HALF YEARLY EXAMINATION, 2017-18

MATHEMATICS

Time : 3 hrs. **Class - X** **M.M. : 80**

Date – 12.09.2017 (Tuesday)

Name of the student _____Section _____

General Instructions –

- All questions are compulsory.
- The question paper comprises 30 questions divided into 4 Sections, Section A, B, C, and D.
- Section A comprises 6 questions of 1 mark each. Section B comprises 6 questions of 2 marks each.
- Section C comprises 10 questions of 3 marks each and Section D comprises 8 questions of 4 marks each.
- There is no overall choice in the paper. All questions are compulsory.
- Use of calculator is not permitted.
- Draw figures & graphs wherever needed.

SECTION-A (6 questions of 1 mark each)

Q.1 Decimal expansion of an irrational number is always _____ and _____.

Q.2 The line which intersect the circle at two points is called a _____.

Q.3 Probability of an impossible event is _____.

Q.4 Common difference of A.P. $\sqrt{2}, \sqrt{8}, \sqrt{18}, \sqrt{32}$ is _____.

Q.5 The decimal expansion of rational numbers having their denominators in the form of 2^m5^n only are _____.

Q.6 The maximum number of zeroes of a cubic polynomial is _____.

SECTION - B (6 questions of 2 marks each)

Q.7 Find 110^{th} term of A.P. 2,5,8,……

Q.8 If HCF and LCM of two numbers are 6 and 36 respectively and one of the number is 12 then find the second number.

Q.9 Find a quadratic polynomial whose sum and the product of the zeroes are 4 and 1 respectively.

Q.10 Find the distance between points A(2,3) & B(5,7)

Q.11 In ΔABC, right angled at B, AB = 3 cm, BC = 4 cm, determine sin A, cos A.

Q.12 List all possible outcomes when two coins are tossed together.

SECTION-C (10 questions of 3 marks each)

Q.13 Using Euclid's division lemma find HCF of 96 and 404.

Q.14 Find the zeroes of the polynomial $x^2 - 2x - 8$ and verify the relationship between the zeroes and the coefficients of the terms of the polynomial.

Q.15 Solve the equation $9x^2 - 15x + 6 = 0$ by completing the square method.

Q.16 If 7 times of the 7^{th} term of an A.P. is equal to 5 times of the 5^{th} term of the same A.P. then find its 12^{th} term.

Q.17 Find the point on the *x*-axis which is equidistant from (2, –5) and (–2, 9).

Q.18 Find the value of k if points (k,4), (6,8) and (10,12) are collinear.

Q.19 Prove that : $\frac{1}{1+\sin A} + \frac{1}{1-\sin A} = 2\sec^2 A$.

Q.20 Find the value of $\tan 7^0 \tan 23^0 \tan 60^0 \tan 67^0 \tan 83^0$.

Q.21 Show that $5 - \sqrt{3}$ is irrational.

Q.22 If the height of a tower is equal to the length of its shadow then find the angle of elevation of the Sun (i.e. Sun's altitude).

SECTION-D (8 questions of 4 marks each)

Q.23 Solve for x: $\frac{2}{x+2} + \frac{3}{x+3} = \frac{11}{x+8}; \; x \neq -2, -3, -8.$

Q.24 Obtain all the zeroes of the polynomial $2x^4 + x^3 - 14x^2 - 19x - 6$, if two of its zeroes are –2 and –1.

Q.25 An aeroplane left 30 minutes later than its scheduled time and in order to reach the destination 1500 km away in time, the pilot has to increase its speed by 250 km/hr from its usual speed. Determine its usual speed. Which value is depicted by the pilot here ?

Q.26 If in an A.P. 4^{th} term is 11 and 7^{th} term is 20 then find the value of its 10^{th} term and also find the sum of the first 10 terms.

Q.27 Find the ratio in which the line segment joining the points (6, 4) and (1, -7) is divided by X-axis. Find the coordinates of the point of intersection also.

Q.28 The angles of elevation of the top of a tower from two points on the same side of the tower at the distance of 'a' meters and 'b' meters from the base of the tower and in the same straight line with it are complementary. Prove that the height of the tower is $\sqrt{ab}$ meters.

Q.29 If $\sin(A - B) = \frac{1}{2}$, $\cos(A + B) = \frac{1}{2}$, $0^0 < A + B \leq 90^0$, $A > B$ then find A and B.

Q.30 Prove that the lengths of the tangents drawn from an external point to a circle are equal.