A–3–X

Roll No.....

Total No. of Questions : **20]**

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

XRSZJF19

22103-X

MATHEMATICS

Time : 3 Hours]

[Maximum Marks : 100

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1. (i) Define a prime number.

(ii) Give an example of linear polynomial.

(iii) Which of the following is not an A.P. ?

(A) 5, 15, 25, 35, ...

(B) 3, 5, 8, 11, ...

(C) $\frac{1}{2}, 1, \frac{3}{2}, 2, \ldots\ldots$

(D) None of these

(iv) A card is drawn at random from a well shuffled deck of 52 cards. The probability of getting a queen is :

(A) 1/4

(B) 1/13

(C) 2/13

(4) None of these

(v) Volume of frustum of a cone is equal to :

(A) $\frac{1}{3}\pi r^2 h$

B) $\frac{1}{3}\pi h\ (r_1^2 + r_2^2 + r_1 r_2)$

(C) $\frac{1}{3}\pi h\ (r_1 + r_2 + r_1 r_2)$

(D) None of these

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

(A) 2 : 3

(B) 16 : 81

(C) 81 : 16

(D) None of these

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

3. Express sin 67° + cos 75º in terms of trigonometric ratios of angles between 0° and 45°.

4. A tangent PQ at a point P of a circle of radius 5 cm meets a line through the centre O at a point Q so that OQ = 12 cm. Find PQ. https://www.jkboseonline.com

5. How many three-digit numbers are divisible by 7 ?

6. Given that HCF (306, 657) = 9, find LCM (306, 657).

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

x + y = 14

x - y = 4

8. For what values of k will the following pair of linear equations have infinitely many solutions ?

$kx + 3y - (k - 3) = 0$

$12x + ky - k = 0$

9. Find the zeroes of the quadratic polynomial $6x^2 - 3 - 7x$.

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

(i) a prime number

(ii) an odd number

11. The altitude of a right triangle is 7 cm less than its base. If the hypotenuse is 13 cm, find the other two sides.

Or

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

12. Rohan's mother is 26 years older than him. The product of their ages (in years) 3 years from now will be 360. Find Rohan's present age.

Or

Find the nature of the roots of the quadratic equation :

$3x^2 - 4\sqrt{3}x + 4 = 0$.

If the real roots exist, find them.

13. Prove that if a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, then the other two sides are divided in the same ratio.

Or

A vertical pole of length 6 m casts a shadow 4 m long on the ground and at the same time a tower casts a shadow 28 m long, Find the height of the tower.

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

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

Or

Prove that the ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding medians.

15. If (1, 2), (4, y), (x, 6) and (3, 5) are the vertices of a parallelogram taken in order, find x and y.

Or

Find the area of the triangle whose vertices are (2, 3), (-1, 0) and (2, 4).

16. In triangle ABC, right-angled at B, if $\tan A = \frac{1}{\sqrt{3}}$, find the value of :

sin A cos C + cos A sin C

OR

Write all the other trigonometric ratios of $\angle A$ in terms of sec A.

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 45º. Determine the height of the tower.

Or

Find all trigonometric ratios of 45° geometrically.

18. Prove that the parallelogram circumscribing a circle is a rhombus.

Or

Prove that the lengths of tangents drawn from an external point to a circle are equal.

19. Draw a triangle ABC with side BC = 6 cm, AB = 5 cm and ∠ABC = 60°. Then construct a triangle whose sides are 3/4 of the corresponding sides of the 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°.

20. A 20 m deep well with diameter 7 m is dug and the earth from digging is evenly spread out to form a platform 22 m by 14 m. Find the height of the platform.

Or

A solid is in the shape of a cone standing on a hemisphere with both their radii being equal to 1 cm and the height of the cone is equal to its radius. Find the volume of the solid in terms of π.