# Maheshwari Public School, Ajmer

Pre mid Test; Session: 2018-2019

Class: XII; Subject: Mathematics

Maximum Time: 45 min  Maximum Marks: 20

General Instructions:

1. All 11 questions in this paper are compulsory.
2. Marks are indicated against each question.

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## SECTION A

Q1) Verify Lagrange's mean value theorem for the following function: (1)

$f(x) = x^2 + 2x + 3$, for $[4, 6]$.

Q2) Differentiate sin x with respect to log x (1)

Q3) If $y = 2\sqrt{\text{Cotx}^2}$ then $dy/dx$ is (1)

Q4) Find the value of $\tan^{-1}\sqrt{3} - \cot^{-1}(-\sqrt{3})$ (1)

Q5) Let $f(x) = \begin{cases} kx^2, & x \le 1 \\ 4, & x > 1 \end{cases}$ .Find k if f(x) is continuous at x =1. (1)

## SECTION B

Q6) Evaluate : $\tan\{2\tan^{-1}(\frac{1}{5}) + \frac{\pi}{4}\}$ (2)

Q7) Prove that $2\tan^{-1}\frac{1}{2} + \tan^{-1}\frac{1}{7} = \tan^{-1}\frac{31}{17}$ (2)

Q8) Differentiate with respect to x of the function $x^{\cos x} + (\cos x)^x$ (2)

## SECTION C

Q9) Find the value of k, for which the function

$$f(x) = \begin{cases} \frac{COS^2X - SIn^2x - 1}{\sqrt{x^2+1}-1}, & x \neq 0 \\ k, & x = 0 \end{cases}$$ is continuous at x = 0. (3)

Q10) If x = a (cos $\theta$ + $\theta$ sin $\theta$) and y = a (sin $\theta$ – $\theta$ cos $\theta$), find $\frac{d^2y}{dx^2}$ . (3)

Q11) Prove that : $\tan^{-1}\left[\frac{\sqrt{1+x}-\sqrt{1-x}}{\sqrt{1+x}+\sqrt{1-x}}\right] = \frac{\pi}{4} - \frac{1}{2}\cos^{-1}x$ (3)