Roll No.....

A–3–Y

Total No. of Questions : 20] [Total No. of Printed Pages : 7

XRSZJF19

22103-Y

MATHEMATICS

Time : 3 Hours] **[Maximum Marks : 100**

1. (i) Define odd number.

(ii) Give an example of a cubic polynomial.

(iii) Which of the following is an A.P. ?

(A) –2, 4, –8, 16, ...

(B) 5, 15, 35, 65, ...

(C) –3, –6, –9, –12, ...

(D) None of these

(iv) If E is an event such that $P(E) = \frac{3}{5}$, then $P(\bar{E})$ is equal to :

(A) $\frac{2}{5}$

(B) $\frac{3}{5}$

(C) $\frac{4}{5}$

(D) None of these

(v) The curved surface area of the frustum of the cone is :

(A) $\pi(r_1 + r_2)$

(B) $\pi l(r_1 + r_2)$

(C) πrl

(D) None of these

(vi) A line segment of length 50 cm is divided in the ratio of 2 : 3 internally, the measure of two parts (in cm) in the given ratio respectively would be :

(A) 20 : 15

(B) 30 : 20

(C) 20 : 30

(D) None of these $1 \times 6 = 6$

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

3. Evaluate :

$$\frac{\tan 65°}{\cot 25°}$$ 2

4. From an external point T, a tangent PT is drawn to a circle whose centre is O. If PT = 21 cm, OT = 29 cm, then find OP. 2

5. Which term of the A.P. :

3, 8, 13, 18, ...

is 78 ? 4

6. Given that HCF (306, 657) = 9, find LCM (306, 657). 4

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

$$3x - y = 3$$

$$9x - 3y = 9$$ 4

8. For which value of k will the following pair of linear equations have no solution ?

$$3x + y = 1$$

$$(2k - 1)x + (k - 1)y = 2k + 1$$ 4

9. Find a quadratic polynomial, the sum and product of whose zeroes are 0 and $\sqrt{5}$ respectively. 4

10. A bag contains 3 red balls and 5 black balls. A ball is drawn at random from the bag. What is the probability that the ball drawn is :

(i) red

(ii) not red ? 4

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. 6

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. 6

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. 6

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. 6

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). 6

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. 6

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

Find all trigonometric ratios of 45° geometrically. 7

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. 7

19. Draw a triangle ABC with side BC = 6 cm, AB = 5 cm and $\angle ABC = 60°$. Then construct a triangle whose sides are $\frac{3}{4}$ 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°. 7

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. 7