

Roll No:

**CONFEDERATION OF KERALA SAHODAYA COMPLEXES  
COMMON MODEL EXAMINATION, JANUARY-2019**

**MATHEMATICS**

**Set III**

CLASS : X

TIME ALLOWED: 3 HOURS

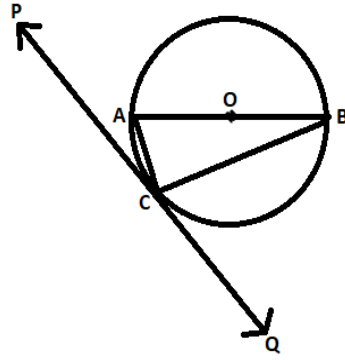
MAX.MARKS:80

**General Instructions:**

- (i) All questions are compulsory.
- (ii) This question paper consists of 30 questions divided into four sections – A,B,C and D.
- (iii) 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.
- (iv) There is no overall choice. However an internal choice has been provided in four questions of 3 marks each and 3 questions of 4 marks each. You have to attempt only one of the alternatives in all such questions.
- (v) Use of calculator is not permitted.

**SECTION - A**

1. If HCF (a, b) = 12 and  $a \times b = 1800$ , then find LCM(a, b).
2. Find the distance of the point (-4, -7) from the y-axis.
3. If 2 is a root of the equation  $x^2+bx+12=0$  and the equation  $x^2+bx+q=0$  has equal roots, then find the value of 'q'.
4. In the fig, PQ is a tangent to a circle with centre O, at the point of contact C. If AB is a



diameter and  $\angle CAB = 30^\circ$ , find  $\angle PCA$ .

5. What is the perimeter of a sector of a circle whose central angle is  $90^\circ$  and radius is 7 cm ?
6. What is the probability that a non-leap year has 53 Mondays?

#### SECTION - B

7. Show that any positive odd integer is of the form  $4q + 1$  or  $4q + 3$ , where  $q$  is some integer.
8. Solve for  $x$  and  $y$ 

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

$$x - \frac{y}{3} = 3$$
9. Find the ratio in which  $y$ -axis divides the line segment joining the points  $A(5, -6)$  and  $B(-1, -4)$ . Also find the co-ordinates of the point of division.
10. If  $\tan(A+B) = \sqrt{3}$ ,  $\tan(A-B) = \frac{1}{\sqrt{3}}$ ,  $0^\circ < A + B \leq 90^\circ$ ,  $A > B$ , then find  $A$  and  $B$ .
11. An arc of a circle is of length  $5\pi$  cm and the sector it bounds has an area of  $20\pi$  cm<sup>2</sup>. Find the radius of the circle.
12. Evaluate:
$$\frac{3\tan^2 30^\circ + \tan^2 60^\circ + \operatorname{cosec} 30^\circ - \tan 45^\circ}{\cot^2 45^\circ}$$

#### SECTION - C

13. Prove that  $\sqrt{3}$  is irrational.
14. If the polynomial  $f(x) = 3x^4 + 3x^3 - 11x^2 - 5x + 10$  is completely divisible by  $3x^2 - 5$ , find all its zeroes.
15. If the roots of the quadratic equation  $(a-b)x^2 + (b-c)x + (c-a) = 0$  are equal, prove that  $2a = b + c$ .
16. Find the 20<sup>th</sup> term of an A.P. whose 3<sup>rd</sup> term is 7 and the 7<sup>th</sup> term exceeds three times the third term by 2. Also find its  $n$ th term.

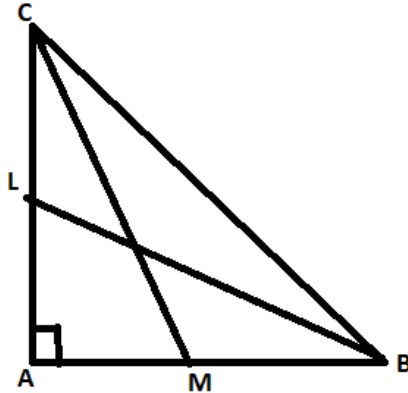
OR

The  $n$ th term of an AP is given by  $-4n+15$ . Find the sum of first 20 terms.

17. Prove that the area of an equilateral triangle described on one side of a square is equal to half the area of the equilateral triangle described on one of its diagonals.

OR

In the given figure, BL and CM are medians of  $\triangle ABC$ , right angled at A. Prove that  $4(BL^2 + CM^2) = 5BC^2$ .



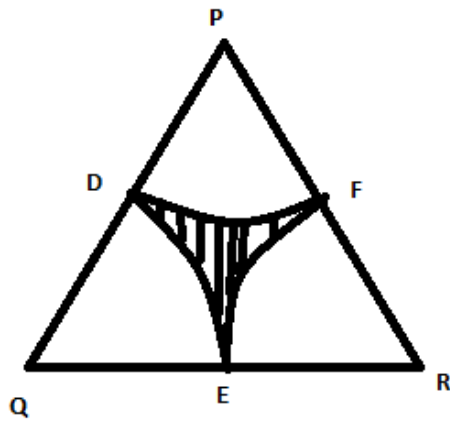
18. Find the values of  $k$  so that the area of the triangle with vertices  $(k+1, 1)$ ,  $(4, -3)$  and  $(7, -k)$  is 6 square units.

OR

The vertices of quadrilateral ABCD are  $A(5,-1)$ ,  $B(8,3)$ ,  $C(4,0)$  and  $D(1,-4)$ . Prove that ABCD is a rhombus.

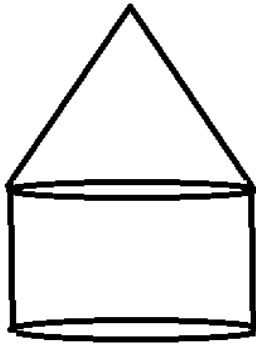
19. . Prove that opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the centre of a circle.
20. In the fig,  $\triangle PQR$  is an equilateral triangle of side 8cm and D,E and F are the centres of circular arcs of radius 4 cm .Find the area of the shaded region.

(Use  $\pi = 3.14$  and  $\sqrt{3} = 1.732$ )



OR

In the given fig, a tent is in the shape of a cylinder surmounted by a conical top of same diameter. If the height and diameter of cylindrical part is 2.1 m and 3 m respectively and the slant height of the conical part is 2.8 m , find the cost of canvas needed to make the tent of the canvas is available at the rate of Rs. 500 per sq.metre..( $\pi = \frac{22}{7}$ )



21. Find the mean of the following data.

Class	0-10	10-20	20-30	30-40	40-50
Frequency	8	16	36	34	6

22. One card is drawn from a well shuffled deck of 52 cards. Find the probability of getting
- a non - face card
  - a black king or a red queen
  - a spade

## SECTION - D

23. Draw a  $\Delta ABC$  with  $BC = 6$  cm,  $AB = 5$  cm and  $\angle ABC = 60^\circ$ . Then construct a triangle whose sides are  $\frac{3}{4}$  of the corresponding sides of the  $\Delta ABC$ .

24. A takes 6 days less than the time taken by B to finish a piece of work. If both A and B together can finish it in 4 days, find the time taken by B to finish the work.

OR

The speed of a boat in still water is 15 km/hr. It can go 30 km upstream and return downstream to the original point in 4 hours 30 minutes. Find the speed of the stream.

25. The sum of first 20 terms of an A.P. is 400 and the sum of its first 40 terms is 1600. Find the sum of its first 10 terms.

26. If a line drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio.

OR

In  $\Delta ABC$ , AD is the median to BC and in  $\Delta PQR$ , PM is the median to QR. If  $\frac{AB}{PQ} = \frac{BC}{QR} = \frac{AD}{PM}$ . Prove that  $\Delta ABC \sim \Delta PQR$ .

27. A man standing on the deck of a ship, which is 10 m above water level, observes the angle of elevation of the top of a hill as  $60^\circ$  and the angle of depression of the base of hill as  $30^\circ$ . Find the distance of the hill from the ship and height of the hill.

28. Water is flowing through a cylindrical pipe of internal diameter 2 cm, into a cylindrical tank of base radius 40 cm, at the rate of 0.4 m/s. Determine the rise in level of water in the tank in half an hour.

29. Prove that :  $\sqrt{\frac{\sec\theta-1}{\sec\theta+1}} + \sqrt{\frac{\sec\theta+1}{\sec\theta-1}} = 2\operatorname{cosec}\theta$

30. Find the values of x and y, if the median for the following data is 31.

Classes	0-10	10-20	20-30	30-40	40-50	50-60
Frequency	5	x	6	y	6	5

OR

The following distribution gives the daily income of 50 workers of a factory:

Daily income in Rs.	200-250	250-300	300-350	350-400	400-450	450-500
No. of worker	10	5	11	8	6	10

Convert the distribution to a less than type cumulative frequency distribution and draw its ogive. Hence find the median daily income.