ARAVALI INTERNATIONAL SCHOOL

MID TERM EXAM(2020-21)
CLASS – X
SUBJECT – MATHEMATICS
Date: 28-09-2020

Time : 3 Hrs. **M.M: 80**

Name : _____ Roll No. _____ Teacher's Signature _____

General Instructions:

- SECTION A Question number 1 to 20 carry One mark each.
- SECTION B Question number 21 to 26 carry two marks each.
- SECTION C Question number 27 to 34 carry three marks each.
- SECTION D Question number 35 to 40 carry four marks each.

All questions are compulsory.

SECTION – A (1x20=20)

Choose the correct answer from the given four options:

1. HCF of 168 and 126 is
(a) 21 (b) 42 (c) 14 (d) 18

2. 325 can be expressed as a product of its primes as
(a) $5^2 \times 7$ (b) $5^2 \times 13$ (c) 5×13^2 (d) $2 \times 3^2 \times 5^2$

3. The pair of equation 5x-15y=8 and 3x-9y= $\frac{24}{5}$ has

(a) one solution (b) two solutions (c) many solutions (d) no solution

4. If $\frac{1}{2}$ is a root of the quadratic equation $4x^2 - 4kx + k + 5 = 0$, then the find the value of k.

(a) - 6 (b) 3 (c) -3 (d) 6

5. A quadratic equation $2x^2 - \sqrt{5}x + 1 = 0$ has
(a) no real roots (b) two equal real roots
(c) two distinct real roots (d) more than two real roots

OR

The sum of the zeroes of the polynomial $2x^2$-8x +6 is
(a) - 3 (b) 3 (c) - 4 (d) 4

6. The distance of the point P(-4,3) from the y-axis is
(a) 5 (b) -4 (c) 4 (d)3

7. The mid-point of the line joining points (2, -2) and (-6,6) is
(a) (-4,4) (b) (2,-2) (c) (4,-4) (d) (-2,2)

8. One card is drawn from a well shuffled deck of 52 cards. The probability that it is black queen is
(a) 1/52 (b) 1/13 (c) 2/51 (d) 2/52

9. A card is drawn at random from a well shuffled pack of 52 playing cards. Find the probability of getting neither a red card nor a queen.
(a) 14/52 (b) 7/13 (c) 28/52 (d) 6/13

10. Two different dice are tossed together. Find the probability that the product of the two numbers on the top of the dice is 6.

(a) 1/6 (b) 1/4 (c) 1/9 (d) none of these

Fill in the following blanks:

11. Every linear equation in two variables has _____ solutions.

12. The value of cos A _____ as angle A increases.(A lies between 0 to 45 degree)

13. Quadratic polynomial whose zeroes are $3+\sqrt{2}$ and $3-\sqrt{2}$ is _____.

Write True / False for the following:

14. The graph of a linear equation in two variables is always a straight line.

15. The distance of the point P (5, -3) from the x -axis is 5 units.

16. The common difference of the A.P whose first term is 12 and fifth term is 0 is -4.

17. cos A is the abbreviation used for the cosecant of angle A.

Solve the following:

18. Find the value of k for which the equations 3x-y+8=0 and 6x-ky=-16 represents coincident lines.

19. Find the 10^{th} term of an AP -40, -15, 10, 35….

OR

In an AP if $a_{18} - a_{14} = 32$. Then find the common difference.

20. If 15 cot A = 8, then find value of cosec A

SECTION – B (2x6=12)

21. What is the probability that a number is selected at random from the number 1,2,2,3,3,3,4,4,4,4 will be their average?

22. If β is an acute angle and tanβ + cotβ =2, Find the value of $\tan^7\beta + \cot^7\beta$

Or

If Sin (A+B) =1 and Cos (A-B) = $\sqrt{3}/2$, 0 degree < (A+B) ≤ 90 degree , A> B then Find A and B.

23. If the distance between the points (3,0) and (0,y) is 5 units and y is positive, then the what is the value of y?

24. The sum of 3 numbers in A.P. is -3 and their product is 8. Find the numbers

Or

The 19^{th} term of an A.P. is equal to three times its sixth term. If 9^{th} term is 19, Find the A.P.

25. For what value of K for which the system kx+2y=5 and 3x+y=1 has no solution

26. Find the zeroes of the quadratic polynomial and also verify the relationship between the zeroes and their co- efficients

P(x)= $6x^2 - 3 - 7x$

SECTION C (3x8=24)

27. Explain why 7 × 11 × 13 + 13 and 7 × 6 × 5 × 4 × 3 × 2 × 1 + 5 are composite numbers.

OR

Prove that $\sqrt{2} - 3$ is an irrational number.

28. Find the ratio in which the y-axis divides the line segment joining the points(5 – 6) and (-1, 4). Also find the point of intersection.

29. Find the roots of the following:

$\frac{1}{x+4}-\frac{1}{x-7}=\frac{11}{30}$, where ≠ - 4, 7

OR

Solve for x by factorisation

$3a^2x^2 + 8abx + 4b^2 = 0,\ a \neq 0$

30. A person standing on the bank of a river observes that the angle of elevation of the top of a tower standing on the opposite bank is 60°. When he moves 40 m away from the bank, he finds the angle of elevation to be 30°. Find the height of the tower and the width of the river. ($\sqrt{3}$ = 1.732)

31. If sec θ – tan θ = x, show that: sec θ=1/2(x+ 1/x) and tan θ=1/2(1/x -x)

32. Prove that:

$\frac{\sin A+\cos A}{\sin A-\cos A}+\frac{\sin A-\cos A}{\sin A+\cos A}=\frac{2}{1-2\cos^2 A}$

OR

Prove that:

$\frac{\cot A-\cos A}{\cot A+\cos A}=\frac{\operatorname{cosec} A-1}{\operatorname{cosec} A+1}$

33. Cards bearing numbers from 30 to 60 are kept in a bag. A card is drawn at random from the bag. Find the probability of getting a card bearing

a) a prime number.

b) a number divisible by 3 or 5.

34. If **p** and **q** are the zeroes of the polynomial $f(x)=x^2-5x+k$ such that p−q=1, find the value of k.

SECTION – D (4x6=24)

35. If the sum of first 14 terms of an A.P. is 1050 and its first term is 10,find the 20^{th} term.

OR

The first term of an A.P. is 5, the last term is 45 and sum is 400. Findthe number of terms and the common difference.

36. As observed from the top of a 75m high light house above the sea level, the angles of depression of two ships are $30^{o}$and 45^{o}respectively If one ship is exactly behind the other on the same side of the light house and in the same straight line, find the distance between the two ships.(use $\sqrt{3}$ = 1.732)

37. Given that the zeroes of the cubic polynomial $x^3 – 6x^2 + 3x + 10$ are of the form a, a + b, a + 2b for some real numbers a and b, find the values of a and b as well as the zeroes of the given polynomial.

OR

Obtain all other zeroes of the polynomial $x^4 – 17x^2 – 36x – 20$, if two of its zeroes are + 5 and – 2.

38. Form a pair of linear equations in two variables using the following information and solve it graphically.

Five years ago, Sagar was twice as old as Tiru. Ten years later Sagar's age will be ten years more than Tiru's age. Find their present ages. What was the age of Sagar when Tiru was born?

OR

The owner of a taxi company decides to run all the taxi on CNG fuels instead of petrol/ diesel. The taxi charges in city comprises of fixed charges together with the charge for the distance covered.

For a journey of 13 km, the charge paid is Rs 129 and for journey of 22 km, the charge paid is Rs 210.

i) What will a person have to pay for travelling a distance of 32 km?

ii) Why did he decide to use CNG for his taxi as a fuel?

39. If A(5, 2), B(2, -2) and C(-2, t) are the vertices of a right angled triangle with $\angle B = 90°$, then find the value of t.

40. i) There is a circular path around a sports field. Sonia takes 18 minutes to drive one round of the field, while Ravi takes 12 minutes for the same. Suppose they both start at the same point and at the same time, and go in the same direction. After how many minutes will they meet again at the starting point?.

ii) Check whether $\mathbf{6^n}$ can end with the digit 0 for any natural number n.