C–3–A

Roll No. .....

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

SSERKDO18

20203-A

MATHEMATICS

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

Note :– Attempt all questions.

1. Choose the correct answer :

(i) The number 1·732 is :

(a) an integer

(b) a rational number

(c) an irrational number

(d) none of these

(ii) The zeroes of the polynomial $x^2 - \sqrt{2}x - 12$ are :

(a) $\sqrt{2}, -\sqrt{2}$

(b) $3\sqrt{2}, -2\sqrt{2}$

(c) $-3\sqrt{2}, 2\sqrt{2}$

(d) None of these

Turn Over

(iii) The common difference of the A.P.

$$\frac{1}{P}, \frac{1-P}{P}, \frac{1-2P}{P}, \ldots\ldots\ldots\ldots$$

is :

(a) 1 (b) -1

(c) $-P$ (d) None of these

(iv) Draw an angle of 45° with the help of compass and ruler.

(v) Total surface area of the frustum of a cone is :

(a) $\pi l(r_1 + r_2)$ (b) πrl

(c) $\pi l(r_1 + r_2) + \pi r_1^2$ (d) None of these

(vi) The probability of getting 8 in a single throw of a die is

(a) 0 (b) 1

(c) -1 (d) None of these

2. From a point A the length of the tangent to a circle is 24 cm and the distance of A from the centre is 25 cm. Find the radius of the circle.

3. Find the distance between the points A($-a$, $-b$) and B(a, b).

4. Express the trigonometric ratio's sin A and tan A in terms of cot A.

5. Define Algorithm and use Euclid's division algorithm to find the H.C.F. of 135 and 225.

6. Find the zeroes of the polynomial $x^2 - 2x - 8$ and also verify the relationship between the zeroes and the co-efficients. 4

How many three-digit numbers are divisible by 7 ? 4

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

$$s - t = 3$$

$$\frac{s}{3} + \frac{t}{2} = 6$$

9. For which values of P does the pair of equations

$$4x + Py + 8 = 0$$

and

$$2x + 2y + 2 = 0$$

have unique solution.

10. One card is drawn from a well-shuffled deck of 52 cards. Calculate the probability that the card will :

(i) be an ace

(ii) not be an ace.

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 $2x^2 - 5x + 3 = 0$ by the method of completing the square.

12. Find the discriminant of the quadratic equation $9x^2 - 6x + 1 = 0$ and hence find the nature of its roots. Find them if they are real.

Or

The difference of squares of two numbers is 180. The square of the smaller number is 8 times the larger number. Find the two numbers.

13. ABCD is a trapezium in which AB $\parallel$ DC and its diagonals intersect each other at a point O. Show that :

$$\frac{AO}{BO} = \frac{CO}{DO}$$

Or

D, E and F are respectively the mid-points of sides AB, BC and CA of Δ ABC. Find the ratio of areas of ΔDEF and ΔABC.

14. In a triangle if square of one side is equal to the sum of the squares of the other two sides, prove that the angle opposite to the first side is a right angle.

Or

PQR is a triangle right angled at P and M is a point on QR such that PM is perpendicular to QR. Show that :

$$PM^2 = QM \cdot MR$$

15. Find a relation between x and y such that the point (x, y) is equidistant from the points $(3, 6)$ and $(-3, 4)$.

Or

Find the co-ordinates of the points of trisection of the line segment joining $(4, -1)$ and $(-2, -3)$.

16. Prove that :

$$\frac{\sin\theta - 2\sin^3\theta}{2\cos^3\theta - \cos\theta} = \tan\theta$$

Or

Given $\sec\theta = \frac{13}{12}$. Calculate all other trigonometric ratios. 6

17. From a point on the ground, the angle 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

Evaluate :

$$\frac{\sin 30° + \tan 45° - \operatorname{cosec} 60°}{\sec 30° + \cos 60° + \cot 45°}$$

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

Or

Prove that the tangents drawn at the ends of a diameter of a circle are parallel.

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

Or

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

20. 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.

Or

A container opened from the top and made up of a metal sheet, is in the form of a frustum of a cone of height 16 cm with radii of its lower and upper ends 8 cm and 20 cm respectively. Find the cost of the milk which can completely fill the container at the rate of Rs. 20 per litre.