** SINDHI HIGH SCHOOL, BANGALURU**

**I PRE-BOARD EXAMINATION (2023-24)**

**SUBJECT – Mathematic Standard (041)**

**Set – 2**

**Class: X Marks: 80**

**Date: 11/12/2023 Reading Time: 8:30 to 8:45 am Number of printed sides: 06 Writing Time: 8:45 to 11:45 am**

**GENERAL INSTRUCTIONS:**

* This Question Paper has 5 Sections A, B, C, D and E.
* Section A has 20 MCQs carrying 1 mark each
* Section B has 5 questions carrying 02 marks each
* Section C has 6 questions carrying 03 marks each.
* Section D has 4 questions carrying 05 marks each.
* Section E has 3 case based integrated units of assessment (04 marks each) with sub- parts of the values of 1, 1 and 2 marks each.
* All Questions are compulsory. However, an internal choice in 2 Qs of 5 marks, 2 Qs of 3 marks and 2 Questions of 2 marks has been provided.
* Draw neat figures wherever required. Take π =22/7 wherever required.

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|  | **Section A** |  |
|  | **Section A consists of 20 questions of 1 mark each.** |  |
| 1 | If a = 6n+5n and b = 6n-5n where n is a natural numbers, then a and b are numbers ending with  a) 6 b)1 c) 0 d) 2 | **1** |
| 2 | The value of k in the polynomial x22kx 8 if sum of the zero is zero  a)0 b)-1 c)-2 d)1 | **1** |
| 3 | For what values of k, the following equations has no solution:  2x+3y = 5 and 6x+ky = 15  a)k=9 b) k 9 c) k=9 d)No value of k | **1** |
| 4 | Which of the following is true is the polynomial ax2+bx+c has distinct rational roots  a) – 4ac 0 b) – 4ac 0  c) – 4ac, a perfect square d) – 4ac=0 | **1** |
| 5 | If 9, a, b, -6 are in AP , then a+b is  a)1 b)5 c)15 d)3 | **1** |
| 6 | The line segment joining points A(4,3) and B(5,-2) is equally divided by the points P, Q and R. The ratio in which the point Q divides AB is  a)2:3 b)5:4 c) 2:1 d)1:1 | **1** |
| 7 | The points A(0,4) , B(3,0) and C(-3,0) forms an isosceles triangle. The length of median drawn from the vertex A to the side BC is  a)12units b)3unitsc)4unitsd) | **1** |
| 8 | In PQR ,D and E are mid-points of sides PQ and PR respectively and QR=6cm , then the length of DE is  a)2.5cm b)3cm c)5cm d)6cm | **1** |
| 9 | One tangent which is drawn at the end point of chord of a circle makes an angle of 300. The angle subtended by the other tangent at the other end points is  a)900 b)450 c)1200 d)300 | **1** |
| 10 | In the give figure, If AB=7cm then CD  a)14cm b)8cm  c)7cm d)9cm    ., | **1** |
| 11 | If tan =cot then the value of is  a)600 b) 450 c)300 d)00 | **1** |
| 12 | The value of (1+)(1+sin) (sin1)  a) 0 b) 3 c)1 d)1 | **1** |
| 13 | The angle of elevation of the top is 450 . If the horizontal distance from the foot of the tower to the point of observation is 20m then the height of the tower is  a) b)20m c)60m d) | **1** |
| 14 | The diagonal of the square whose side is ‘a’ units is    a)a units b)a units c)a units d) a units | **1** |
| 15 | The area of the sector of a circle whose sector angle is 450 is  a)Half of area of the circle b)one-fourth of area of circle c)one-eighth of area of the circle d) one-third of area circle | **1** |
| 16 | X=2,5,1 and Y=5, 3, 4. A number from X and Y are chosen . The probability that XY10 is  a) b) 1 c) d) | **1** |
| 17 | One consonant from the letter of English alphabet is chosen. The probability that it is a consonant from the word ‘SCHOOL’.  a) b) c) d) | **1** |
| 18 | The modal class of the following distribution is   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | Height cm | 30 | 40 | 50 | 60 | 70 | 80 | 90 | | plants | 8 | 20 | 44 | 50 | 60 | 75 | 100 |   a) 20-30 b) 40-50 c) 90-100 d) 80-90 | **1** |
| 19 | In question 19 and 20 a statement of assertion(A) is followed by a statement of reason(R). Choose the correct option.  Assertion(A): A sphere of radius 3cm is completely submerged in a cylindrical vessel that has some water in it. The volume of the water displaced is equal to 113.14 cm3  Reason(R) : If a body is completely submerged , the volume of the fluid displaced is equal to volume of the body.  a)Both assertion (A) and reason (R) are true and reason R is the correct explanation of assertion A  b) Both assertion (A) and reason(R) are true but reason R is not the correct explanation of assertion A.  c) Assertion A is true but reason R is false.  d)Assertion a is false but reason R is true. | **1** |
| 20 | Assertion( A) Let the positive numbers a, b, c be in AP then 1/bc, 1/ac, 1/ab are also in AP.  Reason( R): If each term of the AP is divided by abc , the resultant sequence is in AP.  a)Both assertion (A) and reason (R) are true and reason R is the correct explanation of assertion A  b) Both assertion (A) and reason(R) are true but reason R is not the correct explanation of assertion A.  c) Assertion A is true but reason R is false.  d)Assertion a is false but reason R is true. | **1** |
|  | **SECTION-B** |  |
|  | **Section B consists of 5 questions of 2 marks each** |  |
| 21 | Prove that is an irrational number. | **2** |
| 22 | PQR XYZ is such that PQ=9cm and XY=7cm. PM and XL are medians from the vertices P and X respectively. If PM = 15cm find the length of XL. | **2** |
| 23 | From a point P which is at a distnace 13cm from the center ‘O’ of a circle of radius 5cm, a pair of tangent PQ and PR are drawn to the circle. Find the area of the quadrilteral PQOR. | **2** |
| 24 | Determine the value of x such that 2 x =10  OR  In an acute angled triangle ABC, if tan(A+B-C) = and cot (B+C-A) = . Find the measure of B and A+C | **2** |
| 25 | A Japanese fan can be made by sliding open its 7 small sections (or leaves), each of which is in the form of sector of a circle having central angle 150. If the radius of this fan is 24cm, find out the length of the lace that if required to cover its entire boundary. ( )    OR  Two circles touch each other externally. Distance between their centers is 14cm. Find the sum of circumferences of the circles | **2** |
|  | **SECTION-C** |  |
|  | **Section C consists of 6 questions of 3 marks each** |  |
| 26 | The Muscle Gym has bought 63 treadmills and 108 elliptical machines. The gym divides them into several identical sets of treadmills and elliptical machines for its branches located throughout the city, with no exercise equipment left over. What is the greatest number of branches the gym can have in the city? Also find the number of treadmills and elliptical machines each branch can have? | **3** |
| 27 | If the zeroes of the polynomial x2+px+q are one-third in value to the zeroes of  2x2-5x­-3, find the value of p and q. | **3** |
| 28 | Solve for x and y : 37x+43y= 123 ; 43x+37y=117  OR  Students of a class are made to stand in rows. If one student is extra in a row, there would be 2 rows less. If one student is less in a row there would be 3 rows more. Find the number of students in the class. | **3** |
| 29 | If and ( ) be the diameters of two concentric circles and c is the length of the chord of a circle which is the tangent to the larger circle. Prove that  = + .  OR  In figure, AB is a chord of length 8cm of a circle of radius 5cm. The tangents to the circle at A and B intersect at P. Find the length of AP | **3** |
| 30 | If 1+= 3 sincos, prove that tan = 1 or | **3** |
| 31 | Median of the distribution given below is 14.4. Find the values of x and y, if sum of frequency is 20.   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | Class | 0-6 | 6-12 | 12-18 | 18-24 | 24-30 | | Frequency | 4 | x | 5 | y | 1 | | **3** |
|  | **SECTION-D** |  |
|  | **Section D consists of 4 questions of 5 marks each** |  |
| 32 | An aeroplane left 30minutes later than its scheduled time and in order to reach destination 1500k away in time, it has increase speed by 250km/hr from its usual speed. Determine its usual speed.  **OR**  The speed of a boat in still water is 8km/hr. It can go 15 km upstream and 22 km downstream in 5 hours. Find the speed of the stream. | **5** |
| 33 | Prove that if a line drawn parallel to one side of a triangle to intersect other two sides in distinct points, the other two sides are divided in the same ratio.  The diagonals of a quadrilaterals intersect each other at the point O such that  = Show that ABCD is a trapezium. | **5** |
| 34 | Shown below is a cuboid in different orientations. The length, breadth and height of the cuboid are distinct. The cuboid has 480cm3 of water. If the height of water in orientation II is half of that in orientation I, then find the heights of water in both orientations.  WhatsApp Image 2023-11-02 at 21  **OR**  From a cuboidal solid metallic block of dimensions 15cmx10cmx5cm a cylindrical hole of diameter 7cm is drilled out. Find the surface area of the remaining block. Also find the volume of the solid. | **5** |
| 35 | The frequency distribution table of agricultural holdings in a village is given below.  Find the mean, median and mode of data   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | Area of land (ha) | 1-3 | 3-5 | 5-7 | 7-9 | 9-11 | 11-13 | | No. of families | 20 | 45 | 80 | 55 | 40 | 12 | | **5** |
|  | **SECTION-E** |  |
|  | **Section E consists of 3 case study based questions.** |  |
| 36 | The school auditorium was to be constructed to accommodate at least 1500 people. The chairs are to be placed in concentric circular arrangement in such a way that each succeeding circular row has 10 seats more than the previous one.    i) If the first circular row has 30 seats, how many seats will be there in the  10th row?  ii) For 1500 seats in the auditorium, how many rows need to be there?  **OR**  If 1500 seats are to be arranged in the auditorium, how many seats are still left to be put after 10th row?  iii) If there were 17 rows in the auditorium, how many seats will be there in the middle row? | **4** |
| 37 | A tiling or tessellation of a flat surface is the covering of a plane using one or more geometric shapes called tiles, with no overlaps and no gaps Historically. tessellations were used in ancient Rome and in Islamic art. You may find tessellation patterns on floors, walls, paintings etc. Shown below is a tiled floor in the archaeological Museum of Seville, made using squares, triangles and hexagons.    i)What is the length of the line segment joining points B and F?  ii) The centre 'Z' of the figure will be the point of intersection of the diagonals of rectangle WXOP. Then what are the coordinates of Z  iii) What are the coordinates of the point on y axis equidistant from A and G7  **OR**  What is the area of Trapezium AFGH? | **4** |
| 38 | WhatsApp Image 2023-10-24 at 18Trigonometry in the form of triangulation forms the basis of navigation, whether it is by land , sea or air. GPS a radio navigation system helps to locate our position on earth with the help of satellites.  A guard stationed at the top of a 240m tower, observed an unidentified boat coming towards it. A clinometer is an instrument used for measuring angles or (tilt). He used the clinometer to measure the angle of depression of the boat coming towards the light house and found to be 300.  After 10 minutes , the guard observed that the boat was approaching the tower and its distance from the tower is reduced by 240(-1)m.  i)Draw a labelled figure for the above information.  ii)Find the distance of the boat from the foot of the tower , when the angle of depression was 300  iii)Find the distance between the boat and the top of the tower when the angle of depression is 300  OR  Calculate the angle of depression after 10 minutes. | **4** |

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