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Half Yearly Examination – (2019-20)

CLASS – X **TIME – 3 HRS.**

SUBJECT - MATHEMATICS **FULL MARKS – 80**

General Instructions:

1. All the questions are compulsory.

2. The questions paper consists of 40 questions divided into 4 sections A, B, C and D.

3. 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.

4. 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, four 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.

SECTION -A

1. What is the greatest possible speed at which a man can walk 52 km and 91 km in an exact number of minutes?

(a) 17 m/min (b) 7 m/min (c) 13 m/min(d) 26 m/min

2. If A = 2n + 13, B = n + 7, where n is a natural number then HCF of A and B is:

(a) 2(b) 1(c) 3(d) 4

3. Given that LCM (91, 26) = 182, then HCF (91, 26) is ?

4. The 9th term of an A.P. is 449 and 449th term is 9. The term which is equal to zero is

(a) 508^{th} (b) 502th (c) 501th(d) none of these

5. Sum of first *n* natural number is

(a) $\frac{n(n-1)}{2}$ (b) $\frac{n(n+1)}{2}$

(c) $\frac{n(n+1)(2n+1)}{6}$ (d) $\left[\frac{n(n+1)}{2}\right]^2$

6. Write the zeroes of the polynomial $x^2 - x - 6$.

7. What types of lines do the pair of equations x=c and y=c represent graphically?

8. Write the common difference of an A.P. whose nth term is 3n + 5.

9. Find the distance of the point (–6, 8) from the origin.

10. For what value of k are the roots of the quadratic equation $3x^2 + 2kx + 27 = 0$ real and equal?

11. If sin B= 12/13, then find cot B.

12. Find value of x for which $\sqrt{3}\sin x = \cos x$.

13. sin 3θ= cos (θ-6°) and 3θ and θ-6° are acute angles, find value of θ.

14. Solve for x:

$$\sqrt{3}x^2 - 2\sqrt{2}x - 2\sqrt{3} = 0$$

15. Find the value of p for which the points (–5, 1), (1, p) and (4, –2) are collinear.

16. If $\frac{5}{2}$, a, 2 are three consecutive terms of an A.P., then find the value of a?

17. Which term of the A.P.:

21, 18, 15, ...is zero?

18. The quadratic polynomial whose sum of zeroes is 3 and product of zeroes is –2 is :

(a) $x^2 + 3x - 2$ (b) $x^2 - 2x + 3$ (c) $x^2 - 3x + 2$ (d) $x^2 - 3x - 2$

19. For what value of p, (–4) is a zero of the polynomial $x^2 - 2x - (7p + 3)$?

20. Find the coordinates of the point equidistant from the points A(1, 2), B (3, –4) and C(5, –6).

(a) (2, 3)(b) (–1, –2)(c) (0, 3)(d) (1, 3)

SECTION –B

21. What is the HCF of 52 and 130?

22. Find the cubic polynomial whose zeroes are 5, 3 and –2.

23.Write the pair of linear equations which have solutions x= 2, Y= -2.

24. For what value of p are 2p – 1, 7 and 3p three consecutive terms of an A.P.?

25.If point P (x, y) is equidistant from the points A (3, 6) and B (-3, 4), prove that 3x + y - 5 = 0.

26. If $\text{cosec}^2\theta\,(1+\cos\theta)\,(1-\cos\theta) = x$, then find the value of x.

SECTION –C

27. Prove that $\sqrt{3}$ is irrational.

28. If 1 is a zero of $x^3 - 3x^2 - x + 3$ then find all other zeroes.

29. Find the value of m, when (m+1)x=3ky+15=0 and 5x+ky+5=0 are coincident.

30. Solve it on a graph 4x-3y+4=0, 4x+3y-24=0.

31. A two digit number is four times the sum of the digits . It is also equal to 3 times the product of digits .Find the number .

32.If the sum of first 7 terms of an A.P. is 49 and that of first 17 terms is 289, find the sum of n terms.

33. The sum of 4th and 8th terms of an A.P. is 24 and the sum of 6th and 10th terms is 44. Find the first three terms of the A.P.

34. Find the ratio in which point (x, 2) divides the line segment joining points (-3, -4) and (3, 5). Also find the value of x.

SECTION –D

35. Find all the zeroes of $2x^4 – 3x^3 – 3x^2 + 6x – 2$, if two of its zeroes are 1 and $\frac{1}{2}$.

36. The addition of numerator and denominator of a fraction is three less than twice the denominator. If the numerator and denominator are decreased by 1, the numerator becomes half the denominator. Find the fraction.

37. 38. Show that the triangle PQR formed by the points P (√2, √2), Q (-√2, -√2) and R (-√6, -√6) is an equilateral triangle.

39.Prove that (cosecA – sinA) (secA – cosA) = $\frac{1}{tanA + cotA}$.

40.Prove that $\frac{cosA - sinA + 1}{cosA + sinA - 1}$ = cosecA + cotA .