PUSHUP – 3 | Mathematics – XII | Max Marks – 80

Units : 7 + 8 | Time – 3 hr

2 – Marks

$Q.1$. Evaluate: $\int \frac{dx}{\cos\,(x-a).\cos(x-b)}$

$Q.2$. Evaluate: $\int \left\{\frac{2+\sin 2x}{1+\cos 2x}\right\} e^x dx$

$Q.3$. Evaluate: $\int \left\{\frac{x^2+1}{(x+1)^2}\right\} e^x dx$

$Q.4$. Evaluate: $\int \frac{1}{\sqrt{\sin^3 x . \sin\,(x+\alpha)}} dx$

$Q.5$. Evaluate: $\int_{\pi/6}^{\pi/3} \frac{dx}{1+\sqrt{\tan x}}$

3 – Marks

$Q.6$. Evaluate: $\int \left\{\log\,(\log x) + \frac{1}{(\log x)^2}\right\} dx$

$Q.7$. Evaluate: $\int \{\sqrt{\tan x} + \sqrt{\cot x}\}dx$

$Q.8$. Evaluate: $\int \frac{(3\sin x-2)\cos x}{5-\cos^2 x-4\sin x} dx$

$Q.9$. Evaluate: $\int \left\{\frac{\sin^{-1}\sqrt{x}-\cos^{-1}\sqrt{x}}{\sin^{-1}\sqrt{x}+\cos^{-1}\sqrt{x}}\right\} dx$

$Q.10$. Evaluate: $\int \frac{\sqrt{x^2+1}\,[\log(1+x^2)-2\log x]}{x^4} dx$

$Q.11$. Evaluate: $\int \frac{1-x^2}{x(1-2x)} dx$

$Q.12$. Evaluate: $\int_0^{\pi/4} \log(1+\tan x)dx$

$Q.13$. Evaluate: $\int_0^{\pi/2} \{2\log(\sin x) - \log\,(\sin 2x)\}dx$

$Q.14$. Evaluate: $\int_{1/3}^{1} \frac{(x-x^3)^{1/3}}{x^4} dx$

$Q.15$. Find the area bounded by the curve $x^2 = 4y$ and the line $x = 4y-2$.

$Q.16$. Find the area bounded by the curve $y = x|x|, x-axis$ and the ordinates $x =-1$ and $x = 1$

$Q.17$. Find the area bounded by the line $y = 3x + 2$, the $x - axis$ and the ordinates $x =-1$ and $x = 1$.

$Q.18$. Find the area bounded by the curve $x^2 = y$ the line $y = x + 2$ & $x - axis$.

$Q.19$. Find the area of the region bounded by the parabola $y = x^2$ and $y = |x|$

$Q.20$. Find the area bounded by the curves, $y = x^2 + 2, y = x, x = 0$ & $x = 3$.

5 – Marks

$Q.21$. Evaluate : $\int_0^{\pi} \log(1+\cos x)dx = -\pi\log 2$

$Q.22$. Evaluate : $\int_{-1}^{3/2} |x\sin(\pi x)|dx$

$Q.23$. Evaluate : $\int_0^{\pi} \frac{x\,dx}{a^2\cos^2 x + b^2\sin^2 x}$

$Q.24$. Using integration, find the area of region $\{(x,y): 0 \le y \le x^2+1, 0 \le y \le x+1, 0 \le x \le 2\}$

$Q.25$. Using integration, find the area bounded by the lines : $2x + y = 4, 3x-2y = 6$ & $x-3y+5 = 0$.

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