Questions
For CRT - 11
By O.P. Gupta

Topics : **Indefinite Integrals (Type A to Type D)**

◻ **Advanced MATH Classes**, 1st Floor (Above Burger Shop), Opp. HP Petrol Pump, Thana Road, Najafgarh.

Q01. **(a)** Write an anti-derivative of $\dfrac{3^x}{\sqrt{1-9^x}}$. **(b)** Determine the primitive of $x(1+x)^{12}$.

(c) Write the value of $\displaystyle\int \dfrac{\sin^{5/2}x}{\cos^{9/2}x}\,dx$. **(d)** Evaluate the integral of $4^x\,4^{4^x}\,4^{4^{4^x}}$. $[4\times 1 = 4$

Q02. Evaluate : **(a)** $\displaystyle\int\left(\dfrac{\sqrt{\cot x^2}}{\cos x^2\ \sin x^2}\right)2x\,dx$ **(b)** $\displaystyle\int \dfrac{\sin 3x}{\sin x}\,dx$ $[2\times 2 = 4$

Evaluate the following integrals (**Q03 - Q09**) :

Q03. $\displaystyle\int \csc^4 x\,dx$ **Q04.** $\displaystyle\int \sqrt{e^x - 1}\,dx$

Q05. $\displaystyle\int \sin^3\dfrac{x}{2}\cos^3\dfrac{x}{2}\,dx$ **Q06.** $\displaystyle\int x\sqrt{\dfrac{4-x^2}{4+x^2}}\,dx$

Q07. $\displaystyle\int \dfrac{dx}{x(x^7+6)}$ **Q08.** $\displaystyle\int \dfrac{x\,dx}{1+x\tan x}$.

Q09. $\displaystyle\int \dfrac{dx}{x\left[6(\log x)^2 + 7\log x + 2\right]}$

OR $\displaystyle\int \dfrac{x^2 - 3x + 1}{\sqrt{1-x^2}}\,dx$

Q10. For what values of unknown quantities α and β is the given equation satisfied :

$$\int (\sin 2x + \cos 2x)\,dx = -\dfrac{1}{\sqrt{2}}\cos(2x + \alpha) + \beta\ ?$$ $[4\times 8 = 32$

Solutions Of CRT-11

Q01. **(a)** $\log_3(e)\sin(3^x)+C$ **(b)** $(1+x)^{13}\left[\dfrac{13x-1}{182}\right]+C$

(c) $\dfrac{2}{7}\tan^{7/2}x+C$ **(d)** $\dfrac{4^{4^{4^x}}}{8(\log 2)^3}+C$

Q02. **(a)** $-2\sqrt{\cot x^2}+C$

(b) $\displaystyle\int \dfrac{\sin 3x}{\sin x}dx = \int \dfrac{3\sin x - 4\sin^3 x}{\sin x}dx = \int\left(3-4\sin^2 x\right)dx = \int\left(3-2(1-\cos 2x)\right)dx = x+\sin 2x+C$

Q03. $-\cot x - \dfrac{1}{3}\cot^3 x + C$

Q04. $2\left[\sqrt{e^x-1}-\tan^{-1}\sqrt{e^x-1}\right]+C$

Q05. **(a)** $\left(\dfrac{1}{24}\cos^3 x - \dfrac{1}{8}\cos x\right)+C$ or, $\dfrac{1}{92}\left(\cos 3x - 9\cos x\right)+C$

Q06. $2\sin^{-1}\left(\dfrac{x^2}{4}\right)+\dfrac{1}{2}\sqrt{16-x^4}+C$ **Q07.** $\dfrac{1}{42}\log\left|\dfrac{x^7}{x^7+6}\right|+C$

Q08. See Mathematicia by O.P. Gupta

Q09. $\log\left|\dfrac{2\log x+1}{3\log x+2}\right|+C$ **OR** See Mathematicia by O.P. Gupta

Q10. $\alpha = \dfrac{\pi}{4}, \beta = C$, any real constant .

❖ Dear Student/Teacher,

I would urge you for a little favour. Please notify me about any error (s) which you notice in this (or other Maths) work. It would be beneficial for all the future learners of Maths like us. Any constructive criticism will be well acknowledged.

Please find below my contact info. when you decide to offer me your valuable suggestions.

I'm looking forward for a response.

Apart from this, I would wish **if you inform your friend/students** about my efforts for Maths so that they may also be benefitted.

Let's *learn* Maths with smile :-)

☞ For any clarification(s), please contact :

O.P. Gupta, *Math Mentor*

[Maths (Hons.), E & C Engg., Indira Award Winner]

Call or WhatsApp @ +91-9650 350 480   *Mail us at : **theopgupta@gmail.com***

Follow us on Twitter @theopgupta   *Official Website : **www.theOPGupta.com***

◘ Buy our Books, Test Papers and Sample Papers at **iMathematicia.com**