

**DAV PUBLIC / MODEL SCHOOLS, WEST BENGAL ZONE**  
**ANNUAL EXAMINATION**

Session : 2018 – 2019

SET- B

**Class : IX**

**Maximum Marks: 80**

**Subject: Mathematics**

**Time : 3 Hrs.**

**General Instructions:**

1. All questions are compulsory.
2. The questions paper consists of 30 questions divided into 4 sections A, B, C and D.
3. Section A comprises of 6 questions of 1 mark each. Section B comprises of 6 questions of 2 marks each. Section C comprises of 10 questions of 3 marks each. Section D comprises of 8 questions of 4 marks each.
4. There is no overall choice. However, an internal choice has been provided in two questions of 1 mark each, two questions of 2 marks each, four questions of 3 marks each and three questions of 4 marks each. You have to attempt only one of the alternatives in all such questions.
5. Use of calculators is not permitted.

**Section- A**

1. Find a rational number between  $\sqrt{2}$  and  $\sqrt{3}$  1
2. What is the value of the polynomial  $x^2 + 8x + k$ , if  $-1$  is a zero of the polynomial? 1
3. Write the perpendicular distance of the point  $M(-5, -3)$  from the  $y$ -axis. 1
4. In a parallelogram ABCD  $AB=8\text{cm}$ . The altitudes corresponding to sides AB and AD are respectively 4cm and 5cm. Find AD. 1

OR

The measure of an angle is 8 times its complement. Find the angles.

5. In a circle of radius 5 cm having center O, OL is drawn perpendicular to the chord AB. If  $OL = 3$  cm, find the length of AB. 1
6. Find the range of the given data: 25.7, 16.3, 2.8, 21.7, 24.3, 22.7 and 24.9. 1

OR

Find the mode of 14, 25, 14, 28, 18, 17, 18, 14, 23, 22, 14, 18.

**Section- B**

7. Express  $-5y = 8x + 2$  in the form  $ax + by + c = 0$  also find  $a$ ,  $b$  and  $c$ . 2
8. State Euclid's fifth postulate. 2

OR

It is known that  $p + q = 12$  and  $p = r$ . Show that  $r + q = 12$ .

9. AD is an altitude of an isosceles triangle ABC in which  $AB = AC$ . Show that AD bisects BC. 2

10. ABCD is a parallelogram. P is any point on CD. If  $\text{ar}(\Delta DPA) = 18 \text{ cm}^2$  and  $\text{ar}(\Delta APC) = 30 \text{ cm}^2$ , find the area of  $\Delta APB$ . 2
11. The curved surface area of a right circular cylinder is  $4400 \text{ cm}^2$ . If the circumference of the base is  $110 \text{ cm}$ , find the height of the cylinder. 2
12. If the probability of winning a game is  $0.4$ , what is the probability of losing it? 2

OR

There are 15 girls and 13 boys in a line. If one student is chosen at random, then find the probability that he is a boy.

### Section- C

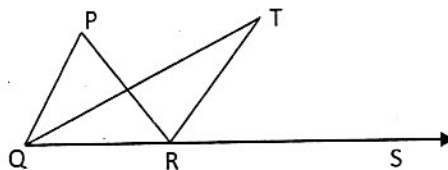
13. Prove  $(x+y)^3 - (x-y)^3 - 6y(x^2 - y^2) = 8y^3$  3
14. If  $p = 2 - a$ , prove that  $a^3 + 6ap + p^3 - 8 = 0$ . 3
15. If  $x^2 - 1$  is a factor of  $px^4 + qx^3 + rx^2 + sx + u$ , show that  $p + r + u = q + s = 0$ . 3

OR

Divide polynomial  $p(x) = 3x^4 + 4x^3 + 4x^2 - 8x + 1$  by  $q(x) = 3x + 1$ . Also, find what should be added to  $p(x)$  so that it is completely divisible by  $q(x)$ .

16. Plot the points  $E(4, 2)$ ,  $L(-1, 3)$ ,  $I(0, 2)$  and  $N(2, 0)$  on the Cartesian plane. Join these points in order. Name the shape of the figure thus obtained. 3
17. In the given figure, the side QR of triangle PQR is produced to a point S. If the bisectors of  $\angle PQR$  and  $\angle PRS$  meet at point T, then prove that 3

$$\angle QTR = \frac{1}{2} \angle QPR.$$



18. If a transversal intersects two lines such that the bisector of a pair of corresponding angle are parallel. Then prove that the two lines are parallel. 3
19. D, E and F are respectively the mid-points of the sides BC, CA and AB of a triangle ABC. Show that 3

(i) BDEF is a parallelogram

$$(ii) \text{ar}(\Delta DEF) = \frac{1}{4} \text{ar}(\Delta ABC)$$

OR

In  $\Delta ABC$ , X and Y are points on sides AB and AC respectively. If  $\angle YXC = \angle BCX$ , prove that  $\text{ar}(\Delta BXC) = \text{ar}(\Delta BYC)$ .

20. ABCD is a cyclic quadrilateral whose diagonals intersect at a point E. If  $\angle DBC = 70^\circ$ ,  $\angle BAC$  is  $30^\circ$ , find  $\angle BCD$ . Further, if  $AB = BC$ , find  $\angle ECD$ . 3
21. A river 3m deep and 40m wide is flowing at the rate of 2km per hour. How much water will fall into the sea in a minute? 3

OR

How many cubic metres of earth must be dug out to sink a well 24 m deep and of diameter 7 m? Also, find the cost of plastering the inner curved surface at Rs. 3 per square metre.

22. A die is rolled 300 times and following outcomes are recorded: 3

|           |    |    |    |    |    |    |
|-----------|----|----|----|----|----|----|
| Outcomes  | 1  | 2  | 3  | 4  | 5  | 6  |
| Frequency | 42 | 60 | 55 | 53 | 60 | 30 |

Find the probability of getting a number (i) more than 4 (ii) less than 3.

OR

A box has 4 red balls and 12 black balls. Find the probability that the selected ball is (i) a red ball (ii) a black ball, chosen at random from the box. Also, prove that sum of these two probabilities is 1.

#### Section- D

23. Rationalise the denominator:  $\frac{1}{\sqrt{6} + \sqrt{5} - \sqrt{11}}$  4
24. a) If  $a + b + c = 9$  and  $ab + bc + ac = 26$ . Find  $a^2 + b^2 + c^2$  4
- b) Without actually calculating the cube. Find the value of  $(-20)^3 + (15)^3 + (5)^3$
25. Solve the equation  $2x + 1 = x - 3$ , and represent the solution(s) on  
(i) the number line (ii) the Cartesian plane. 4
26. Prove that an isosceles trapezium is always cyclic and its diagonal are equal. 4

OR

ABC is a triangle right angled at C. A line through the mid-point M of hypotenuse AB and parallel to BC intersects AC at D. Show that

(i) D is the mid-point of AC (ii)  $MD \perp AC$  (iii)  $CM = MA = \frac{1}{2} AB$

27. The lengths of two adjacent sides of a parallelogram are 17 cm and 12 cm. One of its diagonals is 25 cm long. Find the area of the parallelogram. Also find the length of the altitude from vertex to the side of length 12 cm. 4

28. A conical tent is to accommodate 11 persons. Each person must have 4 square metres of space on the ground and 20 cubic metres of air to breathe. Find the height of the tent. 4

OR

A cylindrical road roller made of iron is 1 m long. Its inner diameter is 54 cm and the thickness of the iron sheet rolled into the road roller is 9 cm. Find the weight of the roller, if  $1 \text{ cm}^3$  of iron weighs 8 g. (Use  $\pi = 3.14$ )

29. The runs scored by two teams A and B on the first 60 balls in a cricket match are given below: 4

|                 |     |      |       |       |       |       |       |       |       |       |
|-----------------|-----|------|-------|-------|-------|-------|-------|-------|-------|-------|
| Number of balls | 1-6 | 7-12 | 13-18 | 19-24 | 25-30 | 31-36 | 37-42 | 43-48 | 49-54 | 55-60 |
| Team A          | 2   | 1    | 8     | 9     | 4     | 5     | 6     | 10    | 6     | 2     |
| Team B          | 5   | 6    | 2     | 10    | 5     | 6     | 3     | 4     | 8     | 10    |

Represent the data of both the teams on the same graph by frequency polygons.

OR

Below are the marks obtained by 30 students of a class in Maths test out of 100. Make a frequency distribution table for this data with class interval of size 10 and draw a histogram to represent the data.

55, 61, 46, 100, 75, 90, 77, 60, 48, 58, 64, 59, 60, 78, 55, 88, 60, 37, 58, 84, 62, 44, 52, 50, 56, 98, 67, 70, 39, 68.

30. Construct a triangle ABC in which  $BC=8\text{cm}$ ,  $\angle B=45^\circ$  and  $AB-AC=3.5 \text{ cm}$ . Write the steps of construction. 4

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