INDIAN SCHOOL SOHAR
PERIODIC TEST III (2019-20)
MATHEMATICS

Class: X **Maxi. Marks: 80**
Date: 16/01/2020 **Duration: 3 Hours**

General Instructions:

a. All questions are compulsory.
b. The question paper consists of 40 questions divided into four sections A, B, C and D.
c. Section A contains 20 questions of 1 mark each. Section B contains 6 questions of 2 marks each, Section C contains 8 questions of 3 marks each, Section D contains 6 questions of 4 marks each.
*d. 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, **three** questions of 3 marks each and **three** questions of 4 marks each. You have to attempt only one of the alternatives in all such questions.*
e. Use of calculators is not permitted.

SECTION A

Q 1 – Q 10 are multiple choice questions. Select the most appropriate answer from the given options.

1. If A = 2n + 13, B = n + 7, where n is a natural number, then HCF of A and B is

   a) 3 b) 2 c) 1 d) 4

2. If $\sec A = \frac{13}{5}$, and A + B = 90, the value of $\operatorname{cosec} B$ is

   a) $\frac{5}{12}$ b) $\frac{12}{13}$ c) $\frac{13}{12}$ d) $\frac{13}{5}$

3. What is the value of k for which the following system of equations has infinite solutions?

   3x – y = 5, 6x – 2y + k = 0

   a) k = 10 b) k = −20 c) k = −10 d) k = −15

4. The LCM of smallest two digit composite number and smallest composite number is

   a) 20 b) 4 c) 12 d) 44

5. The mean, median and mode of a frequency distribution are related by the formula :

   a) Mode = 2 Median – 3 Mean b) Mode = 3 Median – 2 Mean

   c) Mode = 2 Median + 3 Mean d) Mode = 3 Median + 2 Mean

6. If P $(\frac{a}{3}, 4)$ is the mid point of the line segment joining the points Q $(-6, 5)$ and R $(-2, 3)$ then the value of a is

   a) 12 b) 4 c) −4 d) −12

7. The area (in square units) of the triangle formed by the points A(a, 0), O(0, 0) and B(0, b) is

   a) ab b) $\frac{1}{2}$ab c) $\frac{1}{2}a^2b^2$ d) $\frac{1}{2}b^2$

8. If $\sin\theta = \cos\emptyset$,then the value of $(\theta + \emptyset)$ is

a) 30° b) 22.5° c) 60° d) 90°

9. The perimeter of a triangle with vertices (0, 6), (0, 0) and (8, 0) is

a) 10 b) $14 + \sqrt{10}$ c) 24 d) 20

10. If $2\sin 2\theta = \sqrt{3}$, the value of θ is

a) 45° b) 60° c) 90° d) 30°

(Q 11 - Q 15) Fill in the blanks

11. If a − 2d, a − d, a, a + d, a + 2d are in A P, then the common difference is _____

12. Capacity of a cone whose base area is 154 sq.cm and height is 12 cm is _____

13. If one root of the equation $2x^2 + kx + 4 = 0$ is 2, then the other root is _____

OR

If the sum of the zeroes of the quadratic polynomial $3x^2 - kx + 6$ is 3, then the value of k is _____

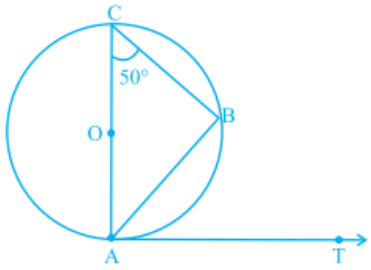
14. Two coins are tossed simultaneously. The probability of getting at most one head is _____

15. $\Delta ABC \cong \Delta RQP$, $\angle A = 80°$, $\angle B = 60°$, then the value of $\angle P$ is _____

(Q 16 - Q 20) Answer the following

16. In the given figure, AB is a chord of the circle and AOC is its diameter, such that $\angle ACB = 50°$.

If AT is the tangent to the circle at the point A, then find $\angle BAT$.



OR

What is the length of the tangent drawn from a point whose distance from the centre of a circle is 25 cm? Given that radius of the circle is 7 cm.

17. Write the number of zeroes in the end of a number whose prime factorization is $2^2 \times 5^3 \times 3^2 \times 17$.

18. If the sum of first m terms of an AP is $2m^2 + 3m$, then what is its second term?

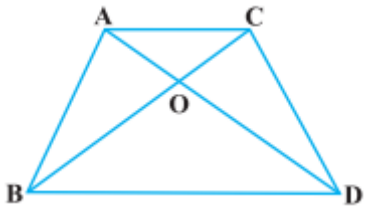
19. Find the value of k for which quadratic equation $2x^2 - kx + k = 0$ has equal roots.

20. In an isosceles ΔABC, if $AC = BC$ and $AB^2 = 2AC^2$, find $\angle C$.

SECTION B

Question numbers 21 to 26 carry 2 marks each.

21. In the given figure, ABC and DBC are two triangles on the same base BC. If AD intersects BC at O, show that $\frac{ar(ABC)}{ar(DBC)} = \frac{AO}{DO}$



OR

PQR is a triangle right angled at P and M is a point on QR such that PM $\perp$ QR. Show that $PM^2 = QM \times MR$.

22. If A, B, C are interior angles of ΔABC, show that $\sec^2\left(\frac{B+C}{2}\right) - 1 = \cot^2\left(\frac{A}{2}\right)$

23. The king, queen and jack of clubs are removed from a deck of 52 playing cards and the remaining cards are shuffled. A card is drawn from the remaining cards. Find the probability of getting a card of (i) heart (ii) queen

OR

A bag contains 5 red balls and some blue balls. If the probability of drawing a blue ball is double that of red ball, determine the number of blue balls in the bag.

24. Rasheed got a playing top as his birthday present, which surprisingly had no colour on it. He wanted to colour it with his crayons. The top is shaped like a cone surmounted by a hemisphere. The entire top is 5 cm in height and the diameter of the top is 3.5 cm, slant height of the cone is 3.7 cm. Find the area he has to colour. (Take $\pi = \frac{22}{7}$)

25. If d_1, d_2 ($d_2 > d_1$) be the diameters of two concentric circles and c be the length of a chord of a circle which is tangent to the other circle, prove that $d_2^2 = c^2 + d_1^2$.

26. Which term of the A.P. 3, 15, 27, 39, ……. is 132 more than its 54th term?

SECTION C

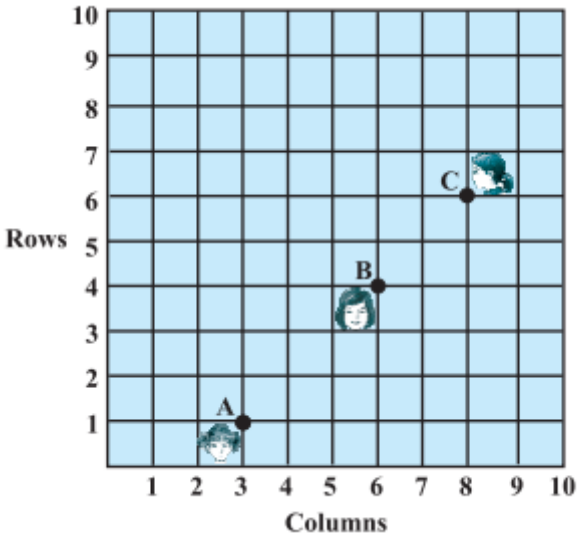
Question numbers 27 to 35 carry 3 marks each.

27. Prove that $\frac{1}{\sec x - \tan x} - \frac{1}{\cos x} = \frac{1}{\cos x} - \frac{1}{\sec x + \tan x}$

OR

Prove that $(\sin A + \text{cosec}\, A)^2 + (\cos A + \sec A)^2 = 7 + \tan^2 A + \cot^2 A$

28. Given figure shows the arrangement of desks in a classroom. Ashima, Bharati and Camella are seated at A(3,1), B(6, 4) and C(8, 6) respectively. Do you think they are seated in a line? Give reasons for your answer.



29. The area of an equilateral triangle is $49\sqrt{3}$ cm^2. Taking each angular point as centre, circles are drawn with radius equal to half the length of the side of the triangle. Find the area of triangle not included in the circles. (Take $\sqrt{3} = 1.73$)

30. If m times mth term of an A P is equal to n times its nth term, show that the (m + n)th term of the A P is zero.

31. Solve the following system of equations for x and y:

$\frac{5}{x-1} + \frac{1}{y-2} = 2$; $\frac{6}{x-1} - \frac{3}{y-2} = 1$

OR

Five years ago, Rani was thrice as old as Gopu. Ten years later, Rani will be twice as old as Gopu. How old are Rani and Gopu?

32. The greatest number that will divide112, 172 and 184 so as to leave remainder 40 in each case is $k^2 \times 3$. Find the value of k.

OR

Given that $\sqrt{3}$ is irrational, prove that $5 - 2\sqrt{3}$ is an irrational number.

33. Draw a more than type ogive of the following distribution:

Marks	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60
No of students	5	4	18	10	15	8

Find median from the graph.

34. Find the other zeroes of the polynomial $x^4 - 5x^3 + 2x^2 + 10x - 8$ if it is given that two of its zeroes are $\sqrt{2}$ and $-\sqrt{2}$.

SECTION D

Question numbers 35 to 40 carry 4 marks each.

35. Draw a right triangle in which the sides (other than hypotenuse) are of length 4 cm and 3cm. Then construct another triangle whose sides are $\frac{5}{3}$ times the corresponding sides of the given triangle.

OR

Construct a pair of tangents to a circle of radius 3 cm which are inclined to each other at an angle of 60°.

36. The ratio of the areas of two similar triangles is equal to the ratio of the squares of their corresponding sides. Prove it.

37. The height of a cone is 30 cm. A small cone is cut off at the top by a plane parallel to the base. If its volume be $\frac{1}{27}^{th}$ volume of the cone, at what height above the base is the section made?

OR

A bucket open at the top is of the form of a frustum of a cone. The diameters of its upper and lower circular ends are 40 cm and 20 cm respectively. If total 17600 cm^3 of water can be filled in the bucket, find the total surface area. (Use $\pi = \frac{22}{7}$)

38. A vertical tower stands on a horizontal plane and is surmounted by a flagstaff of height 5 m. From a point on the ground the angles of elevation of the top and bottom of the flagstaff are 60° and 30° respectively. Find the height of the tower and the distance of the point from the tower. (Take $\sqrt{3}$ = 1.732)

39. Two tapes running together can fill a tank in $3\frac{1}{13}$ hours. If one tap takes 3 hours more than the other to fill the tank, then how much time will each tap take to fill the tank?

OR

Solve the following for x :

$$\frac{1}{2a+b+2x} = \frac{1}{2a} + \frac{1}{b} + \frac{1}{2x}$$

40. Find the mean marks from the following data:

Marks	Below 10	Below 20	Below 30	Below 40	Below 50	Below 60	Below 70
No. of students	5	9	17	29	45	60	70

***** end *****