CENTRAL PUBLIC SCHOOL

Subject – Maths | **TAJPUR ROAD, SAMASTIPUR** | **Time- 3 hrs.**

Class – IX | **MID TERM EXAM - 2018** | **F. M. – 80**

Section – A

Solve these sums.

1. If $625^x = \frac{25}{5^x}$, Find x..
2. In which quadrant (s), the abscissa of a point is negative?
3. Find the value of f(x) = $2x^2+7x+3$ at x= -2.
4. To which country does Euclid belong?
5. Find the measure of an angle whose supplement is equal to the angles itself.
6. Find the area of an isosceles triangle having base x cm and equai side y cm.

Section – B (2marks each)

7. Factorise : $7\sqrt{2}\,x^2 - 10x - 4\sqrt{2}$
8. Find the angle which exceeds its complement by 20°.
9. It is known that x + y=10 and that x=z. Show that z + y=10. Solve the equation using appropriate Euclid's axiom.
10. The diagonals of a rectangle ABCD meet at O. If $\angle BCD = 44$, find $\angle OAD$.
11. The altitude of an equilateral triangle is $3\sqrt{3}$ cm. Find its area.
12. If the mean of the observations x, 2x+1, 2x+5, 2x+9 is 30, what is the mean of last two observations.

Section – C (3 marks each)

13. If $x = 5-2\sqrt{6}$ then find the value of $x^2+\frac{1}{x^2}$
14. Verify that : $x^3+y^3+z^3-3xyz=\frac{1}{2}(x+y+z)[(x-y)^2+(y-z)^2+(z-x)^2]$
15. If a + b + c=5 and ab + bc + ca=10, then prove that $a^3+b^3+c^3-3abc= -25$

Or

If a, b, c are all non-zero and a + b + c = 0, prove that $\frac{a^2}{bc}+\frac{b^2}{ca}+\frac{c^2}{ab}=3$

16. Find the coordinates of the point.
    a. Which lies on both the axes?
    b. Whose abscissa is –4 and lies on x-axis?
    c. Whose ordinate is 5 and lies on y-axis?
17. In $\triangle$ ABC, the side AB and AC of $\triangle$ABC are produce to points E and D respectively. If bisectors BO and CO of $\angle$CBE and $\angle$BCD respectively meet at point O, then prove that $\angle BOC = 90^0 - \frac{1}{2}\angle A$.

18. The mid-points of the sides of a quadrilateral are joined in order, prove that the area of the ||gm so formed will be half of the area of the given quadrilateral.

19. ABCD is a rectangle in which diagonal AC bisects ∠A as well as ∠C. Show that ABCD is square.

20. Factorise: $2x3 - 3x2 - 17x + 30$ or if $x^2 + \frac{1}{x^2} = 34$, find $x^3 + \frac{1}{x^3} - 9$

21. The unequal side of an isosceles triangle measures 24cm and its area is 60cm². Find the perimeter of the given isosceles triangle.

22. The mean of the following distribution is 50.

x	10	30	50	70	90
F	17	5a + 3	32	7a – 11	19

Find the value of a and hence the frequencies of 30 and 70.

Section – D (4 marks each)

23. Represent $\sqrt{4.5}$ on the number line. With steps.

24. Find the values of a and b so that (3+1) and (3-1) are factors of $z^4 + az^3 + 2z^2 - 3z + b$.

Or

Prove that $(a + b + c)^3 - a^3 - b^3 - c^3 = 3(a + b)(b + c)(c + a)$

25. △ABC is an isosceles triangle in which AB=AC. Side BA is produced to D such that AD=AB. Show that ∠BCD is a right angle.

26. ABCD is a trapezium in which AB||CD and AD=BC. Show that.

a. ∠A = ∠B c. ∠C = ∠D d. △ABC ≅ △BAD

b. diagonal AC = diagonal BD.

Or

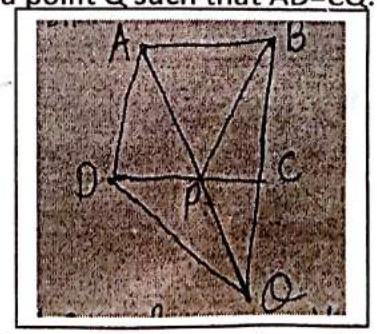
AD is the median of △ABC. E is mid-point of AD. BE produced to meet AC at F. show that $AF = \frac{1}{3}AC$.

27. State and prove SSS congruence rule.

28. Draw a frequency polygon to represent the following information:

Class	25-29	30-34	35-39	40-44	45-49	50-54
frequency	5	15	23	20	10	7

29. In figure ABCD is a parallelogram and BC is produced to a point Q such that AD=CQ. If AQ intersect DC at P, show that ar(BPC) = ar(DPQ).



30. Prove that sum of any two sides of a triangle is greater than twice the median with respect to the third side.

Or

In a □ABCD in which diagonal AC and BD intersect at 0, show that AB + BC + CD + DA ∠2(AC + BD)