#ASSIGNMENT: Maxima/Minima (HOTS)

Q.1 A open box with a square base is to be made out of given Quantity of card board of Area c^2 sq. units. Show that the maximum volume of box is $\dfrac{c^2}{6\sqrt{3}}$ cubic units.

Q.2 A given Quantity of metal is to be cast into a half cylinder with a rectangular base and semi circular ends. Show that in order that total surface area is minimum, the ratio of length of cylinder to the diameter of its semi circular ends is $\pi : (\pi + 2)$

Q.3 Show that the area of the greatest rectangle that can be inscribed in an ellipse $\dfrac{x^2}{a^2} + \dfrac{y^2}{b^2} = 1$ is 2ab.

Q.4 Show that volume of greatest cylinder which can be inscribed in a cone of height h and semi-vertical angle $\propto$ is $\dfrac{4}{27}\pi h^3 \tan^2 \propto$

Q.5 If the sum of lengths of hypotenuse and a side of a right angled triangle is given, show that the Area of the triangle is maximum, when angle between them is $\dfrac{\pi}{3}$.

Distance based Problems : Maxima / Minima

Q.6 An apache Helicopter of enemy is flying along the curve given by y=x^2 +7. A soldier placed at (3,7) wants to shoot down the helicopter when it is nearest to him. Find Nearest Distance.

Q.7 Find the Point P on the curve y^2=4ax, which is Nearest to the point (11a,0).

Q.8 Find the co-ordinates of a point on the Parabola y=x^2+7x+2 which is closest to the straight line y=3x-3.

Q.9 Find the points on the curve $y = \dfrac{1}{4}x^2$ which are nearest to the point (0,5).

Q.10 find the point on the curve x^2=2y which is nearest to the point (0,5).

Answers:

6) $\sqrt{5}$ 7) (9a, $\pm 6a$)   8) (-2,-8)   9) ($\pm 2\sqrt{3}$,3)   10) ($2\sqrt{2}, 4$)