CITY SCHOOL OF EDUCATIONAL INSTITUTE, PANDHURNA
OPEN BOOK EXAMINATION 2020-21
Class-10th
Subject- Mathematics

Time – 3 hour Max. Mark– 100

General Instructions:-

1. All questions are compulsory.

2 Section A is Q.1 to Q.5 are objective type questions. Solve as directed.

Internal choices are given.

3. Section B is from Q.6 to Q.11, each carries 3 marks.
4. Section C is from Q.12 to Q.16, each carries 4marks.
5. Section D is from Q.17 to Q.21, each carries 5 marks.
5. Section E is from Q.22 to Q.23, each carries 6 marks

Section-A

Q.1- Choose the correct option and write-

i)n^2-1 is divisible by 8,if n is-

a)integer b)natural number c)odd integer d)even integer

ii)The degree of polynomial in quadratic polynomial will be-

a)1 b)2 c)3 d)Infinity

iii)If ½ is a root of equation x^2+kx-5/4=0,then the value of k is-

a) 2 b)-2 c)1/4 d)1/2

iv)30th term of AP : 10,7,4,……is:

a)97 b)77 c)-77 d)-87

v)11th term of the AP:-3,-1/2,2,……is:

a)28 b)22 c)-38 d)48

Q.2-Fill in the blanks-

(i) All circles are _____. (congruent, similar)

(ii) All squares are _____. (similar, congruent)

(iii) All _____ triangles are similar. (isosceles, equilateral)

(iv) Two polygons of the same number of sides are similar, if (a) their corresponding angles are _____and (b) their corresponding sides are _____. (equal, proportional)

Q.3-Match the column –

Column A	Column B
• Lines are coincident	y= 0
• Lines are intersecting	x=0
• Lines are parallel	Infinitely many solutions
• Line intersects x-axis	A unique solution
• Line intersects y-axis	No Solution

Q.4-Write True/False-

i. The graph of a quadratic equation is a straight line.
ii. Each natural number is a whole number.
iii. A polynomial of degree 3 is quadratic polynomial.
iv. A quadratic equation has many solutions.
v. The terms of an AP are always in ascending order.

Q.5-Answer in one word/Sentence-

I. What is the least number that must be added to 1056 so the number is divisible by 23?

II. Solve the following pair of equations:2x+y=7 and 3x+2y=12 ?

III. If $\sec\theta + \tan\theta = x$, then $\tan\theta$ is :

IV. What will be the reflection of the point (4, 5) about the X-axis, in the fourth quadrant?

V. If the third and the ninth terms of an AP are 4 and -8 respectively, which term of this AP is zero?

Section-B

Q.6- Show that any positive odd integer is of the form 6q+1, or 6q+3 , or 6q+5 , where q is some integer**.**

Q.7. Find the zeroes of the following quadratic polynomials and verify the relationship between the zeroes and the coefficients.

(i) $x2 – 2x – 8$

(ii) $4s2– 4s + 1$

(iii) $6x2– 3 – 7x$

Q.8. In ΔABC right angled at B, AB = 24 cm, BC = 7 m. Determine

(i) sin A, cos A

(ii) sin C, cos C

Q.9. Find the distance between the following pairs of points:

(i) (2, 3), (4, 1) (ii) (-5, 7), (-1, 3) (iii) (a, b), (- a, - b)

Q.10. Write first four terms of the A.P. when the first term a and the common differenced are given as follows

(i) a = 10, d = 10

(ii) a = - 2, d = 0

(iii) a = 4,d = - 3

Q.11. Aftab tells his daughter, "Seven years ago, I was seven times as old as you were then. Also, three years from now, I shall be three times as old as you will be." (Isn't this interesting?) Represent this situation algebraically and graphically.

Section-C

Q.12. Use Euclid's division lemma to show that the square of any positive integer is either of form 3m or 3m + 1 for some integer m.

Q.13. Divide the polynomial p(x) by the polynomial g(x) and find the quotient and remainder in each of the following :

(i) p(x) = x3– 3x2+ 5x – 3, g(x) = x2– 2

(ii) p(x) = x4– 3x2+ 4x + 5, g(x) = x2+ 1 – x

(iii) p(x) = x4– 5x + 6, g(x) = 2 – x2

Q.14. Prove that $3+ 2*5^{1/2}$is irrational.

Q.15. If sin A =3/4 , calculate cos A and tan A.

Q.16. Name the type of quadrilateral formed, if any, by the following points, and give reasons for your answer:

(i) (- 1, - 2), (1, 0), (- 1, 2), (- 3, 0)

(ii) (- 3, 5), (3, 1), (0, 3), (- 1, - 4)

(iii) (4, 5), (7, 6), (4, 3), (1, 2)

Section-D

Q.17. E and F are points on the sides PQ and PR respectively of a ΔPQR. For each of the following cases, state whether EF || QR.

(i) PE = 3.9 cm, EQ = 3 cm, PF = 3.6 cm and FR = 2.4 cm

(ii) PE = 4 cm, QE = 4.5 cm, PF = 8 cm and RF = 9 cm

(iii)PQ = 1.28 cm, PR = 2.56 cm, PE = 0.18 cm and PF = 0.63 cm

Q.18.For the following A.P.s, write the first term and the common difference.

(i) 3, 1, - 1, - 3 …

(ii) - 5, - 1, 3, 7 …

(iii)1/3,5/3,9/3,13/3...

(iv) 0.6, 1.7, 2.8, 3.9 …

Q.19. (i) John and Jivanti together have 45 marbles. Both of them lost 5 marbles each, and the product of the number of marbles they now have is 124. Find out how many marbles they had to start with.

(ii) A cottage industry produces a certain number of toys in a day. The cost of production of each toy (in rupees) was found to be 55 minus the number of toys produced in a day. On a particular day, the total cost of production was Rs 750. Find out the number of toys produced on that day.

Q.20. The cost of 2 kg of apples and 1 kg of grapes on a day was found to be Rs 160. After a month, the cost of 4kg of apples and 2 kg of grapes is Rs 300. Represent the situation algebraically and geometrically.

Q.21.Give examples of polynomial p(x), g(x), q(x) and r(x), which satisfy the division algorithm and

(i) deg p(x) = deg q(x)

(ii) deg q(x) = deg r(x)

(iii) deg r(x) = 0

Section-E

Q.22. State whether the following are true or false. Justify your answer.

(i) The value of tan A is always less than 1.

(ii) sec A = for some value of angle A.

(iii) cos A is the abbreviation used for the cosecant of angle A.

(iv) cot A is the product of cot and A

(v) sin θ = , for some angle θ

Q.23. Let A (4, 2), B (6, 5) and C (1, 4) be the vertices of ΔABC.

(i) The median from A meets BC at D. Find the coordinates of point D.

(ii) Find the coordinates of the point P on AD such that AP: PD = 2:1

(iii) Find the coordinates of point Q and R on medians BE and CF respectively such that BQ: QE = 2:1 and CR: RF = 2:1.

(iv) What do you observe?

(v) If A(x1, y1), B(x2, y2), and C(x3, y3) are the vertices of ΔABC, find the coordinates of the centroid of the triangle