CBSE Sample Paper Class 11 Maths Set 8

Time Durations : 3 hours **Maximum Marks :100**

General Instructions :

(i) All questions are compulsory.

(ii) Q. 1 to Q. 10 of Section A are of 1 mark each.

(iii) Q. 11 to Q. 22 of Section B are of 4 marks each.

(iv) Q. 23 to Q. 29 of Section C are of 6 marks each.

(v) There is no overall choice. However an internal choice has been provided in some questions.

SECTION A

1. A = {1, 2, 3, 4, 5, 6}, B = {2, 3, 5, 7, 9} U = {1, 2, 3, 4, ...10}, Write $(A - B)'$

2. Express $(1 - 2i)^{-2}$ in the standard form a + ib.

3. Find 20^{th} term from end of the A.P. 3, 7, 11, ... 407.

4. Evaluate $5^2 + 6^2 + 7^2 + ... + 20^2$

5. Evaluate $\lim_{x \to 0} \frac{e^x - e^{-x}}{x}$

6. Evaluate $\lim_{x \to 0} \frac{\sqrt{1 + x + x^2} - 1}{x}$

7. A bag contains 9 red, 7 white and 4 black balls. If two balls are drawn at random, find the probability that both balls are red.

8. What is the probability that an ordinary year has 53 Sundays?

9. Write the contrapositive of the following statement :
"it two lines are parallel, then they do not intersect in the same plane."

10. Check the validity of the compound statement "80 is a multiple of 5 and 4."

11. Find the derivative of $\frac{\sin x}{x}$ with respect to x from first principle.

SECTION B

12. Two students Ajay and Aman appeared in an interview. The probability that Ajay will qualify the interview is 0.16 and that Aman will quality the interview is 0.12. The probability that both will qualify is 0.04. Find the probability that—

(a) Both Ajay and Aman will not qualify.

(b) Only Aman qualifies.

13. Find domain and range of the real function $f(x) = \frac{3}{1 - x^2}$

14. Let R be a relation in set A = {1, 2, 3, 4, 5, 6, 7} defined as R = {(a, b): a divides b, a not equal to b}. Write R in Roster form and hence write its domain and range.

OR

Draw graph of f(x) = 2 + |x – 1|.

15. Solve : $\sin^2 x - \cos x = \frac{1}{4}$.

16. Prove that $\cos 2\theta . \cos \frac{\theta}{2} - \cos 3\theta \cos \frac{9\theta}{2} = \sin 5\theta \sin \frac{5\theta}{2}$.

17. If x and y are any two distinct integers, then prove by mathematical induction that $x^n - y^n$ is divisible by $(x - y)$ $\forall n \in N$.

18. If $x + iy = (a + ib)^{1/3}$, then show that $\frac{a}{x} + \frac{b}{y} = 4\left(x^2 - y^2\right)$

OR

Find the square roots of the complex number $7 - 24i$

19. Find the equation of the circle passing through points (1, –2) and (4, –3) and has its centre on the line $3x + 4y = 7$.

OR

The foci of a hyperbola coincide with of the foci of the ellipse $\frac{x^2}{25} + \frac{y^2}{9} = 1$. Find the equation of the hyperbola, if its eccentricity is 2.

20. Find the coordinates of the point, at which yz plane divides the line segment joining points (4, 8, 10) and (6, 10, –8).

21. How many words can be made from the letters of the word 'Mathematics', in which all vowels are never together.

22. From a class of 20 students, 8 are to be chosen for an excusion party.

There are two students who decide that either both of them will join or none of the two will join. In how many ways can they be choosen?

SECTION C

23. In a survey of 25 students, it was found that 15 had taken mathematics, 12 had taken physics and 11 had taken chemistry, 5 had taken mathematics and chemistry, 9 had taken mathematics and physics, 4 had taken physics and chemistry and 3 had taken all the three subjects. Find the number of students who had taken

(i) atleast one of the three subjects,

(ii) only one of the three subjects.

24. Prove that $\cos^3 A + \cos^3\left(\frac{2\pi}{3} + A\right) + \cos^3\left(\frac{4\pi}{3} + A\right) = \frac{3}{4}\cos 3A.$

25. A manufacturer has 600 litres of a 12% solution of acid. How many litres of a 30% acid solution must be added to it so that acid content in the resulting mixture will be more than 15% but less than 18%?

26. Find n, it the ratio of the fifth term from the beginning to the fifth term from the end in the expansion of $\left[\sqrt[4]{2} + \frac{1}{\sqrt[4]{3}}\right]^n$ is $\sqrt{6} : 1$.

27. The sum of two numbers is 6 times their geometric mean. Show that the numbers are in the ratio $(3 + 2\sqrt{2}) : (3 - 2\sqrt{2})$.

28. Find the image of the point (3, 8) with respect to the line x + 3y = 7 assuming the line to be a plane mirror.

29. Calculate mean and standard deviation for the following data

Age	Number of persons
20 – 30	3
30 – 40	51
40 – 50	122
50 – 60	141
60 – 70	130
70 – 80	51 80 – 90 2

OR

The mean and standard deviation of 20 observations are found to be 10 and 2 respectively. On rechecking it was found that an observation 12 was misread as 8. Calculate correct mean and correct standard deviation.