## **Sample Paper – 2013Class – XISubject –MATHEMATICS**

## **M.M. 100 Time : 3 hours**

## **General Instructions:**

## ***(i).All questions are compulsory***

## ***(ii).The question paper consists of 29 questions divided into three section A comprises of 10 questions***

##  ***of one mark each, section B comprises of 12 questions of four marks each and section C.***

 ***comprises of 07 questions of six marks each.***

***(iii).All questions in section A are to be answered in one word, one sentence or as per the exact***

 ***requirement of the question.***

## ***(iv) There is no overall choice. However Internal choice has been in 04 questions of four marks each***

##  ***and 02 questions of six marks each .You have to attempt only one of the alternative in all such***

 ***questions.***

***(v). Use of calculator is not permitted. However, you may ask for logarithmic and statistical Tables, if***

 ***required.***

# Section – A

Q.01 Find the range of the following function

 $f\left(x\right)=\frac{x^{2}-3x + 2}{x^{2 }+ x - 6}$

Q.02 Find the value of $i^{57}+\frac{1}{i^{125}}$

Q.03 If nC8 = nC6. find nC2.

Q.04 Expand $\left(2x-3y\right)^{5}$

Q.05 Find the equation of the ellipse satisfying the conditions:

 Length of major axis 26, foci $\left(\pm 5, 0\right)$

Q.06 Evaluate $\lim\_{x\to -2}\frac{x^{5} + 32}{x + 2}$

Q.07 Differentiate the following w.r.t. x; x- 4 (3 - 4x-5).

Q.08 Find the component statement of the following compound statements and whether they

 are true or false.

 100 is divisible by 3, 11, and 5.

***P.T.O.***

Q.09 State whether “OR” used in the following statement is “exclusive or inclusive”

 All real number or rational or irrational.

Q.10 Write the converse, contradiction and contrapositive of each of the statements given

 below : n is divisible by 3,if the sum of digits of n is divisible by 3.

# Section – B

Q.11 Let A and B be sets if $A∩X=B∩X= ϕ and A∪X=B∪X $for some set X, prove

 that A = B

Q.12 How many liters of water will have to be added to 1125 liters of the 45% solution of acid

 so that the resulting mixture will contain more than 25%, but less than 30% acid content?

Q.13 Find the ratio in which the line joining the points (2, 4, 5), (3, 5, -4) is divided by (i) xy-

 plane; (ii) yz-plane; (iii) zx-plane and find the coordinates of the points.

 OR

 For what values of k are the three lines 4x + 7y – 9 = 0, 5x + ky + 15 = 0 and 9x – y + 9 = 0

 are concurrent.

Q.14 Show that product of perpendiculars on the line $\frac{x}{a}\cos(θ+\frac{y}{b})\sin(θ=1)$ from the pointes

 ($\pm \sqrt{a^{2}-b^{2}},0) $is $b^{2}$.

 OR

 Prove that the parallelogram formed by the lines

 $\frac{x}{a}+\frac{y}{b}=1, $ $\frac{x}{b}+\frac{y}{a}=1, \frac{x}{a}+\frac{y}{b}=2, and \frac{x}{b}+\frac{y}{a}=2,$ is a rhombus.

Q.15 Find M.D. about the mane for the following distributions:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Class | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 | 60-70 | 70-80 |
| Frequency | 5 | 8 | 12 | 15 | 20 | 14 | 12 | 6 |

Q.16 If a and b are the roots of $x^{2}$ - 3x + p = 0 and c, d are the roots of $x^{2}$ - 12x + q = 0, where

 a, b, c, d form a GP. Prove that (q + p ) : (q - p) =17 : 25

Q.17 If $a=\frac{1 + i}{\sqrt{2}}$ , find the value of $a^{6}+a^{4}+a^{2}+1$

Q.18 Find $\lim\_{x\to 0}\frac{2\sin(x - \sin(2x))}{x^{3}}$

Q.19 If a leap year is selected at random, what is the chance that it will contain 53 Tuesday.

OR

***P.T.O.***

 Find $\frac{1}{1 × 2}+\frac{1}{2 × 3}+\frac{1}{3 × 4}+…………..to n terms.$

Q.20 Two dice are tossed once. Find the probability of getting an even number on first die. Or a

 total of 8.

Q.21 Prove the following by using the principle of mathematical induction for all $nϵ N$.

 $\frac{1}{1 . 4}+\frac{1}{4 . 7}+\frac{1}{7 . 10}+…….+\frac{1}{\left(3n- 1\right)\left(3n + 1\right)}=\frac{n}{\left(3n + 1\right)}$

Q.22 Find the equation to the circle which passes through the points (2,-2), (3, 4) and has

 Its centre on the line 2x + 2y = 7. Find its centre and radius.

OR

 Find the number of ways of selecting 9 balls from 6 red balls, 5 white balls and 5 blue

 Balls. If each selection consists of 3 balls of each colour.

# Section – C

Q.23 In a survey of 100 students, the number of students studying the various languages

 were found to be : English only 18,English but not Hindi 23, English and Sanskrit 8,

 English 26, Sanskrit,48, Sanskrit and Hindi 8, no language 24 Find:

 (i)How many students were studying Hindi?

 (ii) How many students were studying English and Hindi?

Q.24 Find the value of

 $2\cos(\frac{π}{13})\cos(\frac{9π}{13})+\cos(\frac{3π}{13})+\cos(\frac{5π}{13})$

Q.25 Evaluate $lim\_{x\rightarrow 0}\frac{\left(1 + x\right)^{6}-1}{\left(1 + x\right)^{2}-1}$

 OR

 For what integers m and n does both $\lim\_{x\to 0}f\left(x\right), and \lim\_{x\to 1}f\left(x\right)$, exit, if

 $f\left(x\right)= \left\{\begin{array}{c}mx^{2}+n, x<0\\nx+m 0\leq x\leq 1\\nx^{3}+m, x>1\end{array}\right.$

Q.26 Find the domain and range of the function

 $y= \frac{1}{2 - \sin(3x)}$

Q.27 Find the number of all five digit numbers with distinct digits.

Q.28 Find n, if the ratio of the fifth term from the beginning to the fifth term from the end

 In the expansion $\left(\sqrt[4]{2}+ \frac{1}{\sqrt[4]{3}}\right)^{n}$ is $\sqrt{6 }:1$.

Q.29 Find the sum of the following series up to n terms;

 $\frac{1^{3}}{1}+\frac{1^{3 }+ 2^{3}}{1 + 3}+\frac{1^{3} + 2^{3 }+ 3^{3}}{1+ 3 + 5}+………………$

OR

 Out of 1020 boys in a school, 406 play cricket, 324 play hockey and 250 play

 football. 80 Boys play cricket and hockey, 64 play hockey and football, 92 play

 football and cricket while 30 play all the three games. How many boys play none of

 the games?