GUESS PAPER
MATHEMATICS
Class X

Time: Three hours **Full Marks: 80**

General Instructions:

1. All Questions are compulsory.

2. The question paper consists of **thirty** questions divided into **4** sections A, B, C and D. **Section A** comprises of **ten** questions of **01** mark each, **section B** comprises of **five** questions of **02** marks each, **section C** comprises of **ten** questions of **03** marks each and **section D** comprises of **five** questions of **06** marks each.

3. All questions in Section A are to be answered in one word, one sentence or as per the exact requirement of the question.

4. In question on construction, drawings should be neat and exactly as per the given measurements.

5. Use of calculators is not permitted. However you may ask for mathematical tables.

Section A

1. State Euclid's division lemma.

2. Find the zeroes of the polynomial $k^3 - 7k + 6$.

3. Obtain the condition for the following system of linear equations to have a unique solution:

$$ax + by = c\ ; lx + my = n$$

4. Determine k, so that the equation $x^2 - 4x + k = 0$ has coincident roots.

5. If $\text{Cos}\theta = \frac{21}{29}$, determine the value of $\frac{Sec\theta}{\tan\theta - Sin\theta}$.

6. Prove that the tangents drawn at the end of a chord of a circle make equal angles with the chord.

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7. State converse of Thales theorem.

8. Find the area of a sector of a circle where central angle is 30^0 and the radius of the circle is 42cm.

9. If median=30, mode=15, find the mean.

10. Two coins are tossed simultaneously. Find the probability of getting exactly one head.

Section B

11. If the p^{th} term of an AP is q and q^{th} term is p , then prove that its $(p+q)^{th}$ term is zero.

12. Evaluate: $\frac{5Sin^2 30^0 + Cos^2 45^0 + 4tan^2 60^0}{2Sin30^0 Cos60^0 + tan45^0}$

13. Show that the points $(-1,-1)$, $(2,3)$ and $(8,11)$ lie on a line.

14. If A be the area of a right triangle and b one of the sides containing right angle, prove that the length of the altitude on the hypotenuse is $\frac{2Ab}{\sqrt{b^2+4A^2}}$

15. A jar contains 24 marbles, some are green and others are blue. If a marble is drawn at random from the jar, the probability that it is green is $\frac{2}{3}$. Find the number of blue balls in the jar.

Section C

16. Show that any positive odd integer is of the form $(4q+1)$ or $(4q+3)$, where q is some integer.

17. If α, β, γ be zeroes of a cubic polynomial $ax^3 + bx^2 + cx + d, (a \neq 0)$. Determine the relations between its zeroes and coefficients.

18. Solve the following pair of linear equations by any method:

$ax + by = c \;\; ; \;\; bx + ay = 1 + c$

19. Determine p so that the equation $x^2+5px+16=0$ has no real roots.

20. Prove that, $\frac{Sin\theta-Cos\theta+1}{Sin\theta+Cos\theta-1} = \frac{1}{Sec\theta-tan\theta}$

21. Determine the ratio in which the point $(-8,k)$ divides the join of P$(-9,-2)$ and Q$(-6,k)$.

    Also find the value of k.

22. Let, ABC be any triangle whose vertices A(x_1, y_1) , B(x_2, y_2) and (x_3, y_3). Find its area.

23. Draw a pair of tangents to a circle of radius 6cm which are inclined to each other at 60^0.

24. In an equilateral triangle of side 24cm, a circle is inscribed touching its sides. Find the area of the remaining portion of the triangle.

25. In a right-angled triangle ABC, right angled at C, AD is the median in it. Prove that $4AD^2+BC^2=2AB^2+2AC^2$.

Section D

26. The radius of the base of a right circular cone is r.It is cut by a plane parallel to the base at a height h from the base. The distance of the boundary of the upper surface from the centre of the base of the frustum is $\sqrt{h^2+\frac{r^2}{9}}$. Show that the volume of the frustum is $\frac{13}{27}\pi r^2$h.

27. A round balloon of radius r subtend an angle θ at the eye of the observer while the angle of elevation of its centre is φ. Prove that the height of the centre of the balloon is rSin φCosec$\frac{\theta}{2}$.

28. State and prove Pythagoras theorem. A person goes 10m due East and then 30m due North. Find his

Distance from the starting point.

29. The median of the following data is 525. Find the value of x and y, if the total frequency is 100.

Class interval	Frequency
$0 - 100$	2
$100 - 200$	5
$200 - 300$	x
$300 - 400$	12
$400 - 500$	17
$500 - 600$	20
$600 - 700$	y
$700 - 800$	9
$800 - 900$	7
$900 - 1000$	4

30. The denominator of a fraction is more than twice the numerator. If the sum of the fraction and its reciprocal is $2\frac{16}{21}$. Find the fraction.

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