SUMMATIVE ASSESSMENT – II

952VKEM

St. Paul samastipur

MATHEMATICS / Class – X

Time allowed : 3 hours **Maximum Marks : 90**

SECTION-A

Question numbers **1** to **4** carry **one** mark each.

1 Find the numerical difference of the roots of the equation $x^2 - 7x - 18 = 0$. 1

2 A tower stands near an airport. The angle of elevation θ of the tower from a point on the ground is such that its tangent is $\frac{5}{12}$. Find the height of the tower, if the distance of the observer from the tower is 120 metres. 1

3 What is the sum of probabilities of all the elementary events of an experiment ? 1

4 Find the coordinates of a point A, where AB is the diameter of a circle whose centre is $(4, -1)$ and B is $(5, 2)$. 1

SECTION-B

Question numbers **5** to **10** carry **two** marks each.

5 Find the 7^{th} term from the end of the AP : 7, 10, 13, ..., 184. 2

6 Find the roots of the quadratic equation, $3x^2 - 2\sqrt{6}\,x + 2 = 0$. 2

7 A circle with centre O is inscribed in a right angled triangle ΔABC in which $\angle B = 90°$. The circle touches its sides AB, BC and AC at points P, Q and R respectively. If PB = 2 cm, find diameter of the circle. 2

8 Divide a line segment AB of length 9.2 cm in the ratio 1 : 3 by bisecting it twice. Find the measures of the two parts. 2

9 Draw a circle of diameter 7cm. Then, draw two tangents to the circle from a point T at a distance of 7cm from the centre of the circle. 2

10 Two cubes of side 5 cm each are kept together joining edge to edge to form a cuboid. Find the surface area of the cuboid so formed. 2

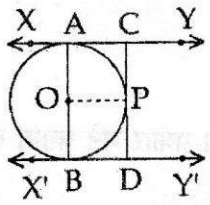
SECTION-C

Question numbers **11** to **20** carry **3** marks each.

11 The 8^{th} term of an AP is zero. Prove that its 38^{th} term is triple of its 18^{th} term. 3

12 Solve for x : $\frac{1}{a+b+x} = \frac{1}{a} + \frac{1}{b} + \frac{1}{x}$; $a \neq 0, b \neq 0$, $x \neq 0$ and $a + b + x \neq 0$. 3

13 The given figure shows two parallel tangents XY and X'Y' at the points A and B respectively to the circle with centre O. 3



Another tangent CD is drawn parallel to AB at the point P. Show that a circle with P as centre and OP as radius will pass through C and D.

14 A ladder is leaning against a wall of a house such that its upper end is touching the top of the wall. The foot of the ladder is 2 m away from the wall and the ladder is making an angle of 60° with the level of the ground. Find the height of the wall. Also, find the length of the ladder. 3

15 A number x is chosen from $-5, -4, -3, -2, -1, 0, 1, 2, 3$. Find the probability that $|x| < 3$. 3

16 The coordinates of the vertices of ΔABC are A(7, 2), B(9, 10) and C(1, 4). If E and F are the mid-points of AB and AC respectively, prove that $EF = \frac{1}{2}BC$. 3

17 Show that the line- segments joining the points (4, 2) and (−6, 4) and (−10, 5) and (8, 1) bisect each other. 3

18 A vessel is in the form of an inverted cone. Its height is 8 cm and radius of its top, which is open, is 5 cm. It is filled with water upto the brim. When lead shots, each of which is a sphere of radius 0.5 cm, are dropped into the vessel, one-fourth of the water flows out. Find the number of lead shots dropped in the vessel. 3

19 Fencing a circular park at the rate of ₹ 70 per metre is ₹ 11000. Find the area of the park. (Use $\pi = \frac{22}{7}$) 3

20 A chord of a circle of radius 10 cm subtends a right angle at the centre. Find the area of the corresponding minor segment. (Use $\pi = 3.14$) 3

SECTION-D

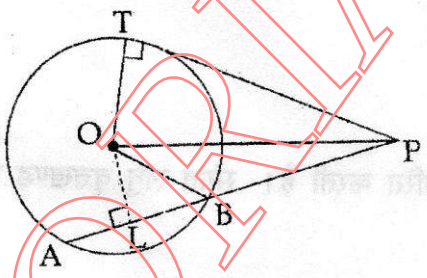
Question numbers **21** to **31** carry **4** marks each.

21 Two APs have the same common difference. If the first terms of the APs are 5 and 6 respectively, find the difference between the sum of their first 20 terms. 4

22 At present, Asha's age (in years) is two more than the square of her daughter Nisha's age (in year). 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 Asha and Nisha. 4

23 Puru and Rajan live in two different villages 165 km apart. They want to meet each other but there is no mode of transport. Puru travels 15 km the first day, 14 km the second day, 13 km the third day and so on. Rajan travels 10 km the first day, 12 km the second day, 14 km the third day and so on. After how many days will they meet? 4

24 In the figure, a tangent PT and a line segment PBA is drawn to a circle with centre O. If OL ⊥ AB, prove that $PA \times PB = PT^2$. 4



25 Construct ΔPQR ~ΔABC in which AB=6.2 cm, BC=5.4 cm and AC=4 cm, using scale factor $\frac{1}{3}$. 4

26 The angles of depression of the top and bottom of a 8 m tall building from the top of a multistoried building are 30°and 45° respectively. Find the height of the multistoried building and the distance between the two buildings. 4

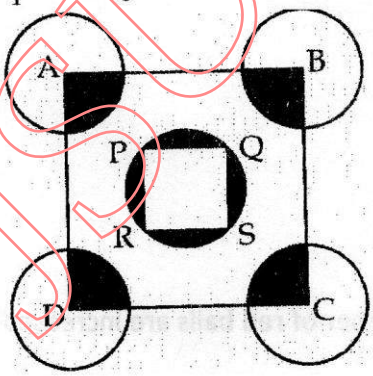
27 A bag contains 15 balls of which x are blue and remaining red. If the number of red balls are increased by 5, the probability of drawing the red ball doubles. Find 4

(i) P (red ball) (ii) P (blue ball) (iii) P (blue ball if 5 extra red balls are actually added)

28 The co-ordinates of the vertices of a quadrilateral ABCD are A (0, 5), B (−2, −2), C(5, 0) and D(7, 7). Prove that the quadrilateral ABCD is a rhombus. 4

29 A hollow cone is cut by a plane parallel to the base and upper part is removed to make a Turkish Cap. If the curved surface area of the remainder is $\frac{24}{25}$ of the curved surface area of the whole cone, find the ratio of the line segments into which the cone's height is divided by the plane from which the cut is made. 4

30 In the figure, ABCD is a square of side 14 cm and circles are drawn at each vertex of radius 4 cm. A circle of diameter 7 cm is drawn in the interior of the square, circumscribing another square PQRS. Find the area of the shaded region. 4



31 An NGO has decided to start a campaign about the consumer services, to spread awareness about the consumer courts and their benefits. For the same purpose, it makes some badges in the shape as shown in the figure, such that AB=BC=CD=DE =21 cm. 4
Find the area and perimeter of the badge (shaded region.) How consumer courts are helpful for the society ?