Assignment - 4

(Definite integrals)

Evaluate:—

(1) $\int_0^{\pi/4} \sin^2 x \cdot \cos^2 x \, dx$

(2) $\int_0^{\log 2} \frac{e^x}{e^x+1} \, dx$

(3) $\int_0^{\pi/2} \frac{\cos x \, dx}{(1+\sin x)(2+\sin x)}$

(4) $\int_2^e \left[\frac{1}{\log x} - \frac{1}{(\log x)^2}\right] dx$

(5) $\int_\alpha^\beta \sqrt{(\beta-x)(x-\alpha)} \, dx, \; \alpha < \beta$

(6) $\int_0^{1/2} \frac{dx}{(1+2x^2)\sqrt{1+x^2}}$

(7) $\int_0^{\pi/2} \frac{\sin x}{\sin x + \cos x} dx$

(8) $\int_0^{\pi} \frac{x \tan x}{\sec x + \tan x} dx$

(9) $\int_0^{\pi/2} \log(\sin x) \, dx$

(10) $\int_0^{\pi} x \log(\sin x) \, dx$

(11) $\int_0^1 \frac{\log(1+x)}{1+x^2} dx$

(12) $\int_0^{\pi} \frac{x \, dx}{a^2 \sin^2 x + b^2 \cos^2 x}$ $[a, b > 0]$

(13) $\int_{\pi/6}^{\pi/3} \frac{dx}{1+\sqrt{\tan x}}$

(14) $\int_1^2 \frac{\sqrt{x}}{\sqrt{x}+\sqrt{3-x}} dx$

(15) $\int_{-\pi/2}^{\pi/2} |\sin x| \, dx$

(16) $\int_0^2 |1-x| \, dx$