Quiz No 01

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Section:- B

Dept:- BE(CE)

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Q. 1) ①

Find

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

Sol:

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

By partial fraction method

Divide $4t^3 - 2t^2 + 3t - 1$ by $2t^2 + 1$

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

(2)

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

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

Using substitution

let $u = 2t^2+1$ then $du = 4t\,dt$ so

$$\frac{1}{4}du = t\,dt$$

$$= 2\left[\frac{t^2}{2}\right]_0^1 + (-t)\Big]_0^1 + \int_1^3 \frac{1}{u} - \frac{1}{4}\,du$$

(5)

$$= 2\left(\frac{t}{2}\right)_0^1 + (-t)\Big]_0^1 + \int_1^3 \frac{1}{4u}\,du$$

Applying limit we get

$$f(x) = 0.2746$$

Q.2) Find $\int_2^3 t \sin t^2 \, dt$ (4)

Sol:

let $u = t^2$

$du = 2t \, dt$

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

Replace the value of t & dt

$= \int_2^3 t \sin u \frac{du}{2t}$

$= \int_2^3 \frac{1}{2} \sin u \, du$

$= -\frac{1}{2} \cos u \Big|_2^3$

(5)

replace u with t^2

$= -1/2 \cos t^2 \Big|_2^3$ Applying limit

$= -1/2 \left(\cos(3)^2 - \cos(2)^2\right)$

$= -1/2 \left(\cos 9 - \cos 4\right)$

$= \boxed{0.0049}$ Ans