

6. సమకాలనము

IPE : 2VSAQ & 2LAQ = 2 + 2 +7+7= 18 Marks

$$1) \int x^n dx = \frac{x^{n+1}}{n+1} + c, n \neq -1$$

$$2) \int k dx = kx + c, k \text{ is a constant}$$

$$3) \int x dx = \frac{x^2}{2} + c$$

$$4) \int \sqrt{x} dx = \frac{2}{3} x\sqrt{x} + c$$

$$5) \int \frac{1}{\sqrt{x}} dx = 2\sqrt{x} + c$$

$$6) \int \frac{1}{x^2} dx = -\frac{1}{x} + c$$

$$7) \int \frac{1}{x} dx = \log_e |x| + c$$

$$8) \int \log_e x dx = x \log x - x + c$$

$$9) \int a^x dx = a^x \log_a e + c$$

$$10) \int e^x dx = e^x + c$$

$$11) \int \sin x dx = -\cos x + c$$

$$12) \int \cos x dx = \sin x + c$$

$$13) \int \tan x dx = \log |\sec x| + c$$

$$14) \int \cot x dx = \log |\sin x| + c$$

$$15) \int \sec x dx = \log |\sec x + \tan x| + c$$

$$16) \int \csc x dx = \log |\csc x - \cot x| + c$$

$$17) \int \csc^2 x dx = -\cot x + c$$

$$18) \int \sec^2 x dx = \tan x + c$$

$$19) \int \sec x \tan x dx = \sec x + c$$

$$20) \int \csc x \cot x dx = -\csc x + c$$

$$21.1) \int \frac{1}{a^2 + x^2} dx = \frac{1}{a} \left(\tan^{-1} \frac{x}{a} \right) + c$$

$$21.2) \int \frac{1}{1+x^2} dx = \tan^{-1} x + c$$

$$22.1) \int \frac{1}{\sqrt{a^2 - x^2}} dx = \sin^{-1} \frac{x}{a} + c$$

$$22.2) \int \frac{1}{\sqrt{1-x^2}} dx = \sin^{-1} x + c$$

$$23) \int \frac{1}{x\sqrt{x^2 - a^2}} dx = \frac{1}{a} \left(\sec^{-1} \frac{x}{a} \right) + c$$

$$24.1) \int \frac{1}{\sqrt{a^2 + x^2}} dx = \sinh^{-1} \frac{x}{a} + c \text{ or } \log \left(x + \sqrt{a^2 + x^2} \right) + c$$

$$24.2) \int \frac{1}{\sqrt{1+x^2}} dx = \sinh^{-1} x + c = \log \left(x + \sqrt{1+x^2} \right) + c$$

$$25.1) \int \frac{1}{\sqrt{x^2 - a^2}} dx = \cosh^{-1} \frac{x}{a} + c \text{ or } \log \left(x + \sqrt{x^2 - a^2} \right) + c$$

$$25.2) \int \frac{1}{\sqrt{x^2 - 1}} dx = \cosh^{-1} x + c = \log \left(x + \sqrt{x^2 - 1} \right) + c$$

$$26) \int \sqrt{a^2 - x^2} dx = \frac{x}{2} \sqrt{a^2 - x^2} + \frac{a^2}{2} \sin^{-1} \frac{x}{a} + c$$

$$27) \int \sqrt{a^2 + x^2} dx = \frac{x}{2} \sqrt{a^2 + x^2} + \frac{a^2}{2} \sinh^{-1} \frac{x}{a} + c$$

$$28) \int \sqrt{x^2 - a^2} dx = \frac{x}{2} \sqrt{x^2 - a^2} - \frac{a^2}{2} \cosh^{-1} \frac{x}{a} + c$$

$$29) \int \frac{1}{a^2 - x^2} dx = \frac{1}{2a} \log \left| \frac{a+x}{a-x} \right| + c$$

$$30) \int \frac{1}{x^2 - a^2} dx = \frac{1}{2a} \log \left| \frac{x-a}{x+a} \right| + c$$

$$31) \int \frac{f'(x)}{\sqrt{f(x)}} dx = 2\sqrt{f(x)} + c \quad 32) \int \frac{f'(x)}{f(x)} dx = \log |f(x)| + c$$

$$33. \text{ విభాగ సమాకలనం: } \int uv dx = u \int v dx - \int \left(\frac{du}{dx} \int v dx \right) dx$$

$$34. \int e^x (f(x) + f'(x)) dx = e^x f(x) + c$$

$$35. (a) \int \frac{px+q}{ax^2+bx+c} dx \quad (b) \int \frac{px+q}{\sqrt{ax^2+bx+c}} dx$$

(c) $\int (px+q)\sqrt{ax^2+bx+c} dx$ కనుగొనుటకు $px+q$ ను ఈ క్రింది విధముగా వ్యక్తపరచి k మరియు l విలువలు కనుగొనవలెను.

$$px+q = k \frac{d}{dx} (ax^2+bx+c) + l$$

$$36. \int \frac{a \cos x + b \sin x}{c \cos x + d \sin x} dx \text{ కనుగొనుటకు హోరాన్సి } Nr = A(Dr) + B \frac{d}{dx} Dr$$

అని వ్రాసి A, B విలువలు కనుగొనవలెను.

$$37. \int \frac{dx}{a+b \sin x}, \int \frac{dx}{a+b \cos x} \text{ కనుగొనుటకు } \tan \frac{x}{2} = t \text{ అయితే}$$

$$\sin x = \frac{2t}{1+t^2}, \cos x = \frac{1-t^2}{1+t^2}, dx = \frac{2dt}{1+t^2} \text{ అగును.}$$