CBSE Sample Paper Class 11 Maths
Set 10

Time: 3 hrs **M.M: 100**

GENERAL INSTRUCTIONS:

1. All questions are compulsory.

2. The question paper consists of 26 questions divided into 3 section A,B and C. Section A comprises of 6 questions of 1 mark each, Section-B comprises of 13 questions of 4 marks each and section-c comprises of 7 questions of 6 marks each.

3. There is no overall choice, however internal choice has been provided in 4 questions of four marks each and 2 questions of six marks each. You have to attempt only one of the alternatives in all such questions.

4. Use of calculators is not permitted.

(SECTION-A)

1. If U ={1,2,3,4,5,6,7,8,9}, A = {1,2,3,4}, B = {2,4,6,8}. Find $(A-B)'$.

2. If set A has 2 elements and set B has 3 elements, then how many relations from set A to Set B can be formed?

3. If $\sqrt{3}\text{cosec } x = -2$, find x.

4. Solve the following equation.

$$x^2+3x+9 = 0$$

5. If $x \in N$, find the smallest value of x which satisfies the inequation.

$$2x + \frac{5}{2} \geq \frac{5x}{2} + 1$$

6. Find the equation of the line, which makes intercepts -3 and 2 on the x- and y- axes respectively.

SECTION-B

7. If P(A) = P (B) show that A=B

Or

Let A and B be sets; if $A \cap X = B \cap X = \emptyset$ and $A \cup X = B \cup X$ for some set X. show that A=B.

8. Find the domain and range of the function $f(x) = 1 - |x-3|$.

9. Let A = {1,2,3,4,5,6,7,8,9,10} a relation R from set A to A be define by R = {(x,y) : y = x+5}

(i) Write R in roster form

(ii) Find the domain of R.

(iii) Find the range of R

(iv) Depict R using an arrow diagram.

10. Prove that

$$(\cos x + \cos y)^2 + (\sin x - \sin y)^2 = 4\cos^2\left(\frac{x+y}{2}\right)$$

Or

For any ΔABC, prove that

$$\frac{a+b}{c} = \frac{\cos\left(\frac{A-B}{2}\right)}{Sin\frac{C}{2}}$$

11. Find $Sin\frac{x}{2}$, if tan x = $\frac{-4}{3}$ and x lies in quadrant IV.

12. Find the general solution for the equation sin 2x - sin4x + sin6x = 0

13. For all n $\geq$ 1, prove the following by using the principle of mathematical induction

$$\frac{1}{1.2}+\frac{1}{2.3}+\frac{1}{3.4}+\ldots\ldots\ldots\ldots+\frac{1}{n(n+1)}=\frac{n}{n+1}$$

14. Find the polar form of complex number

$$\frac{-16}{1+i\sqrt{3}}$$

Or

Find the square root of complex number -7-24i.

15. A committee of 7 has to be formed form 9 boys and 4 girls. In how many ways can this be done when the committee consists of at least three girls?

16. How many words, with or without meaning each of 3 vowels and 2 consonants can be formed from the letters of the word INVOLUTE?

17. Find the middle term in the expansion of $(\frac{x}{3}+9y)^{10}$.

18. The sum of n terms of two arithmetic progressions are in the ratio (3n+8):(7n+15). Find the ratio of their 12^{th} term.

Or

Find the sum of following series upto n terms.

$3x1^2 + 5x2^2 + 7x3^2 + \ldots\ldots\ldots\ldots\ldots$

19. The vertices of ΔPQR are P(2,1), Q(-2,3) and R(4,5). Find the equation of the median through the vertex R.

SECTION-C

20. A college awarded 38 medals in football, 15 in basketball and 20 in cricket. If these medals went to a total of 58 men only three men got medals in all the three sports, how many received medals in exactly two of the three sports?

21. Prove that $3^{2n+2} - 8n - 9$ is divisible by 8 using P.M.I.

22. If α and β are different complex numbers with $|\beta| = 1$, then find $\left|\frac{\beta-\alpha}{1-\bar{\alpha}\beta}\right|$

23. Solve the system of inequalities graphically

$$4x+3y \leq 60,\ y \geq 2x,\ x \geq 3,\ x \geq 0,\ y \geq 0$$

24. The coefficient of the $(r-1)^{th}$, r^{th} and $(r+1)^{th}$ terms in expansion of $(x+1)^n$ are in the ratio 1:3:5. Find n and r.

Or

If the coefficient of a^{r-1}, a^r and a^{r+1} in the expansion of $(1+a)^n$ are in arithmetic progression, prove that $n^2-n(4r+1) + 4r^2 - 2=0$

25. Let S be the sum, P the product and R the sum of reciprocals of n terms in a G.P. prove that $P^2R^n = S^n$

Or

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

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