**KENDRIYA VIDYALAYA SANGATHAN GUWAHATI REGION**

**HALF YEARLY EXAM (2018 - 19)**

**Class-X**

**Mathematics (SET – 1)**

**Time allowed: 3 Hours Max. Marks: 80**

**General Instructions:**

**(i) All questions are compulsory.**

**(ii) The question paper consists of 30 questions divided into four sections A, B, C and D.**

**(iii)Section A contains 6 questions of 1 mark each. Section B contains 6 questions of 2 marks each. Section C contains 10 questions of 3 marks each. Section D contains 8 questions of 4 marks each.**

**(iv)There is no overall choice. However, an internal choice has been provided in four questions of 3 marks each and 3 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**

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|  | **Section A****Question numbers 1 to 6 carry 1 mark each.** |
| **1** | **Is 7×11×13 + 11 a composite number? Justify your answer.** |
| **2** | **Find the value of k for which the equation 9x2 + 8kx + 16 = 0 has equal roots.** |
| **3** | **Find the sum of first tweleve multiples of 7.** |
| **4** | **For what value of x, the points A (1, 2), b (–4, 7) & C (x, –1) are collinear?** |
| **5** | **If sin3A = cos(A – 260) where 3A is an acute angle, find the value of A.** |
| **6** | **Find the zeros of the polynomial 4x2 – 7.** |
|  | **Section B****Question numbers 7 to 12 carry 2 marks each.** |
| **7** | **Check whether 6 n can end with the digit 0 for any natural number n?** |
| **8** | **In an A.P, the sum of first n terms of an A.P. is given by sn = 3n2 – n. Determine the A.P. & its 25th term.** |
| **9** | **Solve : 10ax2 – 6x + 15ax – 9 = 0, a ≠ 0** |
| **10** | **Find those points on the X-axis which are at a distance of 5 units from the point (5, –3).** |
| **11** | **In an isosceles triangle ABC, if AB = AC = 13 cm & the altitude from A on BC is 5 cm. Find BC.** |
| **12** | **Find the value of the expression**  |
|  | **Section C****Question numbers 13 to 22 carry 3 marks each.** |
| **13** | **Use Euclid’s division lemma to show that the cube of any positive integer is of the form 9m, 9m + 1 or 9m + 8.** |
| **14** | **If one solution of the equation 3x2 =8x +2k + 1 is seven times the other. Find the solution & the value of k.** |
| **15** | **Solve graphically: x – y = – 1 & 2x + y – 10 = 0. Also find the area formed by two lines with x axis.** |
| **16** | **Determine the ratio in which the point (x, 2) divides the line segment joining the points (–3, –4) & (3, 5). Also find x.** |
|  | **OR** |
|  | **Determine the ratio in which the line 2x + y – 4 = 0 divides the line segment joining the points (2, –2) & (3, 7).** |
| **17** | **In the fig, ABCD is a trapezium in which AB ׀׀ DC. The diagonals AC & DB intersect at O. Prove that**  |
|  | **OR** |
|  | **In fig, DE ׀׀ AC & DF ׀׀ AE. Prove that**  |
| **18** | **Solve for x & y:  +3y =14; – 4y = 23** |
| **19** | **Find the value of  +  – 8 sin2300** |
|  | **OR** |
|  | **If tan ( A + B ) = , tan ( A – B ) = , where A > B & A, B are acute angles. Find the values of A & B.** |
| **20** | **A fast train takes 3 hours less than a slow train for a journey of 600 km. If speed of the slow train was 10 km/hr less than that of the fast train, find the speeds of the trains.** |
| **21** | **A contractor on construction job specifies a penalty for delay of completion beyond a certain date as follows: Rs. 200 for the first day, Rs. 250 for the second day, Rs. 300 for the third day etc., the penalty for each succeding day being Rs. 50 more than for the preceeding day. How much money the contractor has to pay as penalty if he has delayed the work by 30 days?** |
|  | **OR** |
|  | **A spiral is made up of successive semicircles, with centers alternatively at A & B, starting with center at A of radii 0.5 cm, 1 cm, 1.5 cm, 2 cm …….as shown in the figure. What is the total length of such spiral made up of thirteen consecutive semicircles? ( = )** |
| **22** | **Prove that the area of the equilateral triangle described on the side of a square is half the area of the equilateral triangle described on its diagonal.** |
|  | **Section D****Question numbers 23 to 30 carry 3 marks each.** |
| **23** | **The sum of the reciprocals of Rehman’s ages (in years) 3 years ago & 5 years from now is . Find his present age.** |
|  | **OR** |
|  | **Solve:**  |
| **24** | **If m times the mthterm of an A.P. is same as n times the nth term, find its (m + n)th term.** |
| **25** | **Prove that in a right triangle the square of the hypotenuse is equal to the sum of the squares of the other two sides.** |
|  | **OR** |
|  | **Prove that the equilateral triangles described on the two sides of a right-angled triangle are together equal to the equilateral triangle described on the hypotenuse in terms of their areas.** |
| **26** | **Prove that is an irrational number.** |
| **27** | **Find all the zeros of the polynomial x4 – 5x3 + 2x2 + 10x – 8, if two of its zeros are, –.** |
| **28** | **Find values of a & b for which the system of linear equations has infinite number of solutions. 2x – (a – 4)y = 2b + 1; 4x – (a – 1)y = 5b – 1.** |
| **29** | **Find the area of the quadrilateral ABCD formed by the joining of the following points in order: A(2, 9), B (3, 5), C (5, 5), D(7, 9).** |
| **30** | **If sin + cos = sin(900 – ), then find the value of tan** |
|  | **OR** |
|  | **Evaluate sin(500 +) – cos(400 – ) + cot2300 +  +**  |