VYDEHI SCHOOL OF EXCELLENCE
PRE BOARD EXAMINATION (2019-20)
SUBJECT: MATHEMATICS
CLASS: X

Date: 02/12/2019

Time: 3 Hours
Maximum Marks: 80

General Instructions -

- All the questions are compulsory.
- The question paper consists of 40 questions divided into 4 sections A, B, C, and D.
- Section A comprises of 20 questions of 1 mark each. Section B comprises of 6 questions of 2 marks each. Section C comprises of 8 questions of 3 marks each. Section D comprises of 6 questions of 4 marks each.
- 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.
- Use of calculators is not permitted.

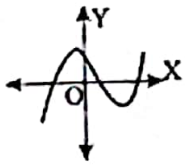
SECTION–A

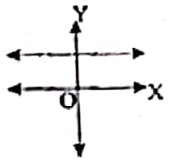
(20 × 1= 20)

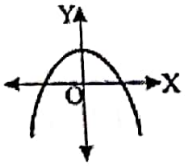
Q 1- Q 10 are multiple choice questions. Select the most appropriate answer from the given options.

1. If two positive integers p and q can be expressed as $p = ab^2$ and $q = a^3b$; a, b being prime numbers, then LCM (p, q) is
   a) ab b) a^2b^2 c) a^3b^2 d) a^3b^3

2. Which of the following is the graph of a linear polynomial?

   a) 

   b) 

   c) 

   d) 

3. $(1 + \tan A + \sec A)(1 + \cot A - \operatorname{cosec} A) =$_____.
   a) 0 b) 1 c) -1 d) 2

4. Which of the following is true for two co-prime numbers?
   a) Then- H.C.F. is 1. b) Their L.C.M. is 1.
   c) Their H.C.F. is equal to their product. d) Their L.C.M. is twice their H.C.F.

5. Which one among the following is incorrect statement for $0° \le \theta < 90°$?
   a) The Value of $\tan\theta$ increases as θ increases.
   b) The Value of $\tan\theta$ increases faster than $\sin\theta$ as θ increases.
   c) The Value of $\sin\theta+\cos\theta$ is always greater than 1.
   d) The Value of $\cos\theta$ increases as θ decreases.

6 Shyam has twice as many sisters as he has brothers. If Reena, Shyam's sister has the same number of brothers as she has sisters, then Reena has how many brothers?
a) 6 b) 3 c) 1 d) 5

7 If the centroid of the triangle whose vertices are (2, 4), (3, k), (4, 2) is (k, 3) then k is
a) 4 b) 1 c) 3 d) 2

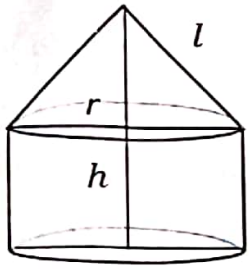
8 The point which divides the line segment joining the points (8, – 9) and (2, 3) in ratio 1 : 2 internally lies in the
a) I quadrant b) II quadrant c) III quadrant d) IV quadrant

9 Which among the following statements is correct?
a) Mode is the middle most value of a data.
b) Median and mode of a data can be determined graphically.
c) The mode of a frequency distribution can be determined graphically from ogive.
d) All the above

10 The distance of the point P (−3, −4) from the x-axis (in units) is
a) 3 b) −3 c) 4 d) 5

Q 11- Q 15 Fill in the blanks.

11 The total surface area of the given solid figure is _



12 If 9th term of an A.P. is zero, then its 29th term is _____of its 19th term.

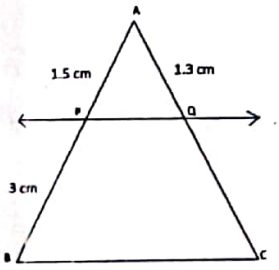
OR

In an A.P., if the pth term is 'q' and the qth term is 'p', then its nth term is _____.

13 If $\text{Cot}^2\theta = a^2 - 1$, then the value of $\text{Cosec}\,\theta + \text{Cot}^3\theta\,\text{Sec}\,\theta$ is _____.

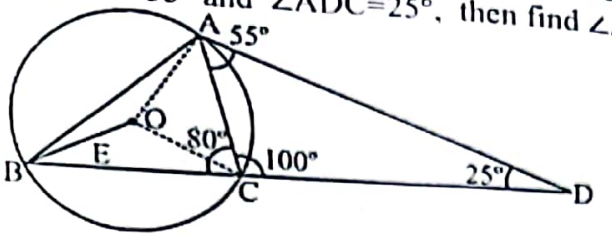
14 Two dice are tossed. The probability that the total score is a prime number is_____.

15 In the fig, if PQ || BC, then value of QC is _____.



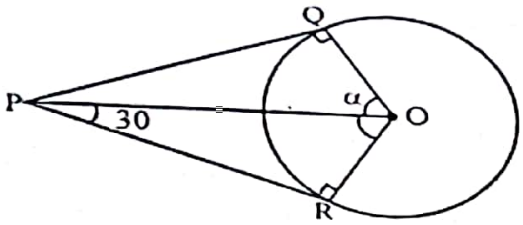
Q 16- Q 20 Answer the following.

16 In the given figure, O is the centre of the circle and AD is a tangent to the circle at A. If $\angle CAD=55°$ and $\angle ADC=25°$, then find $\angle AOC$.



OR

In the figure below, PQ & PR are two tangents to circle, then find α.



17 Find the 25th term ~~from the end~~ of the AP -5, $\frac{-5}{2}$, 0, $\frac{5}{2}$,.....

18 Base of a right angled ΔABC is 16 times the base of another right angled triangle PQR and height of first right angled triangle is 1/6th of other's height, then what will be ratio of area of first triangle to second triangle.

19 Three distances are 8 m, 9 m 20 cm and 10 m 80 cm long. What is the greatest possible length which can be used to measure these ropes?

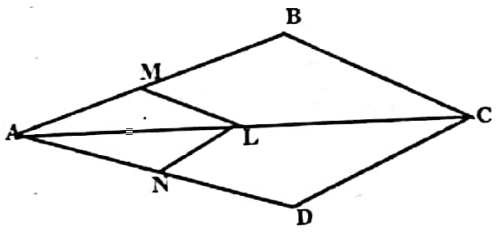
20 If m and n are zeros of the polynomial $3x^2 + 11x - 4$, find the value of $\frac{m}{n} + \frac{n}{m}$.

SECTION–B

(6 × 2= 12)

21 In an A.P., the 24th term is twice the 10th term. Prove that the 36th term is twice the 16th term.

22 In the given figure, if LM || CB and LN || CD, prove that $\frac{AM}{AB} = \frac{AN}{AD}$.



OR

In an equilateral triangle, prove that three times the square of one side is equal to four times the square of one of its altitudes.

23 A solid consists of a right circular cylinder with a right circular cone at the top. The

height of cone is 'h' cm. The total volume of the solid is 3 times the volume of the cone. Find the height of the cylinder.

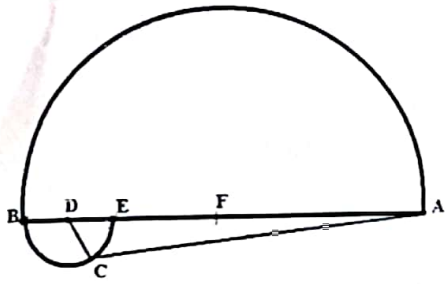
OR

The height of frustum is 4 cm and the radii of two bases are 3 cm and 6 cm respectively. Find the slant height of the frustum.

24 Cards bearing numbers 1, 3, 5,…. 35 are kept in a bag. A card is drawn at random from the bag. Find the probability of getting a card bearing prime number less than 15.

25 A tree breaks due to storm and the broken part bends so that the top of the tree touches the ground making an angle 60° with the ground. The distance from the foot of the tree to the point where the top touches the ground is 5m. Find the total height of the tree.

26 In the given fig. a semicircle is drawn outside the bigger semicircle. Diameter BE of smaller semicircle is half of the radius BF of the bigger semicircle. If radius of bigger semicircle is $4\sqrt{3}$ cm. Find the length of the tangent AC from A on a smaller semicircle.



SECTION–C

(8× 3 = 24)

27 Find HCF of 56, 96 and 324 by Euclid's algorithm.

OR

Prove that 3- $\sqrt{7}$ is an irrational number.

28 Find the value of k such that $3x^2 + 2kx + x - k - 5$ has the sum of the zeroes as half of their product.

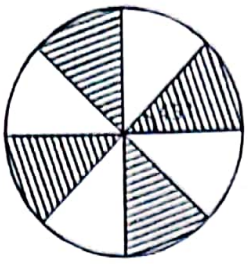
29 Evaluate

$$\frac{sin^2 20^0 + sin^2 70^0}{cos^2 20^0 + cos^2 70^0} + \left[\frac{\sin(90^0 - \theta).\sin\theta}{\tan\theta} + \frac{\cos(90-\theta).\cos\theta}{\cot\theta}\right]$$

OR

If $\cot\theta = \frac{5}{12}$, show that $\sqrt{\frac{\sec\theta - cosec\,\theta}{\sec\theta + cosec\,\theta}} = \sqrt{\frac{7}{17}}$

30 Find the area of the four blades of same size of radius 20 cm and central angle 45° of a circular fan.



31 The following frequency distribution shows the marks obtained by 100 students in a school. Find the mode.

Marks	Number of Students
Less than 10	10
Less than 20	15
Less than 30	30
Less than 40	50
Less than 50	72
Less than 60	85
Less than 70	90
Less than 80	95
Less than 90	100

32 The sum of first six terms of an AP is 42. The ratio of its 10^{th} term to its 30^{th} term is 1 : 3. Calculate the first and seventeeth terms of the AP.

33 In ΔABC, the coordinates of A are (3, 2) and the coordinates of the mid point of AC and AB are (2, –1) and (1, 2) respectively. Find the coordinates of mid point of BC.

34 The distance between school and metro station is 300 m. Kartikay starts running from school towards metro station, while Ashu starts running from metro station to school. They meet after 4 minutes. Had Kartikay doubled his speed and Ashu reduced his speed to third of the original they would have met one minute earlier. Find their speeds.

OR

A mobile company charges a fixed amount as monthly rental which includes 100 minutes free per month and charges a fixed amount these after for every additional minute. Abhishek paid Rs. 433 for 370 minutes and Ashish paid Rs. 398 for 300 minutes. Find the bill amount under the same plan, if Usha use for 400 minutes.

SECTION–D

(6 × 4 = 24)

35 Draw a less than and more than type ogive for the given data and find the median.

Distance(in m)	0-10	10-20	20-30	30-40	40-50	50-60	60-70
No.of students	4	5	13	20	14	8	4

36 Marbles of diameter 1.4 cm are dropped into a cylindrical beaker of diameter 7 cm containing some water. Find the number of marbles that should be dropped into the beaker so that the water level rises by 5.6 cm.

OR

A rocket is in the form of a right circular cylinder closed at the lower end and surmounted by a cone with the same radius as that of the cylinder. The diameter and height of the cylinder are 6 cm and 12 cm, respectively. If the slant height of the conical portion is 5 cm, find the total surface area and volume of the rocket [Use $\pi = 3.14$].

37 In a cricket match against Sri Lanka, Sehwag took one wicket less than twice the number of wickets taken by Amit Mishra. If the product of the number of wickets takes by these two is 15, find the number of wickets taken by each.

OR

At present, Asha's age is 2 more than the square of her daughter Nisha's age. When Nisha grows to her mother's present age, Asha's age would be one year less than 10 times the present age of Nisha. Find the present ages of Nisha and Asha.

38 Prove that the ratio of the areas of two similar triangles is equal to the ratio of the squares of their corresponding sides.

39 At a point, the angle of elevation of a tower is such that its tangent is $\frac{5}{12}$. On walking 240m nearer to the tower, the tangent of the angle of elevation becomes $\frac{3}{4}$. Find the height of the tower

40 Construct a right angled triangle in which base is 2 times of the perpendicular. Now construct a triangle similar to it with base 1.5 times of the original triangle.

OR

Draw a circle of diameter 7 cm. Draw a pair of tangents to the circle, which are inclined to each other at an angle of 60°.