MBS INTERNATIONAL SCHOOL
SECTOR-11, DWARKA
PRACTICE PAPER
SESSION 2019-20
MATHEMATICS
CLASS- XI

Time allowed: $1\frac{1}{2}$ Hours **Maximum Marks: 40**

General Instructions:

- *Read all the questions carefully.*
- *All the questions are compulsory.*
- *Questions 1 to 10 in Section-A are Very Short Answer Objective Type Questions carrying 1 mark each.*
- *Questions 11 to 13 in Section-B are Short Answer Type Questions carrying 2 marks each.*
- *Questions 14 to 16 in Section-B are Long Answer I Type Questions carrying 4 marks each.*
- *Questions 17to 18 in Section-B are Long Answer II Type Questions carrying 6 marks each.*

SECTION – A

1 If A and B are two sets, then $A \cap (A \cup B)$ equals to 1

(a) A (b) B (c) $\emptyset$ (d) $A \cap B$.

2 When $A = \emptyset$, then number of elements in $P(A)$ is ……. 1

3 Let $n(A) = m$ and $n(B) = n$. Then, the total number of relations that can be defined from A to B is 1

(a) m^n (b) $n^m - 1$ (c) $mn - 1$ (d) 2^{mn}.

4 Find the domain of $f(x) = \sqrt{a^2 - x^2}$ $(a > 0)$. 1

5 If $\tan\theta = 3$ and θ lies in third quadrant, then find the value of $\cos\theta$. 1

6 If $\sin x + \cos x = 1$, then the value of $\sin 2x$ is …….. 1

7 If $x, y \in R$, then $x + iy$ is a non- real complex number, if 1

(a) $x = 0$ (b) $y = 0$ (c) $x \neq 0$ (d) $y \neq 0$.

8 The locus of a point for which x = 0 is ……. . 1

9 Find the sum of the series: $1 + \frac{4}{5} + \frac{16}{25}$ ……to ∞. 1

10 Reduce the equation $3x - 4y - 12 = 0$ into the intercept form 1

SECTION-B

11 Write the negation of the compound statement: 6 is divisible by 2 and 3. 2

12 Find the value of n , if ${}^{n}p_5 = 42\,{}^{n}p_3$, n>4. 2

OR

How many words each of 3 vowels and 2 consonants can be formed from the letters of the word "INVOLUTE"?

13 Find the real values of $'\theta'$, for which $z = \frac{3+2i\sin\theta}{1-2i\sin\theta}$ is purely real. 2

SECTION-C

14 Find the mean, standard deviation and variance of the first n natural numbers. 4

15 Using induction, Prove that $\frac{1}{2.5} + \frac{1}{5.8} + \frac{1}{8.11} + \cdots + \frac{1}{(3n-1)(3n+2)} = \frac{n}{(6n+4)}$, for all n$\in N$. 4

16 Find a, if the coefficients of x^2 and x^3 in the expansion of $(3 + ax)^9$ are equal. 4

SECTION-D

17 (i) Find the values of p and q, for which

$$f(x) = \begin{cases} \frac{1-sin^3x}{3cos^2x}, if\ x < \pi/2 \\ p, if\ x = \pi/2 \\ \frac{q\,(1-\sin x)}{(\pi-2\,x)^2}, if\ x > \pi/2 \end{cases}$$ if $\lim_{x\to\frac{\pi}{2}} f(x) is\ exist.$ 3+3

(ii) Evaluate: $\lim_{x\to 0}\left(\frac{\sin 2x+\sin 3x}{2x+\sin 3x}\right)$

18 (a) If 4-digit numbers greater than 5000 are randomly formed from the digits 0,1,3,5 and 7, what is the probability of forming a number divisible by 5 when 6
(i) the digits may be repeated? (ii) the repetition of digits not allowed?

(b) Find the derivative of : (i) $f(x) = 3\sec x - 4cosec\ x)(-2\sin x + 5\cos x)$

(ii) $f(x) = \frac{x}{x^2+a^2}$ with respect to x.