

DAV PUBLIC SCHOOLS, ODISHA ZONE-I
ANNUAL EXAMINATION, 2019-2020

- Please check that this question paper contains **06** printed pages.
- Please check that this question paper contains **40** questions.
- Please write down the Serial Number of the question in the left side of the margin before attempting it.
- 15 minutes cooling time has been allotted to read this question paper only and do not write any answer on the answer book during this period.

CLASS: IX

SUBJECT: MATHEMATICS

Time :3 hours

Maximum Marks: 80

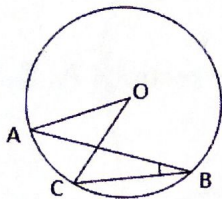
General Instructions:

- All questions are compulsory.
- The question paper consists of 40 questions divided into four sections A, B, C & D
- Section A comprises of 20 questions of 1 mark each.
- Section B comprises of 6 questions of 2 marks each.
- Section C comprises of 8 questions of 3 marks each.
- Section D comprises of 6 questions of 4 marks each.
- There is no overall choices, however the internal choices provided in two questions of one mark each, two questions of two marks each three questions of three marks each and three questions of four marks each. You have to attempt only one of the alternatives in all such questions.
- Use of calculators is prohibited.

SECTION :A

Select the most appropriate answer from the given options:

- Every rational number is
a. a natural number b. an integer c. a real number d. a whole number
- The zero of the polynomial $2x + 5$ is
a. $\frac{2}{5}$ b. $-\frac{2}{5}$ c. $\frac{5}{2}$ d. $-\frac{5}{2}$
- The graph of the linear equation $2x + 3y = 6$ is a line which meets the X-axis at the point
a. (0,2) b. (2,0) c. (3,0) d. (0,3)
- If one angle of a triangle is equal to the sum of the other two angles, then the triangle is
a. an isosceles triangle b. an obtuse triangle
c. an equilateral triangle d. a right triangle
- The diagonals AC and BD of a parallelogram ABCD intersect each other at the point O. If $\angle DAC = 32^\circ$ & $\angle AOB = 70^\circ$, then $\angle DBC$ is equal to
a. 24° b. 86° c. 38° d. 32°
- In the given figure, O is the centre of the circle. If $\angle ABC = 20^\circ$, then $\angle AOC$ is equal to



- a. 30° b. 10° c. 40° d. 20°
- If the area of an equilateral triangle is $16\sqrt{3}cm^2$, then the perimeter of the triangle is
a. 48cm b. 24cm c. 12cm d. 36cm
- A right angle triangle ABC with sides 5cm, 12cm & 13cm is revolved about the side 12cm, then the radius of the resulting solid is
a. 12cm b. 13cm c. 5cm d. 10cm
- If each observation of the data is increased by 5, then their mean
a. remains the same
b. becomes 5 times the original mean
c. is decreased by 5
d. is increased by 5
- In triangle PQR, $\angle P = 70^\circ$ & $\angle R = 30^\circ$, then the longest side of the triangle is
a. PQ b. QR c. PR d. None of these

Fill in the blanks:

11. Ordinate of any point on X-axis is _____.
12. A line segment joining mid-points of two parallel chords of a circle passes through _____ of the circle.
13. The coefficient of x in the expansion of $(x + 3)^3$ is _____.

OR

The degree of the polynomial $(2x - 5)(2x^2 - 3x + 1)$ is _____.

14. The value of $(256)^{0.16} \times (256)^{0.09}$ is _____.
15. If x is the height & y is the radius of a right circular cone, then the volume of the cone is _____.

Answer the following:

16. If the radius of a circle is 10cm and the perpendicular distance from the centre to the chord is 8 cm. Find the length of the chord.
17. Show that $p - 1$ is a factor of $p^{10} - 1$.
18. Rationalise the denominator of $\frac{2}{3\sqrt{3}}$.

OR

Express $0.\bar{9}$ in $\frac{p}{q}$ form.

19. Find the mode of the given data: 15, 14, 19, 20, 14, 15, 16, 14, 15, 18, 14, 19, 15, 17 & 15.
20. An isosceles right triangle has area 8 cm^2 . Find the length of its hypotenuse.

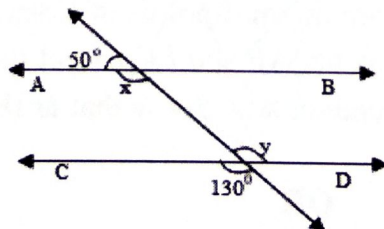
SECTION : B

21. Find two different irrational numbers between the rational numbers $\frac{5}{7}$ & $\frac{9}{11}$.

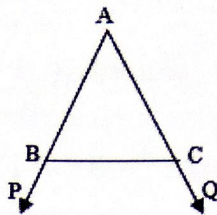
OR

Give examples to show that

- i) The product of two irrational numbers is rational.
 - ii) The sum of two irrational numbers is rational.
22. Find the value of k , if $x = 2$ & $y = 1$ is a solution of the equation $2x + 3y = k$.
 23. Find the value of x & y in the given figure, if $AB \parallel CD$



24. In the given figure, AB and AC of triangle ABC are extended to points P & Q respectively. Also, $\angle PBC < \angle QCB$. Show that $AC > AB$.



OR

- D is a point on side BC of $\triangle ABC$ such that $AD = AC$. Show that $AB > AD$
25. Three coins are tossed simultaneously 200 times with the following frequencies of different outcomes:

Outcome	3 heads	2 heads	1 head	No head
Frequency	23	72	77	28

- If the three coins are simultaneously tossed again, compute the probability of getting
- No tail.
 - Exactly two heads.
26. The record of a weather station shows that out of the past 250 consecutive days, its weather forecasts were correct 175 times.
- What is the probability that on a given day, it was correct?
 - What is the probability that on a given day, it was not correct?

SECTION : C

27. Simplify : $\frac{1}{2+\sqrt{3}} + \frac{2}{\sqrt{5}-\sqrt{3}} - \frac{1}{2-\sqrt{5}}$
28. Factorise : $27x^3 + y^3 - z^3 + 9xyz$
29. Plot the points P(-3,2), Q(-7,-3), R(6,-3) & S(2,2) & join them in order. Write the name of the figure so obtained. Also find the area of the resulting figure.
30. Show that the line segments joining the midpoints of the adjacent sides of a rectangle in order is a rhombus.

OR

In a parallelogram ABCD, E and F are the mid-points of sides AB and CD respectively. Show that the line segments AF and EC trisect the diagonal BD.

31. In $\triangle ABC$, E is the mid point of the median AD. Show that $\text{ar}(\triangle BED) = \frac{1}{4} \text{ar}(\triangle ABC)$.

OR

Show that the diagonals of a parallelogram divide it into four triangles of equal area.

32. A park in the shape of quadrilateral ABCD has $\angle C = 90^\circ$, $AB = 9\text{ m}$, $BC = 12\text{ m}$, $CD = 5\text{ m}$ & $AD = 8\text{ m}$. How much area does it occupy?
33. The diameter of moon is approximately one-fourth of the diameter of the earth. Find the ratio of their surface areas.

OR

The floor of a rectangular hall has a perimeter 250 m. If the cost of painting the four walls at the rate of ₹ 10 per m^2 is ₹ 15000, find the height of the hall.

34. The capacity of a closed cylindrical vessel of height 1m is 15.4 litres. How many square metres of metal sheet should be needed to make it?

SECTION : D

35. If the polynomials $az^3 + 4z^2 + 3z - 4$ & $z^3 - 4z + a$ leave the same remainder when divided by $z - 3$, find the value of a .

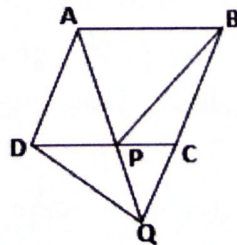
OR

If both $x - 2$ & $x - \frac{1}{2}$ are factors of $px^2 + 5x + r$, then show that $p = r$.

36. The cost of a notebook is twice the cost of a pen. Write a linear equation in two variables to represent this statement. Write any one solution. Does the graph of the equation pass through origin?
37. Diagonals AC and BD of a quadrilateral ABCD intersect each other at P. show that $\text{ar}(\text{APB}) \times \text{ar}(\text{CPD}) = \text{ar}(\text{APD}) \times \text{ar}(\text{BPC})$.

OR

ABCD is a parallelogram and BC is produced to a point Q such that $AD = CQ$. If AQ intersect DC at P, show that $\text{ar}(\text{BPC}) = \text{ar}(\text{DPQ})$



38. Two equal chords AB and CD of a circle when produced intersect at a point P.
Prove that $PB = PD$.

OR

ABCD is a parallelogram. The circle through A, B and C intersect CD (produced if necessary) at E. prove that $AE = AD$

39. Construct a triangle ABC, in which $\angle B = 60^\circ$, $\angle C = 45^\circ$
and $AB + BC + CA = 11$ cm
40. 100 surnames were randomly picked up from a local telephone directory and a frequency distribution of the number of letters in the English alphabet in the surnames was found as follows:

Number of letters	Number of surnames
1 – 4	6
4 – 6	30
6 – 8	44
8 – 12	16
12 – 20	4

Draw a histogram to depict the given information.