing a blue one at random is $\dfrac{2}{7}$, how many blue and green marbles are there in the jar ?		2
11.	Find a point on the *x*-axis which is equidistant from A(2, −5) and B(−2, 9).		2
12.	Two unbiased coins are tossed simultaneously. Find the probability of getting (a) at least one head (b) at most one head.		2
		Section-C	
13.	Find the area of a quadrilateral ABCD formed by the points A (-2, -2), B (5, 1), C (2,4) and D (-1,5).		3
		OR	
	Find k if points A (k, 2−2 k), B (−k+1, 2 k) and C (−4−k, 6−2 k) are collinear.		
14.	If A+B = 90°, then prove that $\sqrt{\dfrac{\tan A \tan B + \tan A \cot B}{\sin A \sec B} - \dfrac{\sin^2 B}{\cos^2 A}} = \tan A$		3
		OR	
	Prove that $\dfrac{\cos(90-\theta)}{1+\sin(90-\theta)} + \dfrac{1+\sin(90-\theta)}{\cos(90-\theta)} = 2\operatorname{cosec}\theta$		
15.	Find the area of the shaded region in figure, if BC = BD = 8 cm, AC = AD = 15 cm and O is the centre of the circle. (Take $\pi = 3.14$)		3
16.	Two tangents TP and TQ are drawn to a circle with centre O from an external point T.		3

	Prove that $\angle$ PTQ = 2 $\angle$ OPQ	
17.	In fig. (a) and (b) sides AB, BC and median AD of ∆ABC are respectively proportional to sides PQ, QR and median PM of ∆PQR. Prove that ∆ABC ~ ∆PQR. 	**3**
	OR	
	In an equilateral triangle ABC, D is a point on side BC such that BD= $\dfrac{1}{3}$ BC. Prove that $9AD^2 = 7AB^2$	**3**
18.	Use Euclid's division algorithm to find the HCF of 10224 and 9648	
19.	On dividing $x^3 - 3x^2 + x + 2$ by a polynomial $g(x)$, the quotient and remainder were $x - 2$ and $-2x + 4$, respectively. Find $g(x)$.	**3**
20.	Juhi travels 300 km to her home partly by train and partly by bus. She takes 4 hours if she travels 60 km by train and the remaining by bus. If she travels 100 km by train and the remaining by bus, she takes 10 minutes longer. Find the speed of the train and the bus separately	**3**
21.	Find the median of the following data. | Classes	Frequency
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500-600	40
600-700	28
700-800	35
800-900	22
900-1000	25		**3**
22.	A hemispherical tank full of water is emptied by a pipe at the rate of $3\dfrac{4}{7}$ litres per second. How much time will it take to empty half the tank, if it is 3m in diameter? (Take $\pi = \dfrac{22}{7}$)	**3**
	OR	
	A vessel is in the form of an inverted cone. Its height is 8 cm and the radius of its top, which is open, is 5 cm. It is filled with water up to the brim.When lead shots, each of which is a sphere of radius 0.5 cm are dropped into the vessel, one-fourth of the water flows out. Find the number of lead shots dropped in the vessel.	
	Section-D	

23.	The difference of square of two numbers is 180. The square of the smaller number is 8 times the large number. Find the two numbers.	4
	OR	
	A two – digit number is such that the product of the digits is 35. When 18 is added to this number, the digits interchange their places. Determine the number.	
24.	A milk seller serves his customers using glasses shown in the figure. The inner diameter of the cylindrical glass is 7 cm and height 12 cm. The bottom of the glass has a raised hemispherical portion. Find the apparent and the actual capacities of the glass. ←7 cm→ 12 cm	4
25.	The angle of elevation of a jet fighter from point A on ground is 60°. After a flight of 10 seconds, the angle changes to 30°. If the jet is flying at a speed of 648 km/hour, find the constant height at which the jet is flying. (Take $\sqrt{3}$ = 1.73)	4
	OR	
	From a point P on the ground the angle of elevation of the top of a 10 m tall building is 30°. A flag is hoisted at the top of the building and the angle of elevation of the top of the flagstaff from P is 45°. Find the length of the flagstaff and the distance of the building from the point P. (Take π = 3.14 ; $\sqrt{3}$ = 1.732)	
26.	How many terms of the A.P. : −15, −13, −11, …. are needed to make the sum −55 ? Explain the reason for double answer ?	4
27.	The following table gives production yield per hectare of wheat of 100 farms of a village.	4

Production yield (in kg/ha)	50-55	55-60	60-65	65-70	70-75	75-80
Number of farms	2	8	12	24	38	16

Change the distribution to a more than type distribution, and draw its ogive .Hence find the median.

OR

The mode of the following data is 65.625 hours. Find the value of p

C.I	0-20	20-40	40-60	60-80	80-100	100-120
Number of students	10	35	52	61	p	29

28.	The radii of the ends of a frustum of a cone 45 cm high are 28 cm and 7 cm. Find its capacity in litres (Take $\pi = \dfrac{22}{7}$)	4
29.	Draw a pair of tangents to a circle of radius 5 cm which are inclined to each other at an angle of 60°.	4
30.	Prove that $\dfrac{\sin\theta - \cos\theta}{\sin\theta + \cos\theta} + \dfrac{\sin\theta + \cos\theta}{\sin\theta - \cos\theta} = \dfrac{2}{2\sin^2\theta - 1}$	4