DELHI PUBLIC SCHOOL

SAIL TOWNSHIP, RANCHI

PRE- BOARD-I EXAMINATION (2017-18)

Class:-X **Subject:- Mathematics**

Time- 3 Hrs. **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 3 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 **The decimal expansion of the rational number $\frac{11}{2^3 \times 5^2}$ will terminate after how many places of decimal?**

Q.2 **If 1 is a zero of the polynomial $p(x) = ax^2 - 3(a-1)x - 1$, then find the value of a.**

Q.3 **If n^{th} term of an A.P is 7-4n. Find its common difference.**

Q.4 **If $\cos A = \frac{3}{5}$ find $9\cot^2 A - 1$.**

Q.5 **Find the mode of the data, whose mean and median are given by 10.5 and 11.5 respectively.**

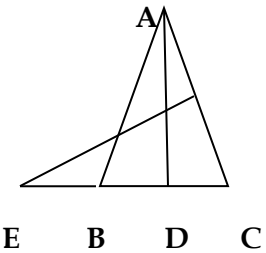
Q.6 **What is the probability of getting neither prime nor composite number, where an unbiased die is tossed?**

Section-B

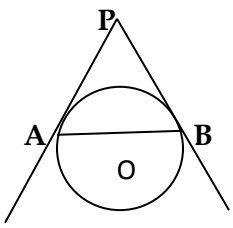
Q.7 **Show that any positive ever integer can be written in the form 6q, 6q+2 or 6q+4 where q is an integer.**

Q.8 **Find the value of k, for which the system of equations $3x+5y=0$; $kx+10y=0$ has a non-zero solution.**

Q.9 **In the adjoining figure, E is a point on the side CB produced of an isoceles triangle ABC with AB=AC. If AD $\perp$ BC, and EF $\perp$ AC, Prove that $AB \times EF = AD \times EC$**



Q.10 **In the adjoining figure, AP and BP are tangents to a circle with centre O, such that AP=5cm and $\angle APB = 60°$, find the length of chord AB.**



Q.11 Simplify:

$$\frac{sin^3\,\theta + cos^3\,\theta}{sin\,\theta + cos\theta} + \sin\theta\cos\theta$$

Q.12 If the total surface area of a solid hemisphere in 462 cm² . Find its volume. (Take $\pi = \frac{22}{7}$)

Section-C

Q.13 Solve graphically the pair of linear equations 2x+3y = 11 and 2x-4y = -24. Hence find the value of m, given that the line represented by y = mx+3 passes through the intersection of the given pair.

Q.14 A peacock is sitting on the top of a pillar, which is 9m high. From a point 27 m away from the bottom of the pillar, a snake is coming to its hole at the base of the pillar. Seeing the snake the peacock pounces on it. If their speeds are equal, at what distance from the whole is the snake caught?

Q.15 The sum of 4th and 8th terms of an A.P. is 24 and the sum of 6th and 10th term is 44. Find the A.P.

Q.16 State and prove Basic proportionality theorem.

Q.17. Prove that

$$\frac{(1+cot\,A+tan\,A)\,(sin\,A-cos\,A)}{sec^3\,A-cosec^3\,A} = \sin^2\cos^2 A$$

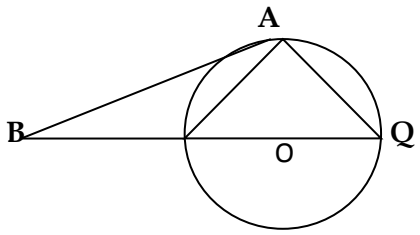
OR

Prove that

$$\text{Cot}^2\,A\left(\frac{secA-1}{1+sin\,A}\right) + \sec^2 A\left(\frac{sin\,A-1}{1+sec\,A}\right) = 0$$

18. If the point (x,y) is equidistant from the points (a+b , b-a) and (a-b a+b) prove that bx=ay.

19. The tangent at a point A of a circle with centre O intersects the diameter PQ of the circle (when extended) at the point B. If ∠BAQ = 105°, find ∠APQ

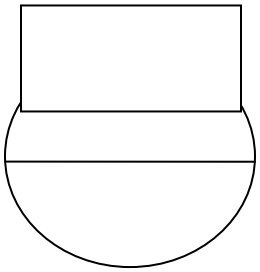


20. Draw a triangle ABC with side BC = 6 cm , ∠B=30° , ∠A=120° Then construct a triangle whose sides are $\frac{4}{3}$ times the corresponding sides of Δ ABC

21. The inner perimeter of a racetrack is 400m and the outer perimeter is 488m. The length of each straight portion is 90m. Find the cost of developing the track at the rate of Rs. 12.50 /m².

OR

ABCD is a rectangle in which AB=20 cm and BC = 10cm. A semicircle is drawn with centre at O and radius $10\sqrt{2}$ cm. It passes through A and B as shown in figure.
Find the area of the shaded region.



22. **A circus tent is in the form of a right circular cylinder and a right circular cone above it. The diameter and the height of the cylindrical part of the rent are 126m and 5m respectively. The total height of the tent is 21m. Find the total surface area of the tent.**

OR

A cone of radius 10 cm is divided into two parts by drawing a plane through the mid-point of its axis, parallel to its base compare the volumes of the two parts.

Section- D

23. **Given that the zeroes of the cubic polynomial $x^3 - 6x^2 + 3x + 10$ are of the form a, a +b , a+ 2b for some real numbers a and b, find the values of a and b as well as the zeroes of the given polynomial.**

24. **A fire in a building B is reported on telephone to two fire stations P and Q, 20 km apart from each other on a straight road. P observes that the fire is at an angle of 60° to the road and Q observes that it is at an angle of 45° to the road.**

(a) Which station should send its team and how much will this team have to travel?
(b) What according to you, are the values displayed by the teams at fire station P and Q.

25. **Draw 'less than ogive' and more than ogive for the following distribution and find its median from the graphs**

Class	Frequency
20-30	25
30-40	15
40-50	10
50-60	6
60-70	24
70-80	12
80-90	8

26. **If the area of the triangle formed by points A(x,y) B(1,2) and C (2,1) is 6 square units, show that x+y=15 and x+y = -9**

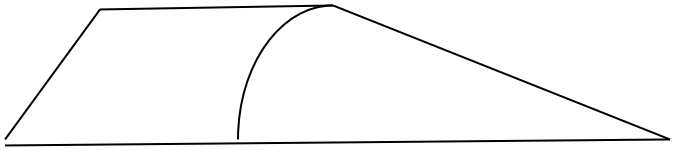
OR

If the points A(1,-2), B(2,3), C(-3,2) and D(-4, -3) are the vertices of a parallelogram ABCD , then taking AB as the base find the height of the parallelogram.

27. **If an isosceles triangle ABC in which AB=AC=6cm is inscribed in a circle of radius 9 cm , find the area of the triangle.**

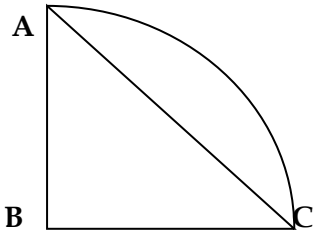
28. **Draw a pair of tangents to a circle of radius 5 cm which are inclined to each other at an angle of 60°.**

29. **ABCD is a trapezium with AB ∥ CD and ∠BCD =60°. If BFEC is a sector of a circle with centre C and AB= BC=7cm and DE= 4cm , then find the area of the shaded region.**



OR

ABCP is a quadrant of a circle of radius 14 cm with AC as diameter, a semicircle is drawn. Find the area of the shaded portion.



30. **A cistern internally measuring 150cm × 120cm × 110 cm has 129600 cm^3 of water in it. Some bricks are placed in the water until the cistern is full to the brim. Each brick absorbs one seventeenth of its own volume of water . How many bricks can be put in without the water flowing , each brick being 22.5cm × 7.5 cm × 6.5 cm?**