Preliminary Examination II (2019-2020)
SUBJECT: MATHEMATICS

Grade: X **DATE: 06/01/2020**
Time: 3 hour **Total Marks: 80**

General Instructions :
(i) All 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.1-10 are multiple choice questions. Select the most appropriate answer from the given options.

1 Which of the following will have a terminating decimal expansion? 1
(a) 77/210 (b) 23/30 (c) 125/ 441 (d) 23/8

2 If $a^3 - 3a^2b + 3ab^2 - b^3$ is divided by a-b then the remainder is 1
(a) $a^2 - ab + b^2$ (b) $a^2 + ab + b^2$ (c) 1 (d) 0

3 There are 60 terms in an A.P of which the first term is 8 and the last term is 185. The 31st term is 1
(a) 56 (b) 94 (c) 85 (d) 98

4 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) $x = 4y + 1$

5 If the nth term of an A.P. is given by $a_n = 5n - 3$, then the sum of first 10 terms if 1
(a) 225 (b) 245 (c) 255 (d) 270

6 The sides of a triangle (in cm) are given below. In which case, the construction of triangle is not possible. 1
(a) 8, 7, 3 (b) 8, 6, 4 (c) 8, 4, 4 (d) 7, 6, 5

7 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

8 If a circular grass lawn of 35m in radius has a path 7m wide running around it on the outside, then the area of the path is 1
(a) $1450m^2$ (b) $1576m^2$ (c) $1694m^2$ (d) $3368m^2$

9 x and y are 2 different digits. If the sum of the two digit numbers formed by using both the digits is a perfect square, then value of x + y is 1
(a) 10 (b) 11 (c) 12 (d) 13

10 If one root of the quadratic equation $ax^2 + bx + c = 0$ is the reciprocal of the other, then 1
(a) b = c (b) a = b (c) ac = 1 (d) a = c

(Q.11-Q.15) Fill in the blanks.

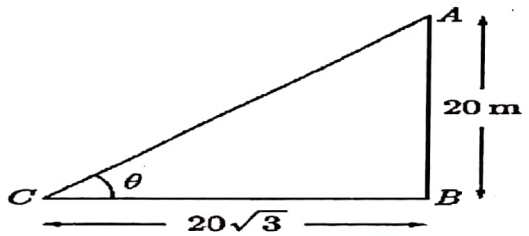
11 The volume of a solid hemisphere having radius r is _____ 1

12 If HCF (a,b) = 12 & a x b =1800, then find LCM (a,b) is _____ 1

13 Ratio in which the line 3x + 4y = 7 divides the line segment joining the points (1, 2) and (-2 ,1) is _____ 1

14 In △PQR, right-angled at Q, PR+ QR = 25 cm and PQ = 5 cm. The value of tanP is _____ 1

15 In figure, a tower AB is 20 m high and BC, its shadow on the ground, is $20\sqrt{3}$ m long. find the Sun's altitude. 1



(Q.16-Q.20) Answer the following

16 Find the following frequency distribution, find the median class : 1

Cost of living index	1400- 1500	1550- 1700	1700- 1850	1850- 2000
Number of weeks	8	15	21	8

17 What is the ratio of the total surface area of the solid hemisphere to the square of its radius? 1

18 Out of 200 bulbs in a box, 12 bulbs are defective. One bulb is taken out at random from the box. What is the probability that the drawn bulb is not defective? 1

19 Given that HCF (306, 1314) = 18, find the LCM (306, 1314). 1

20 If sec5A = cosec (A + 30°) , where 5A is an acute angle, then what is the value of A? 1

Section B

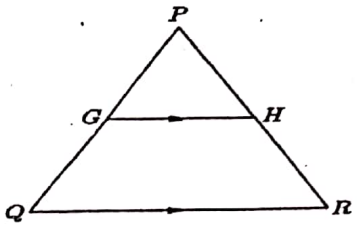
21 The diameter of two circle with centre A and B are 16 cm and 30 cm respectively. If area of another circle with centre C is equal to the sum of the areas of these two circles, then find the circumference of the circle with centre C. 2

22 Read the following passage and the question that follows: There are 60 students in a class among which 30 are boys. In another class there are 50 students among which 25 of them are boys. If one from each class is selected, 2

(a) What is the probability of both being girls ?

(b) What is the probability of having at least one girl?

23 In the given figure, G is the midpoint of the side PQ of $\triangle PQR$ and $GH \parallel QR$. 2
Prove that H is the midpoint of the side PR or the triangle PQR.



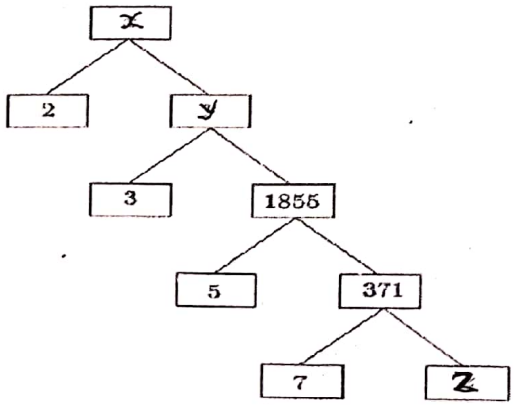
24 Read the following passage and the question that follows: The radius and height of a wax made cylinder are 6 cm and 12 cm respectively. A cone of same base radius and height has been made from this cylinder by cutting out. 2

(a) Find the volume of cone

(b) Find the volume of the remaining wax.

25 The angle of elevation of the top of a hill at the foot of a tower is 60° and the angle of elevation of the top of the tower from the fort of the hill is 30°. If the tower is 50m high, what is the height of the hill. 2

26 Complete the following factor tree and find the composite number x 2



Section C

27 Solve for x : $\frac{1}{x} + \frac{2}{2x-3} = \frac{1}{x-2}$, $x \neq 0, \frac{2}{3}, 2$. 3

28 Use Euclid division lemma to show that the square of any positive integer cannot be of the form 5m+2 or 5m+3 for some integer m. 3

29 If the co-ordinates of points A and B are $(-2, -2)$, and $(2, -4)$, respectively, find the co-ordinates of P such that $AP = \frac{3}{7}$ AB, where P lies on the line segment AB. 3

30 Construct a triangle with sides 5 cm, 6 cm and 7 cm and then another triangle whose sides are $\frac{7}{5}$ of the corresponding sides of the first triangle. 3

31 The following table shows the ages of the patients admitted in a hospital during a year: 3

Age (in years)	5 - 15	15 - 25	25 - 35	35 - 45	45 - 55	55 - 65
Number of patients	6	11	21	23	14	5

Find the mode and the mean of the data given above.

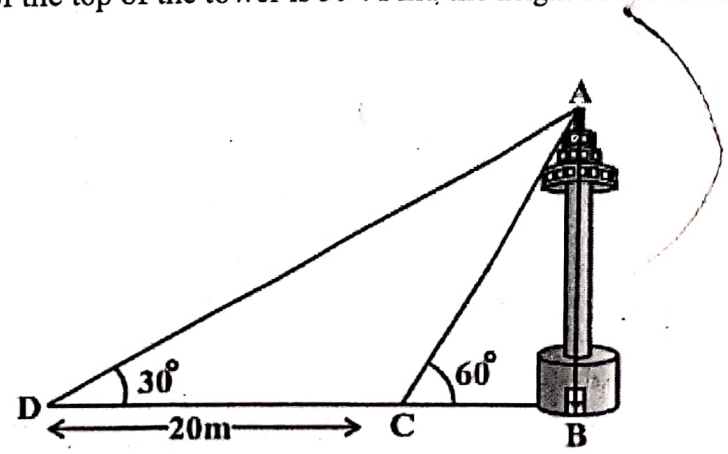
32 Find the 20th term of an A.P. whose 3rd term is 7 and the seventh term exceeds three times the 3rd term by 2. Also find its nth term (a_n) . 3

33 Obtain all other zeros of the polynomial $9x^4 - 6x^3 - 35x^2 + 24x - 4$, if two of its zeroes are 2 and -2. 3

34 If $x\sin^3\theta + y\cos^3\theta = \sin\theta\cos\theta$ and $x\sin\theta = y\cos\theta$, Prove that $x^2 + y^2 = 1$ 3

Section D

35 A TV tower stands vertically on the bank of a canal. From a point on the other bank directly opposite the tower, the angle of elevation of the top of the tower is 60°. From another point 20 m away from this point on the line joining this point to the foot of the tower, the angle of elevation of the top of the tower is 30°. Find the height of the tower and the width of the canal. 4



36 A passenger while boarding the plane, slipped from the stairs and got hurt. The pilot took the passenger in the emergency clinic at the airport for treatment. Due to this, the plane got delayed by half an hour. To reach the destination 1500 km away in time, so that the passengers could catch a connecting flight, the speed of the plane was increased by 250 km/hour than the usual speed. What is the usual speed of the plane? 4

37 Hanumappa and his wife Gangamma are busy making jaggery out of sugarcane juice. They have processed the sugarcane juice to make the molasses, which is poured into moulds in the shape of a frustum of a cone having the diameters of its two circular faces as 30 cm and 35 cm and the vertical height of the mould is 14 cm. If each cm^3 of molasses has mass about 1.2 g, find the mass of the molasses that can be poured into each mould. 4

38 In the right triangle ACD, B is a point on AC such that AB+AD = BC + CD . $\angle C = 90°$ 4

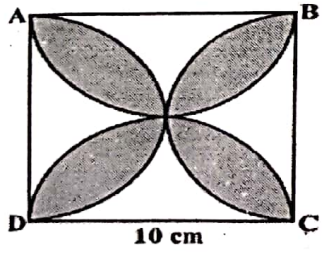
If AB = x, BC = h , and CD = d , then find x (in terms of h and d).

39 The following distribution gives the marks of 53 students in mathematics. 4

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
Number of students	5	3	4	3	3	4	7	9	7	8

Draw less than type ogive for the data above and hence find the median.

40 Find the area of the shaded design, where ABCD is a square of side 10 cm and semicircles are drawn with each side of the square as diameter. (Use $\pi = 3.14$) 4



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