

BACHELOR OF ARCHITECTURE EXAMINATION, 2018

(1st Year, 1st Semester, Supplementary, Old Syllabus)

Mathematics - I A

Time : Three hours

Full Marks : 100

Answer any *five* questions.

Notations/Symbols have their usual meanings.

1. (a) State and prove Leibnitz's theorem on successive differentiation.
(b) If $y = a \cos(\log x) + b \sin(\log x)$, then prove that $x^2 y_{n+2} + (2n+1)x y_{n+1} + (n^2+1)y_n = 0$.
(c) If $y = x^2 e^{ax}$, then find y_n . 8+7+5

2. (a) State and prove Lagrange's Mean Value theorem and give geometrical interpretation of it.
(b) Verify Rolle's theorem for the function $f(x) = |x|$ in the interval $[-1,1]$.
(c) Prove that $\frac{x}{1+x^2} < \tan^{-1} x < x$ for $x > 0$. 10+6+4

3. (a) Evaluate $\lim_{x \rightarrow 0} (Cot^2 x)^{\sin x}$.

(Turn Over)