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ANNUAL EXAMINATION (2022-23)
CLASS IX SUBJECT – MATHEMATICS

TIME-3Hrs. **MM: 80**

General Instructions –

1. This question paper contains 4 printed pages and it is divided into 5 Sections A, B, C, D and E.
2. Section A has 20 multiple choice questions of 1 mark each, Section B has 5 questions of 2 mark each, Section C has 6 questions of 3 marks each, Section D has 4 questions of 5 marks each and Section E has 3 case study questions of 4 marks each.
3. All questions are compulsory. However, attempt any one question wherever internal choices are given.

SECTION A

Q1. Which of the following is equal to x^3

i) $x^6 - x^3$ ii) $x^6 . x^3$ iii) $\frac{x^6}{x^3}$ iv) $(x^6)^3$

Q2. The coefficient of x^2 in $x^3 + 4x^2 - 3x + 10$ is

i) 4 ii) 1 iii) x^2 iv) 10

Q3. The graph of $x = \pm a$ is a straight line parallel to the

i) x- axis ii) y- axis iii) line $x = y$ iv) line $x + y = 0$

Q4. The longest chord of the circle is –

i) radius ii) diameter iii) tangent iv) sector

Q5. The linear equation $3y - 5 = 0$ represented by $ax + by + c = 0$ has

i) a unique solution ii) infinitely many solutions

ii) two solutions iv) no solutions

Q6. The angles of a quadrilateral are $7x, 5x, 3x$ and $3x$, then the value of x will be

i) 10 ii) 20 iii) 30 iv) 40

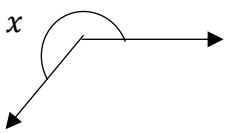
Q7. The radius of a circle is 13 cm and the length of one of its cord is 10 cm. The distance of the cord from the centre is:

i) 11.5 cm ii) 12 cm iii) $\sqrt{69}$ cm iv) 23 cm

Q8. Which of the following is not a parallelogram?

i) trapezium ii) square iii) rectangle iv) rhombus

Q9. In the given figure, $\angle x$ is



i) obtuse angle ii) acute angle iii) reflex angle iv) straight angle

Q10. Which among is not the congruency condition for a triangle?

i) SAS ii) AAA iii) ASA iv) RHS

Q11. In a right-angled triangle where $\angle A = 90°$ and $AB = AC$. The value of $\angle B$ is

i) 45° ii) 35° iii) 75° iv) 65°

Q12. The base diameter of a cone is 38 cm and its height is 30 cm. What will be its slant height?

i) 34 cm ii) 33 cm iii) 27 cm iv) 25 cm

Q13. A frequency polygon can be

i) drawn using variables ii) drawn using bar graph

iii) drawn independently and by using histogram iv) none of the above

Q14. The difference between the class marks of two successive classes is

i) class size ii) lower class limit iii) upper class limit iv) range

Q15. Volume of the spherical shell is

i) $\frac{2}{3}\pi r^3$ ii) $\frac{3}{4}\pi r^3$ iii) $\frac{4}{3}\pi R^3$ iv) $\frac{4}{3}\pi(R^3 - r^3)$

Q16. If a point P lies between M and N and C is the mid-point of MP, then

i) $MC + PN = MN$ ii) $MP + CP = MN$ iii) $MC + CN = MN$ iv) $CP + CN = MN$

Q17. $x^3 - x$ is a _____ polynomial.

i) linear ii) quadratic iii) cubic iv) none of the above

Q18. Two parallel lines intersect at

i) one point ii) two points iii) three points iv) null

Direction : in the questions 19 and 20, a statement of Assertion (A) is followed by a statement of Reason (R). chose the correct answer out of the following choices.

i) Both Assertion and Reason are correct, and reason is the correct explanation for assertion.

ii) Both Assertion and Reason are correct, and Reason is not the correct explanation for Assertion.

iii) Assertion is true but Reason is false.

iv) Both Assertion and Reason are false.

Q19. **Assertion –** According to statistics, more female children are born each year than male children in India.

Reason – In India, the death rate of a male child is higher than that of the female child.

Q20. **Assertion:** There can be infinite number of lines that can be drawn through a single point.

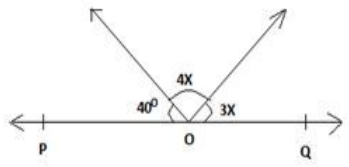
Reason: . From this point we can draw only two lines.

SECTION B

Q21. Express $18.\overline{48}$ in the form of $\frac{p}{q}$ where p and q are integers and q ≠ 0.

Q22. Determine the volume of a conical tin having radius of the base as 30cm and its slant height as 50cm (use $\pi = 3.14$)

Q23. In the given figure, POQ is a line, find the value of x.



Q24. Find two solutions for the equation $4x + 3y = 24$ how many solutions of this equation are possible?

Q25. Find the value of the polynomial $\mathbf{5x - 4x^2 + 3}$ at

i) $\boldsymbol{x = 0}$ ii) $\boldsymbol{x = 2}$

SECTION C

Q26. Divide $\mathbf{3y4 - 8y3 - y2 - 5y - 5}$ by $\boldsymbol{y - 3}$ and find the quotient and the reminder.

OR

If $\mathbf{f}(\boldsymbol{x}) = \mathbf{5x^2 - 4x + 5}$ find $\boldsymbol{f}(\mathbf{1}) + \boldsymbol{f}(\mathbf{-1}) + \boldsymbol{f}(\mathbf{0})$.

Q27. What is the value of a and b, if $\frac{(3+\sqrt{5})}{(3-\sqrt{5}} = \boldsymbol{a} + \boldsymbol{b}\sqrt{\mathbf{5}}$ where a and b are rational numbers?

Q28. Find the area of a triangle whose perimeter is 180 cm and two of its sides are 80 cm and 18 cm

Q29 .Find three solution and draw the graph of the following linear equation;$\mathbf{3x + y = 6}$.

Q30. $\boldsymbol{ABCD}$ is a rectangle and $\boldsymbol{P}, \boldsymbol{Q}, \boldsymbol{R}$ and $\boldsymbol{S}$ are mid-points of the sides $\boldsymbol{AB}, \boldsymbol{BC}, \boldsymbol{CD}$ and $\boldsymbol{DA}$ respectively. Show that the quadrilateral $\boldsymbol{PQRS}$ is a rhombus.

Q31. In a city the following weekly instructions are made in a study on cost of living index draw a histogram and frequency polygon for the data on the same graph.

Cost Of Living	No. Of Weeks
120 – 130	8
130 – 140	12
140 – 150	4
150 – 160	16
160 – 170	8
170 – 180	4

SECTION D

Q32. A solid metallic sphere of diameter 21 cm is melted and recast into a number of smaller cones, each of diameter 3.5 cm and height 3 cm. Find the number of cones so formed.

OR

A bus stop is barricaded from the remaining part of the road, by using 50 hollow cones made of recycled cardboard. Each cone has a base diameter of 40 cm and height 1 m. If the outer side of each of the cones is to be painted and the cost of painting is ₹ 12 per m^2, what will be the cost of painting all these cones? (Use π = 3.14 and take $\sqrt{\mathbf{1.04}} = \mathbf{1.02}$)

Q33. A chord of a circle is equal to the radius of the circle. Find the angle subtended by the chord at a point on the minor arc and also at a point on the major arc.

Q34. Factorize $\boldsymbol{x^3 + 13x^2 + 32x + 20}$

OR

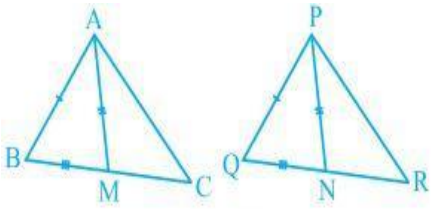
If $\boldsymbol{z^2 + \frac{1}{z^2} = 34}$, find the value of $\boldsymbol{z^3 + \frac{1}{z^3}}$ using only the positive value of $\boldsymbol{z + \frac{1}{z}}$.

Q35. Two sides AB and BC and median AM of one triangle ABC are respectively equal to sides PQ and QR

and median PN of ΔPQR . Show that:

(i) $\Delta ABM \cong \Delta PQN$

(ii) $\Delta ABC \cong \Delta PQR$



SECTION E

Case Based Study I

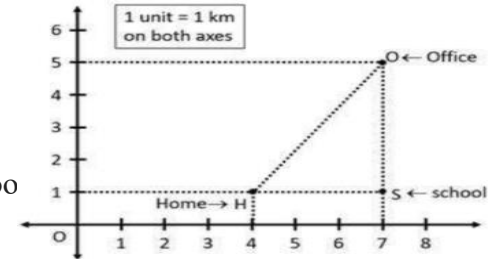
Q36. Saumya has to reach her office every day at 10:00 am. On the way to her office, she drops her son at school. Now, the location of Saumya's house, her son's school and her office are represented by the map below. Using the details given, answer the following questions.

i. Find the coordinates of Saumya's home.

ii. Find the coordinates of Saumya's office.

iii. Find the coordinates of Saumya's son's school.

iv. Find the distance between Saumya's home and her son's schoo



Case Based Study II

Q37. Real numbers are broadly classified as rational and irrational numbers. Rational numbers are the ones that can be expressed in p/q form where q is not equal to zero and p and q are co-prime . whereas irrational numbers can't be expressed in p/q form. The decimal expansion of a rational number can either be recurring or terminating. But the decimal expansion of an irrational numbers is neither recurring nor terminating. Based on the given information answer the following questions.

(i) Is zero a rational number ?
Can you write it in the form p/q, where p and q are integers and $q \neq 0$? (1)

(ii) Find two rational numbers between 1 and 2 . (1)

(iii) State whether the following statements are true or false. Justify your answers.

(a) Every irrational number is a real number.

(b) Every real number is an irrational number. (2)

Q38. **Paper Folding Activity**

Mrs. Sukanya, a maths teacher was explaining the topic "Congruency of Triangle" by paper folding method. She took a quadrilateral shaped original sheet $\boldsymbol{ACBD}$ and folded it in such a way from point $\boldsymbol{A}$ and $\boldsymbol{B}$ that $\boldsymbol{AB}$ bisects $\angle \boldsymbol{A}$ and $\boldsymbol{AC} = \boldsymbol{AD}$.

i) Why is $\angle \boldsymbol{CAB} = \angle \boldsymbol{DAB}$?

ii) $\boldsymbol{\Delta ABC}$ and $\boldsymbol{\Delta ABD}$ are congruent by which congruence criterion?

iii) Is $\angle \boldsymbol{ACB} = \angle \boldsymbol{ADB}$? If yes, why?

iv) $\boldsymbol{BC}$ is equal to _____.