

E-3-A

Roll No.....

Total No. of Questions : 20]

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XARKDN20

2303-A

MATHEMATICS

Time : 3 Hours]

[Maximum Marks : 100

1. Choose the correct/most appropriate answer and write in your answer-book :

(i) The LCM of 336 and 54 is :

(A) 4203

(B) 3024

(C) 2430

(D) None of these

(ii) The common difference of the A.P. :

-10, -6, -2, 2 is :

(A) -16

(B) -4

(C) 4

(D) None of these

(iii) The graph of the equation $y = 0$ is :

(A) A line parallel to y-axis

(B) A line parallel to x-axis

(C) y-axis

(D) x-axis

(iv) The degree of the polynomial $4x + 2$ is :

(A) 4

(B) 2

(C) 1

(D) None of these

(v) $\operatorname{cosec}^2\theta - \cot^2\theta$ is equal to :

(A) 1

(B) -1

(C) 2.

(D) None of these

(vi) Sides of two similar triangles are in the ratio 2 : 3. Areas of these triangles are in the ratio of :

(A) 6:9

(B) 9:4

(C) 4 : 9

(D) None of these

2. Find the distance between the points (0, 0) and (36, 15).

3. The sides of a triangle are 3 cm, 4 cm and 5 cm. Prove that it is a right angled triangle.

4. From a point Q, the length of the tangent to a circle is 24 cm and the distance of 'Q' from the centre is 25 cm. Find the radius of the circle. <https://www.jkboseonline.com>

5. Use Euclid's algorithm to find the HCF of 867 and 255.

6. Divide the polynomial $x^3 - 3x^2 + 5x - 3$ by the polynomial $x^2 - 2$ to find the quotient and remainder.

7. Find the roots of the quadratic equation $6x^2 - x - 2 = 0$ by factorization.

8. Find the area of a sector of a circle with radius 6 cm, if angle of the sector is 60° .

9. Prove that the tangent at any point of a circle is perpendicular to the radius through the point of contact.

10. If $P(E) = 0.05$, what is the probability of 'not E' ?

11. Find the roots of the equation $5x^2 - 6x - 2 = 0$ by the method of completing the square.

OR

Find the values of 'K' for the quadratic equation $2x^2 + kx + 3 = 0$ so that it has two equal roots.

12. Half the perimeter of a rectangular garden, whose length is 4 m more than its width is 36 m. Find the dimensions of the garden.

OR

Solve the following pair of linear equations by using cross multiplication method :

$$2x + y = 5$$

$$3x + 2y = 8$$

13. Find the sum of first 22 terms of an A.P. in which $d = 7$ and 22nd term is 149.

Or

The 17th term of an A.P. exceeds the 10th term by 7. Find the common difference.

14. Prove that the ratio of the areas of two similar triangles is equal to the ratio of the squares on their corresponding sides.

Or

ABC is an equilateral triangle of side 2a. Find each of its altitudes.

15. Find the area of the quadrilateral whose vertices, taken in order, are (-4, -2), (-3, -5), (3, -2) and (2, 3).

OR

Find the coordinates of a point 'A', where AB is the diameter of a circle whose centre is (2, -3) and B is (1, 4).

16. Prove the identity :

$$\sqrt{\frac{1+\sin A}{1-\sin A}} = \sec A = \cot A$$

Or

Express $\sin 67^\circ + \cos 75^\circ$ in terms of trigonometric ratio of angles between 0° and 45° .

17- From the top of a 7 m high building, the angle of elevation of the top of a cable tower is 60° and the angle of depression of its foot is 45° . Determine the height of the tower.

OR

Two poles of equal heights are standing opposite each other on either side of the road, which is 80 m wide. From a point between them on the road, the angles of elevation of the top of the poles are 60° and 30° respectively. Find the height of the poles and the distances of the point from the poles.

18. Draw a circle of radius 6 cm. From a point 10 cm away from its centre. Construct the pair of tangents to the circle and measure their lengths.

Draw a triangle ABC with side $BC = 7$ cm, $\angle B = 45^\circ$, $\angle A = 105^\circ$. Then construct a $\frac{4}{3}$ triangle whose sides are times of the corresponding sides of ΔABC .

19. The slant height of a frustum of cone is 4 cm and the perimeters (circumferences) of its circular ends are 18 cm and 6 cm. Find the curved surface area of the frustum.

Or

A well of diameter 3 m is dug 14 m deep. The earth taken out of it has been spread evenly all around it in the shape of circular ring of width 4 m to form an embankment. Find the height of the embankment.

20. The distribution below gives the weights of 30 students of a class. Find the median weight of the students :

Wt. (in kg)	40-45	45-50	50-55	55-60	60-65	65-70	70-75
No. of Students	2	3	8	6	6	3	2

Or

The following data gives the information on the observed lifetimes (in hours) of 225 electrical components :

Lifetimes (in hours)	0-20	20-40	40-60	60-80	80-100	100-120
Frequencies	10	35	52	61	38	29

Determine the modal lifetimes of the components.