* M A F - 7 9 1 *

MAF-791 Seat No. _____

B. Sc. (Sem. V) Examination

October / November - 2018

Mathematics - ES 31

(Business Mathematics - III)

(Elective Subject)

Time : **2** Hours] [Total Marks : **30**

Instructions : (1) All questions are compulsory.

(2) Figures to the right indicate marks of the corresponding question.

1 Attempt any **three** : **18**

(a) $\frac{d}{dx}\left(\tan^{-1}\frac{3x-x^3}{1-3x^2}\right)$

(b) $\frac{d}{dx}\left(\sqrt{\cos^3 x}\right)$

(c) $\frac{d}{dx}\left(\sin^2 x \cos^2 x\right)$

(d) If $y=\sqrt{a^{\cos^{-1}t}}$ then prove that $\frac{dy}{dx}=\frac{-y}{x}$ for $|t|<1$.

2 Attempt any **three** : 18

(a) Evaluate : $\int \sin x \sin 2x \sin 3x \, dx$

(b) Evaluate : $\int \frac{x^2 \sin^{-1}\left(x^3\right)}{\sqrt{1-x^6}} dx$

(c) Find $\int \frac{\cos^9 x}{\sin x} dx$

(d) Evaluate : $\int \frac{3x+4}{\sqrt{4x+5}} dx$

3 Attempt any **two** : 14

(a) Evaluate $\int \frac{2x^2+5x^2+3x+1}{2x-1} dx$

(b) If $x^y = e^{x-y}$ then prove that $\frac{dy}{dx} = \frac{\log x}{(1+\log x)^2}$

(c) Evaluate $\int \frac{\tan x}{\sec x + \tan x} dx.$

(d) If $y = \left(\tan^{-1} x\right)^2$, the prove that

$\left(1+x^2\right) y_2 + 2x\left(1+x^2\right) y_1 = 2.$