

School Of Math
SCF- 33 ,Sec- 4 Market, Gurgaon. Ph. 8586000650
Class: XI
Sample Paper

Time: 3 hour

M.M.100

General Instructions:

1. All questions are compulsory.
2. The question paper consists of **29** questions divided into three sections **A, B, C** and **D**. Section **A** comprises **4** questions of **one mark** each, Section **B** comprises **8** questions of **two marks** each, Section **C** comprises **11** questions of **four marks** each and Section **D** comprises **6** questions of **six 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 questions.
4. Use of calculator is not permitted. You may ask for logarithmic tables, if required.

SECTION - A

- Q1 Express the following sets as sets of ordered pairs: 1
 $\{(x, y) : 2x + 3y = 15, x, y \in W\}$.
- Q2 Find the equation of the straight line with slope 2 and x – intercept 3. 1
- Q3 Find the value of $\cot(-1575^\circ)$. 1
- Q4 Find the limits : 1
 $\lim_{x \rightarrow 2} \frac{3x^2 - x - 10}{x^2 - 4}$

SECTION – B

- Q5 Write the following as intervals : 2
 i) $\{x : x \in R, -5 \leq x < 8\}$ ii) $\{x : x \in R, -2 < x \leq 9\}$ iii) $\{x : x \in R, 0 \leq x \leq 3\}$
 iv) $\{x : x \in R, -5 < x < 5\}$
- Q6 Prove that 2
 a) i) $\tan 7A - \tan 5A - \tan 2A = \tan 7A \tan 5A \tan 2A$
- Q7 Find the modulus of $\frac{1+i}{1-i} - \frac{1-i}{1+i}$. 2
- Q8 Evaluate : $\sum_{r=1}^6 {}^6C_r + 1$ 2
- Q9 The 4th term of a G.P. is square of its second term, and the first term is -3. Determine its 7th term. 2
- Q10 Find the equation of the hyperbola whose vertices are at $(\pm 2, 0)$ and foci at $(\pm 3, 0)$. 2

- Q11 If $\lim_{x \rightarrow a} \frac{x^9 - a^9}{x - a} = \lim_{x \rightarrow 5} (x + 4)$, find all possible values of a. 2
- Q12 Find $\frac{dy}{dx}$, if $y = \frac{x^3 + 6x^2 + 11x + 6}{x^2 + 5x + 6}$ 2
- SECTION – C**
- Q13 Find range of function f . 4
 If $f : [1, \infty) \rightarrow R$
 $f(x) = 2x^2 - 8x - 7$
- Q14 Prove that : $\sin 10^\circ \sin 50^\circ \sin 60^\circ \sin 70^\circ = \frac{\sqrt{3}}{16}$ 4
- Q15 Prove by using the principle of mathematical induction 4
 $1^3 + 3^3 + 5^3 + \dots + (2n - 1)^3 = n^2(2n^2 - 1)$.
- Q16 Write the following complex numbers in polar form 4
 $\frac{2 + 6\sqrt{3}i}{5 + \sqrt{3}i}$
- Q17 A committee of 12 is to be formed from 9 women and 8 men. In how many ways this can be done if at least five women have to be included in a committee? In how many of these committees i) the women are in majority ii) the men are in majority? 4
- Q18 Sum to n terms : 4
 $3 + 4 + 6 + 10 + 18 + \dots$
- Q19 If the coefficients of second, third and fourth terms in the expansion of $(1 + x)^{2n}$ are in A.P., Show that $2n^2 - 9n + 7 = 0$. 4
- Q20 Find the equation of the circle which passes through the points (3, -2) and (-2, 0) and having its centre on the line $2x - y - 3 = 0$ 4
- Q21 A (3, 2, 0), B (5, 3, 2) and C (-9, 6, -3) are three vertices of a triangle ABC. AD, the bisector of $\angle BAC$, meets BC in D. Find the coordinates of D. 4
- Q22 Find the derivative of the following functions from the first principle $e^{\sin x}$ 4
- SECTION – D**
- Q23 Four cards are drawn at random from a pack of 52 playing cards. Find the probability of getting: 6
 i) all face cards ii) two red cards and two cards iii) one card from each suit iv) all the four cards of the same suit
- Q24 In a group of children, 35 play Football out of which 20 play Football only, 22 play Hockey; 25 play Cricket out of which 11 play Cricket only. Out of these 7 play Cricket and Football but not Hockey, 3 play Football and Hockey but not Cricket and 12 play Football and Cricket both. How many play all the three games? How many play Cricket and Hockey but not Football? How many play Hockey only? What is the total number of children in the group? 6
- Q25 Evaluate $\sin^4 \frac{\pi}{8} + \sin^4 \frac{3\pi}{8} + \sin^4 \frac{5\pi}{8} + \sin^4 \frac{7\pi}{8}$ 6

- Q26 Solve the graphically $x + 2y \leq 3, 3x + 4y \geq 12, y \geq 1, x \geq 0, y \geq 0$ 6
 Q27 Find the coordinates of the orthocentre of the triangle whose sides are $3x - 2y = 6, 3x + 4y + 12 = 0$ and $3x - 8y + 12 = 0$. 6
 Q28 Differentiate the following functions w.r.t.x. 6

$$\frac{\sin x - x \cos x}{x \sin x + \cos x}$$

- Q29 Find the standard deviation from the following data: 6

No. of Students	4	12	22	37	48	55	58	60
Marks obtained	under 10	under 20	under 30	under 40	under 50	under 60	under 70	under 80

- Ans 1 $\{(0,5), (3,3), (6,1)\}$ 2 $2x - y - 6 = 0$ 3 1 4 $11/4$
 5 i) $[-5, 8]$ ii) $(-2, 9]$ iii) $[0, 3]$ iv) $(-5, 5)$ 7 $\sqrt{0^2 + 2^2} = 2$ 8 64 9 -2187 10 $\frac{x^2}{4} - \frac{y^2}{5} = 1$
 11 1, -1 12 1 13 16 $2\left(\cos \frac{\pi}{3} + i \sin \frac{\pi}{3}\right)$ 17 i) 2702 ii) 1008 18 $2^n - 1 + 12$
 20 $x^2 + y^2 + 3x + 12y + 2 = 0$ 21 $D \equiv \left(\frac{19}{8}, \frac{57}{16}, \frac{17}{16}\right)$ 22 $e^{\sin x} \cos x$ 24 60 27 $\left(\frac{-1}{6}, \frac{-23}{9}\right)$
 28 $\frac{x^2}{(x \sin x + \cos x)}$ 29 S.D. = 17.13