Practice Questions (Indeterminate forms)

*** (0/0) form :-

(1) $\lim_{x\to 0} \frac{e^{ax}-e^{-ax}}{\log(1+bx)}$ Ans = 2a/b

(2) $\lim_{x\to 0} \frac{x-\tan x}{\sin x - x}$ Ans = 2

(3) $\lim_{x\to 0} \frac{x-\log_e(x+1)}{1-\cos 2x}$ Ans = 1/4

(4) $\lim_{x\to 0} \frac{a^x-b^x}{x}$ Ans = $\log\left(\frac{a}{b}\right)$

(5) $\lim_{x\to 0} \frac{1+\sin x-\cos x+\log(1-x)}{x\cdot\tan^2 x}$ Ans = -1/2

(6) $\lim_{x\to \pi/2} \frac{a^{\sin x}-a}{\log \sin x}$ Ans = ∞

(7) $\lim_{x\to 0} \frac{e^x+\sin x-1}{\log(1+x)}$ Ans = 2

(8) $\lim_{x\to 0} \frac{\sin x-\tan^{-1}x}{x^2\cdot\log_e(1+x)}$ Ans = 1/6

(9) $\lim_{x\to 1/2} \frac{\cos^2 \pi x}{e^{2x}-2xe}$ Ans = $\pi^2/2e$

(10) $\lim_{x\to \pi/2} \frac{\sin(x\cdot\cos x)}{\cos(x\cdot\sin x)}$ Ans = $\frac{\pi}{2}$

✱✱ $\left(\frac{\infty}{\infty}\right)$ Form :-

(1) $\lim_{x\to\infty} \frac{\log x}{x^n}$ Ans = 0

(2) $\lim_{x\to\pi/2} \frac{\log(x-\pi/2)}{\tan x}$ Ans = 0

(3) $\lim_{x\to\infty} \frac{1^2+2^2+3^2+\dots x^2}{x^3}$ Ans = 1/3

(4) $\lim_{x\to\infty} \frac{\left(\frac{1}{e}\right)+\left(\frac{1}{e}\right)^2+\left(\frac{1}{e}\right)^3+\dots\left(\frac{1}{e}\right)^x}{x}$ Ans = 0

(5) $\lim_{x\to 0} \frac{\log x^2}{\cot(x^2)}$ Ans = 0

(6) $\lim_{x\to\infty} \frac{\log(1+e^{3x})}{x}$ Ans = 3