Mid-Term Exam(Mathematics) Summer 2016 Time : 1 hour 20 Marks

[1]Find y`, where :

(a) $y = x^3 + 3^x + \cos 2x$ (b) $y = \frac{2}{3} + x^3 . \ln x$

(c) $y = x^{-2} + \log x$ (d) $y = (x + \sin x)^8$

[2]Find the extrema of the function : $f(x) = x^3 - 6x^2 + 9x - 2$

[3] Find the integrals :

(a) $\int (3 - x^4 + 2^x)\, dx$ (b) $\int (x^3 - 2)^2\, dx$ (c) $\int (\frac{2}{x+2} + \cos 2x)\, dx$ (d) $\int x . \cos x\, dx$

[4]If y is the quantity of a drug decreases according to the equation $\frac{dy}{dt} = -\frac{1}{y^2}$.

Find y as function of the time t where the initial quantity is 3 units.

Also, find (i)The value of y after 1 hour.

(ii)The time at which there is no drug in the blood.

[5]If $A = \begin{bmatrix} 3 & 2 & -2 \\ 0 & 1 & -1 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 0 & 1 \\ 1 & 2 & 3 \end{bmatrix}$

Find, if possible, A + B, A.A , A.B , A^t.B.