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Section A

quizz NO 1

Submitted To

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Q:-> $\int_2^3 t \sin t^2 \, dt$

Sol:- let $t^2 = y$

Diff w.r.t "t^2"

$$2t = \frac{dy}{dt}$$

$t^2 = y$
$(3)^2 = y$
$9 = y$

$$dt = \frac{dy}{2t}$$

Now

As $t \longrightarrow 3$ then $y = 9$
As $t \longrightarrow 2$ then $y = 4$

So

$$\int_2^3 t \sin t^2 \, dt = \int_4^9 \cancel{t} \cdot \sin y \, \frac{dy}{\cancel{2t}}$$

$$= \int_4^9 \sin y \, dy$$

$$= -\cos y \Big|_4^9$$

$$= -[\cos(9) - \cos(4)]$$

$$= -[0.9876 - 0.9975]$$

$$= -(-0.0098)$$

$$= \boxed{0.00987} \text{ Ans}$$

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$$\int_0^1 \frac{4t^3-2t^2+3t-1}{2t^2+1}\,dt$$

Sol:-) $\int_0^1 \frac{4t^3-2t^2+3t-1}{2t^2+1}\,dt$

$$= \int_0^1 \frac{t(4t^2+3)-(2t^2+1)}{2t^2+1}\,dt$$

$$= \int_0^1 \frac{t(4t^2+3)}{2t^2+1}\,dt \int_0^1 \frac{\cancel{2t^2+1}}{\cancel{2t^2+1}}\,dt$$

$$= \int_0^1 \frac{t(4t^2+3)}{2t^2+1}\,dt - \int_0^1 1\,dt$$

$$= \int_0^1 \frac{t(4t^2+3)}{2t^2+1}\,dt - t\Big|_0^1$$

$$= \int_0^1 \frac{t(4t^2+3)}{2t^2+1}\,dt - [1-0]$$

$$= \int_0^1 \frac{t(4t^2+3)}{2t^2+1} - 1 \longrightarrow (1)$$

Now Let $2t^2+1 = y$ $\Rightarrow$ $2t^2+1=y$

$2t^2 = y-1$

As $t \to 1$ i.e $y=3$

$t \to 0$ i.e $y=1$

X both sid 2

$4t^2 = 2y-2$

$4t^2+3 = 2y+3-2$

Now Diff

$4t^2+3 = 2y+1$

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$$\Rightarrow 4t = \frac{dy}{dt}$$

$$\Rightarrow dt = \frac{dy}{4t}$$

$$= \int_1^3 \frac{t(2y+1)}{y} \cdot \frac{dy}{4t} - 1$$

$$= \int_1^3 \frac{2y+1}{4y}\, dy - 1$$

$$= \frac{1}{4}\left[\int_1^3 \frac{2\cancel{y}}{\cancel{y}}\, dy + \int_1^3 \frac{1}{y}\, dy\right] - 1$$

$$= \frac{1}{4}\left[\int_1^3 2\, dy + \int_1^3 \frac{1}{y}\, dy\right] - 1$$

$$= \frac{1}{4}\left[2(y)\Big|_1^3 + \ln y \Big|_1^3\right] - 1$$

$$= \frac{1}{4}\left[2(3) - 2(1) + \ln(3) - \ln(1)\right] - 1$$

$$= \frac{1}{4}\left[6 - 2 + 1.0986\right] - 1$$

$$= \frac{1}{4}\left[5.0986\right] - 1$$

$$= 1.27465 - 1$$

$$\boxed{0.2746} \text{ Ans}$$