C–3–A

Roll No. .....

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

SSERKNO17

15103–A

MATHEMATICS

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

1. In each of the following write down the correct answer on your answer-book :

(i) π is :

(a) a composite number

(b) an irrational number

(c) a rational number

(d) none of the above

(ii) The zero's of the quadratic polynomial $x^2 + 7x + 10$ are :

(a) –2, 5

(b) 2, –5

(c) –2, –5

(d) None of the above

Turn Over

(iii) The common difference of an A P 2, 7, 12, ... is

(a) −5

(b) 5

(c) 3

(d) None of the above

(iv) The tangent to the circle intersect it in

(a) One point

(b) Two points

(c) Three points

(d) None of the above

(v) The volume of a sphere is

(a) $4/3\ \pi r^2$

(b) $2/3\ \pi r^3$

(c) $4/3\ \pi r^3$

(d) None of the above

(vi) Which of the following cannot be the probability of an event ?

(a) 2/3

(b) −1.5

(c) 3.2

(d) None of the above 1×6=6

2. Determine if the points (1, 5), (2, 3) and (−2, −11) are collinear. 2

3. If the 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 the length of PQ. 2

4. Show that :

$$\tan 48° \tan 23° \tan 42° \tan 67° = 1$$ 2

5. Use Euclid's algorithm to find the H. C. F. of 135 and 225. 4

6. Divide $3x^2 - x^3 - 3x + 5$ by $x - 1 - x^2$, and varify the division algorithm. 4

7. How many two-digit numbers are divisible by 3 ? 4

8. Solve $2x + 3y = 11$ and $2x - 4y = -24$ and hence find the value of m for which $y = mx + 3$. 4

9. Solve the pair of linear equations $x + y = 5$ and $2x - 3y = 4$ by the elimination method. 4

10. In a cricket match, a batsman hits a boundary 6 times out of 30 balls she plays. Find the probability that she did not hit a boundary. 4

11. Find the roots of the quadratic equation $2x^2 - 7x + 3 = 0$ by the method of completing square.

Or

A train travels 360 km at a uniform speed. If the speed has been 5 km/h more, it would have taken one hour less for the same journey. Find the speed of the train. 6

12. Find two numbers whose sum is 27 and product is 182.

Or

The sum of the resprocals of Rehman's age, (in years) 3 years ago and 5 years from now is $\frac{1}{3}$. Find his present age. 6

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

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

Or

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

$$\frac{AB}{PQ} = \frac{AD}{PM}$$ 6

14. In a triangle, the square of hypotenuse is equal to the sum of the squares of the other two sides. Prove it.

Or

In an equilateral ΔABC, D is a point on side BC such that $BD = \frac{1}{3}BC$. Prove that $9AD^2 = 7AB^2$. 6

15. Find the area of a rhombus if its verticies are (3, 0), (4, 5), (–1, 4) and (–2, –1) taken in order.

Or

Find the area of the triangle formed by joining the mid points of the sides of the triangle whose verticies are (0, –1), (2, 1) and (0, 3). Find the ratio of this area to the area of the given triangle. 6

16. If A, B and C are interior angles of a triangle ABC, then show that :

$$\sin\left(\frac{B+C}{2}\right) = \cos\frac{A}{2}$$

Or

If $\angle A$ and $\angle B$ are acute angles such that cos A = cos B, then show that $\angle A = \angle B$. 6

17. Prove that :

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

Or

A tree breaks due to storm and the broken part bends so that the top of the tree touches the ground making the angle 30° with it. The distance between the foot of the tree to the point where the top touches the ground is 8 m. Find the height of the tree. 7

18. 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.

Or

Prove that the lengths of tangents drawn from an external point to a circle are equal 7

19 Construct a triangle with sides 5 cm. 6 cm and 7 cm and then another triangle whose sides are $\frac{7}{5}$ of the corresponding sides of the first triangle. (Steps of construction is not required)

Or

Draw a circle of radius 3 cm. Take two points P and Q on one of its extended diameter each at a distance of 7 cm from its centre. Draw tangents to the circle from these two points P and Q. 7

(Steps of construction is not required)

20. Metallic spheres of radii 6 cm. 8 cm and 10 cm, respectively, are melted to form a single solid sphere. Find the radius of the resulting sphere.

Or

A vessel is in the form of a hollow hemisphere mounted by a hollow cylinder. The diameter of the hemisphere is 14 cm and total height of the vessel is 13 cm. Find the inner surface area of the vessel. 7