

***E-3-B***

Roll No.....

Total No. of Questions : **20**

[Total No. of Printed Pages : **7**

***XARKDN20***

***2303-B***

***MATHEMATICS***

**Time : 3 Hours]**

**[Maximum Marks : 100**

E-3-B

Roll No.....

Total No. of Questions : 20

Total No. of Printed Pages : 7

XARKDN20

2303-B

MATHEMATICS

Time : 3 Hours

Maximum Marks : 100

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

(i) The LCM of 12, 15 and 21 is :

(A) 48

(B) 420

(C) 320

(D) None of these

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

$$2, \frac{5}{2}, 3, \frac{7}{2} \dots\dots\dots$$

is :

- (A) -0.5
- (B) 0.5
- (C) 1.5
- (D) -1.5

(ii) The graph of  $x = 7$  is :

- (A) A line parallel to x-axis
- (B) A line parallel to y-axis
- (C) x-axis
- (D) y-axis

(iv) The degree of the polynomial  $5x^3 - 4x^2 + x - \sqrt{2}$  is:

- (A) 5
- (B) 4
- (C) 3
- (D) 2

(v)  $\tan^2 \theta - \sec^2 \theta$  is equal to :

- (A) 1
- (B) -1
- (C) 2

(D) None of these

(vi) Sides of two similar triangles are in the ratio 9 : 4. Areas of these triangles are in the ratio of:

(A) 3 : 2

(B) 4 : 9

(C) 81 : 16

(D) 16 : 81

2. Find the distance between the points (-5, 7) and (-1, 3).

3. The sides of a triangle are 10 cm, 8 cm and 6 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.

5. Use Euclid's algorithm to find the HCF of 135 and 225.

6. Divide the polynomial  $3x^4 + 5x^3 - 7x^2 + 2x + 2$  by the polynomial  $x^2 + 3x + 1$  to find the quotient and remainder.

7. Find the roots of the  $x^2 - 3x - 10 = 0$  by factorisation.

8. In a circle of radius 21 cm an arc subtends an angle of  $60^\circ$  at the centre. Find the length of the arc.

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

10. A die is thrown once. Find the probability of getting :

(i) a number lying between 2 and 6

(ii) a prime number

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 :

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

OR

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

17. From the top of a 7 m high building, the angle of elevation of the top of a cable tower is  $60^\circ$  and the angle of depression of its foot is  $45^\circ$ . 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  $60^\circ$  and  $30^\circ$  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.

OR

Draw a triangle ABC with side  $BC = 7$  cm,  $\angle B = 45^\circ$ ,  $\angle A = 105^\circ$ .

Then construct a triangle whose sides are  $\frac{4}{3}$  times of the corresponding sides of  $\triangle ABC$ .

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.