Mathematics Mid-Term Exam-I Autumn 2015 20 marks Time: 1 Hour

[1]Find y` :

(a) $y = 3x^3 + 3^x - \sqrt{3}$ (b) $y = \log x + \ln(x^2 + 3)$

(c) $y = \cos x + (\sin x)^5$ (d) $y = \frac{\sin x}{x^5} + \frac{3^x}{2^x}$

[2]Find the extrema of each function : $f(x) = \frac{x}{3} + \frac{3}{x}$

[3]Find the integrals:

(a) $\int (2^x - \sin x)\, dx$ (b) $\int (x^3 + \cos 3x)\, dx$ (c) $\int (\frac{1}{x} - \frac{3}{x+5})\, dx$

(d) $\int (x^2 - 2x)^2\, dx$ (e) $\int \cos x \,.\, (\sin x)^8\, dx$ (f) $\int x \cos x\, dx$

[4]If y is the quantity of a drug decreases according to the equation : $\frac{dy}{dt} = -y.$

Find y as function of the time t where the initial quantity is 10 units.

Also, find the value of y after 3 hours.