CLASS X
SAMPLE PAPER
MATHEMATICS (STANDARD)

Exam: I Preliminary Examination 2019-20   Date: 9/12/2019

Max. Marks: 80   Duration: 3 Hr.

General Instructions:

(i)   All the questions are compulsory.

(ii)   The question paper consists of 40 questions divided into 4 sections A, B, C, and D.

(iii)   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.

(iv)   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.

(v)   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.

Q.1   The decimal representation of $\frac{23}{2^3 5^2}$ will   [1]

a) terminate after 1 decimal place
b) terminate after 2 decimal places
c) terminate after 3 decimal places
d) not terminate

Q.2   Consider the following frequency distribution of the heights of 60 students of a class   [1]

Height (in cm)	150-155	155-160	160-165	165-170	170-175	175-180
No of Students	15	13	10	8	9	5

The upper limit of the median class in the given data is
a) 165
b) 155
c) 160
d) 170

Q.3 The number $3^{13} - 3^{10}$ is divisible by [1]
a) 2 and 3   b) 3 and 10   c) 2, 3 and 10   d) 2, 3 and 13

Q.4 If $\frac{1}{2}$ is a root of the equation $x^2 + kx - \frac{5}{4} = 0$, then the value of k is_____ [1]

a) 2   b) -2   c) $\frac{1}{4}$ d) $\frac{1}{2}$

Q.5 If $\sec 5A = cosec\ (A + 30^0)$, where 5A is an acute angle, then the value of A is _____ [1]
a) 15^0 b) 5^0 c) 20^0 d) 10^0

Q.6 If $\sin\theta + \cos\theta = \sqrt{2}\cos\theta$, $(\theta \neq 90^0)$ then the value of $\tan\theta$ is [1]
a) $\sqrt{2} - 1$ b) $\sqrt{2} + 1$
c) $\sqrt{2}$ d) $-\sqrt{2}$

Q.7 If $x = p\ secx$ and $y = q\ tanx$ then, [1]
a) $x^2 - y^2 = p^2 q^2$ b) $x^2 q^2 - y^2 p^2 = pq$
c) $x^2 q^2 - y^2 p^2 = \frac{1}{p^2 q^2}$ d) $x^2 q^2 - y^2 p^2 = p^2 q^2$

Q.8 The points $(7,2)$ and $(-1,0)$ lie on a line [1]
a) $7y = 3x - 7$ b) $4y = x + 1$
c) $y = 7x + 7$ d) $x = 4y + 1$

Q.9 The distance of the point P $(-3, -4)$ from the x-axis (in units) is [1]
a) 3   b) -3 c) 4   d) 5

Q.10 If $A\left(\frac{m}{3}, 5\right)$ is the mid-point of the line segment joining the points Q $(-6, 7)$ and [1]
R $(-2, 3)$, then the value of m is _____
a) -12 b) -4 c) 12   d) -6

(Q 11- Q 15) Fill in the blanks

Q.11 The length of the diagonal of a cube that can be inscribe in a sphere of radius 7.5 cm is [1]
_____.

Q.12 If α and β are the zeros of the quadratic polynomial $ax^2 + bx + c = 0$, then [1]
$\alpha + \beta = -b/$_____ and $\alpha\beta = c/$_____

OR

Find the number of zeros of $p(x)$ using the graph.
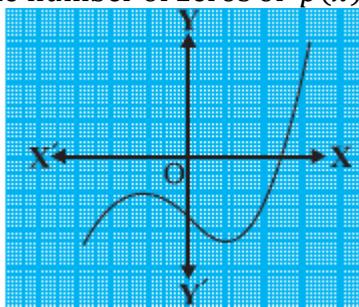
Q.13 The area of two similar triangles ABC and PQR are in the ratio 9:16. If BC=4.5 cm, then [1]
the length of QR is _____

Q.14 An A.P. starts with a positive fraction and every alternate term is an integer. If the sum [1]

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of first 11 integers is 33, then the fourth term is_____

Q.15 The probability of selecting a rotten apple randomly from a heap of 900 apples is 0·18. [1]
      What is the number of rotten apples in the heap?

(Q 16- Q 20) Answer the following

Q.16 Write one rational and one irrational number lying between 0.25 and 0.32 [1]
Q.17 In figure if $AD = 6\ cm, DB = 9\ cm, AE = 8\ cm, EC = 12\ cm$ and $\angle ADE = 48^0$. [1]
      Find $\angle ABC$.
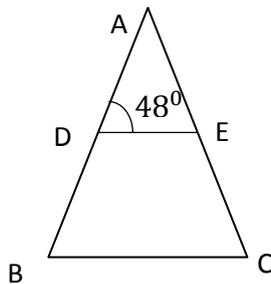
Q.18 If the angle between two tangents drawn from an external point P to a circle of radius [1]
      'a' and center O, is 60^0, then find the length of OP.

                                    OR

      If the radii of two concentric circles are 4 cm and 5 cm, then find the length of each
      chord of one circle which is tangent to the other circle.

Q.19 In an AP, if the common difference (d) = –4, and the seventh term (a_7) is 4, then find [1]
      the first term.

Q.20 Find the nature of roots of the quadratic equation $2x^2 - 4x + 3 = 0$. [1]

                                Section B

Q.21 Write the smallest number which is divisible by both 306 and 657. [2]
Q.22 Prove that the rectangle circumscribing a circle is a square. [2]
Q.23 In $\Delta ABC, AD \perp BC$, such that $AD^2 = BD \times CD$. Prove that ΔABC Is right angle at A. [2]
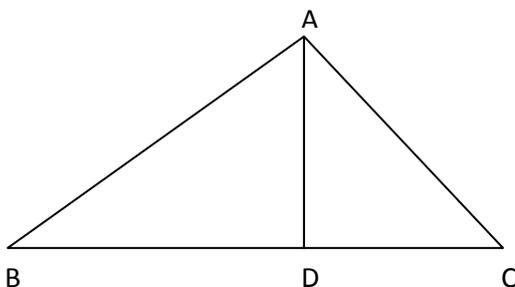
OR

Diagonals of a trapezium PQRS intersect each other at the point O, PQ || RS and PQ = 3RS. Find the ratio of the areas of triangles POQ and ROS.

Q.24 The angle of depression of two ships from an aero plane flying at the height at 7500m are 30^0 and 45^0. If both the ships are in the same direction that one ship is exactly behind the other, find the distance between the ships. [2]

Q.25 A die is thrown twice. Find the probability that [2]
    (i)   4 will come up at least once.
    (ii)   4 will not come up either times.

OR

A bag contains 19 cards, bearing numbers 1, 2, 3, ..., 19. A card is drawn at random from the bag. Find the probability that the number on the drawn card is
(i) prime (ii) Divisible by 3

Q.26 A right cylindrical container of radius 6 cm and height 15 cm is full of ice-cream, which has to be distributed to 10 children in equal cones having hemisphere shape on the top. If the height of the conical portion is four times its base radius, Find the radius of the ice-cream cone. [2]

Section C

Q.27 Prove that $3 - 2\sqrt{5}$ is an irrational number. [3]

OR

If the HCF of 408 and 1032 is expressible in the form of $1032m - 408x$, find m.

Q.28 For what value of n, are the nth term of two A.Ps 63, 65, 67, ...and 3, 10, 17, ...equal? [3]

Q.29 In the figure, ABCDE is a pentagon with BE||CD and BC||DE. BC is perpendicular to CD. AB= 5cm, AE=5cm, BE= 7cm, BC= $x - y$ and CD= $x + y$. If the perimeter of ABCDE is 27cm. find the value of x and y, given x, y $\neq$ 0. [3]
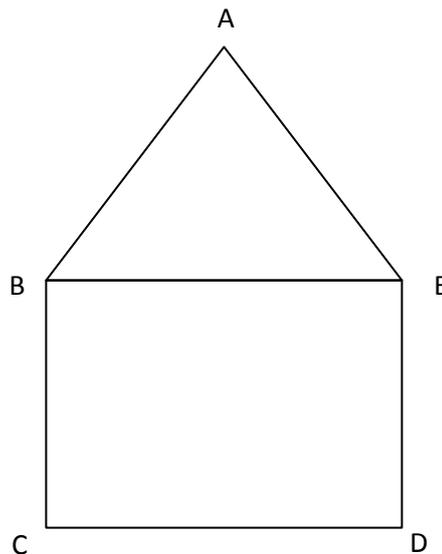
OR

Solve for x and y:

$$\frac{x+1}{2} + \frac{y-1}{3} = 9; \frac{x-1}{3} + \frac{y+1}{2} = 8$$

Q.30 Find all the other zeros of the polynomial $p(x) = x^4 + 3x^3 - x^2 - 9x - 6$. If two zeros are $\sqrt{3}$ and $-\sqrt{3}$. [3]

Q.31 Rajesh starts walking from his house to office. Instead of going to the office directly, he goes to a mall first, from there to his wife's office and then reaches the office. What is the extra distance travelled by Rajesh in reaching his office? Assume that all distance covered are in straight lines, if the house is situated at (2,4), mall at (5,8), wife's office at (13,14) and office at (13,26) and coordinates are in kilometre. [3]

Q.32 If $4\tan\theta = 3$, evaluate $\frac{4sin\theta - cos\theta + 1}{4sin\theta + cos\theta - 1}$ [3]

OR

Prove that: $\cot\theta - tan\theta = \frac{2\cos^2\theta - 1}{sin\theta\, cos\theta}$

Q.33 In the given figure, two concentric circles with center O have radii 21 cm and 42 cm. If $\angle AOB = 60^0$, find the area of the shaded region. [3]
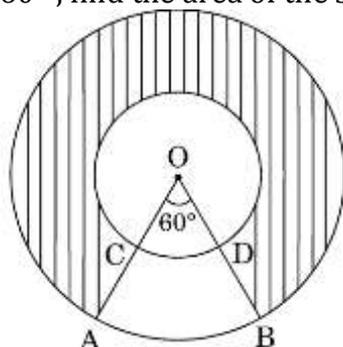
Q.34 Monthly expenditures on milk in 100 families of a housing society are given in the following frequency distribution: [3]

Monthly expenditure (in Rs.)	0-175	175-350	350-525	525-700	700-875	875-1050	1050-1125
Number Of families	10	14	15	21	28	7	5

Find the mode and median for the distribution.

Section D

Q.35 Draw a triangle ABC with side AB = 5cm, BC = 6 cm, $\angle$ABC =60°. Then construct another triangle whose sides are $\frac{5}{7}$ times the corresponding sides of the triangle ABC. [4]

OR

Draw two concentric circles of radii 2 cm and 5 cm. Take a point P on the outer circle and construct a pair of tangents PA and PB to the smaller circle. Measure PA.

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Q.36 In a triangle, if square of one side is equal to the sum of the square of the other two sides, then prove that the angle opposite the first side is a right angle. [4]

Q.37 A train covers a distance of 360 km at a uniform speed. Had the speed been 5km/hour more, it would have taken 48 minutes less for the journey. Find the original speed of the train. [4]

OR

Solve for x: $\frac{1}{x+1} + \frac{2}{x+2} = \frac{4}{x+4}$, $x \neq -1, -2, -4$

Q.38 From each end of a solid metallic cylinder, metal was scooped in a hemispherical form of same diameter. The height of the cylinder is 10 cm and its base is of radius 4.2 cm. The rest of the cylinder is melted and covered into cylindrical wire of 1.4 cm thickness. Find the length of the wire. (use $\pi = \frac{22}{7}$) [4]

OR

Water is flowing at the rate of 15km/hour through a pipe of diameter 14cm into a cuboidal pond which is 50m long and 44m wide. In what time will the level of water in the pond rise by 21cm?

Q.39 The angle of the elevation of the top Q of a vertical tower PQ from a point X on the ground is 60^0. From the point Y 40 m vertically above X, the angle of elevation of the top Q of tower is 45^0. Find the height of the PQ and the distance PX. (Use $\sqrt{3} = 1.73$) [4]

Q.40 Change the following data into 'less than type' distribution and draw its ogive: [4]

Class Interval:	30-40	40-50	50-60	60-70	70-80	80-90	90-100
Frequency:	7	5	8	10	6	6	8

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