

C-3-Z

Roll No.....

Total No. of Questions : 20]

[Total No. of Printed Pages : 8

XWZJDRO/N19

24703-Z

MATHEMATICS

Time : 3 Hours]

[Maximum Marks : 100

Note : Attempt all questions.

1. ~~(i)~~ A die is thrown once. The probability of getting a prime number is :

(A) $\frac{1}{2}$

(B) $\frac{1}{3}$

(C) $\frac{1}{6}$

(D) None of these

~~(ii)~~ A line segment of length 14 cm is divided in the ratio of 3 : 4, the measure of the two parts in the given ratio respectively would be. :

(A) 4 cm, 10 cm

(B) 10 cm, 4 cm

(C) 6 cm, 8 cm

(D) None of these

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(iii) The 10th term of the A.P. 2, 4, 6, is :

(A) 10

(B) 20

(C) 30

(D) None of these

(iv) Total surface area of hemisphere with radius r is :

(A) $2\pi r^2$

(B) $3\pi r^2$

(C) $4\pi r^2$

(D) None of these

(v) A number of the form $\frac{p}{q}$, where p and q are both integers and $q \neq 0$ is called :

(A) a natural number

(B) an irrational number

(C) a rational number

(D) None of these

(vi) If α and β are the zeroes of the quadratic polynomial $x^2 - 4x + 1$, then $\alpha + \beta$ is equal to :

(A) -4

(B) 4

(C) 1

(D) None of these

1×6=6

2. Find the distance between the points (2, 3) and (4, 1). 2

3. Evaluate :

$$\frac{\cos 45^\circ}{\sec 30^\circ + \operatorname{cosec} 30^\circ}$$

2

4. If tangents PA and PB from a point P to a circle with centre O are inclined to each other at an angle of 80° , then find $\angle POA$. 2

5. Find the sum of first 22 terms of an A.P. in which $d = 7$ and 22nd term is 149. 4

6. Find the H.C.F. and L.C.M. of 6, 72 and 120, using the prime factorization method. 4

7. Solve the following pair of linear equations by the substitution method :

$$8x + 5y = 9$$

and

$$3x + 2y = 4$$

4

8. For which values of a and b does the following pair of linear equations have an infinite number of solutions ?

$$2x + 3y = 7$$

$$(a - b)x + (a + b)y = 3a + b - 2$$

4

(4)

9. Divide the polynomial $p(x)$ by the polynomial $g(x)$ and find the quotient and remainder :

$$p(x) = x^3 - 3x^2 + 5x - 3,$$

$$g(x) = x^2 - 2$$

4

10. One card is drawn from a well-shuffled deck of 52 cards. Find the probability of getting :

(i) a king of red colour

(ii) the queen of diamonds

4

11. Find the roots of the quadratic equation $2x^2 + x - 4 = 0$ by the method of completing the square.

Or

A train travels a distance of 480 km at a uniform speed. If the speed had been 8 km/h less, then it would have taken 3 hours more to cover the same distance. Find the speed of the train.

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(5)

12. Find the nature of the roots of the quadratic equation :

$$2x^2 - 6x + 3 = 0.$$

Also find the roots of this equation if they exist.

Or

Find two consecutive odd positive integers, sum of whose squares is 290.

6

13. If AD and PM are medians of triangles ABC and PQR, respectively where $\Delta ABC \sim \Delta PQR$, prove that :

$$\frac{AB}{PQ} = \frac{AD}{PM}$$

Or

Diagonals of a trapezium ABCD with $AB \parallel DC$ intersect each other at the point O. If $AB = 2 CD$, find the ratio of the areas of triangles AOB and COD.

6

14. Prove that in a right triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides.

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(6)

Or

D and E are points on the sides CA and CB respectively of a triangle ABC right-angled at C. Prove that :

$$AE^2 + BD^2 = AB^2 + DE^2$$

6

15. Find the ratio in which the line segment joining the points $(-3, 10)$ and $(6, -8)$ is divided by $(-1, 6)$. <https://www.jkboseonline.com>

Or

If $A(-5, 7)$, $B(-4, -5)$, $C(-1, -6)$ and $D(4, 5)$ are the vertices of a quadrilateral, find the area of the quadrilateral ABCD.

6

16. Given that $\sec \theta = \frac{13}{12}$, calculate all other trigonometric ratios.

Or

Prove that :

$$(\operatorname{cosec} \theta - \cot \theta)^2 = \frac{1 - \cos \theta}{1 + \cos \theta}$$

6

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17. From a point on the ground, the angles of elevation of the bottom and the top of a transmission tower fixed at the top of a 20 m high building are 45° and 60° respectively. Find the height of the tower.

Or

The angles of depression of the top and the bottom of an 8 m tall building from the top of a multi-storeyed building are 30° and 45° respectively. Find the height of the multi-storeyed building and the distance between the two buildings. 7

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

Or

Two concentric circles are of radii 5 cm and 3 cm. Find the length of the chord of the larger circle which touches the smaller circle.

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

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

Or

Draw a pair of tangents to a circle of radius 5 cm which are inclined to each other at an angle of 60° . 7

20. A vessel is in the form of a hollow hemisphere mounted by a hollow cylinder. The diameter of the hemisphere is 14 cm and the total height of the vessel is 13 cm. Find the inner surface area of the vessel.

Or

A metallic sphere of radius 4.2 cm is melted and recast into the shape of a cylinder of radius 6 cm. Find the height of the cylinder. 7

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