DEPTT — S.S. College J-Bad
TOPIC — objective question on definite integral
Time — 10.15 to 11 A.M
11.00 A.M to 11.45 A.M
Date — 19-09-2020 class - B.Sc I (Hons)
By - Dr. Shree Nath Sharma

objective question

(1) If $\int_a^b f(x)dx = \phi(x)$, for all $x \in [a,b]$

$\Rightarrow \int_a^b f(x)dx =$

(i) $\phi(a) - \phi(b)$ (ii) $\phi(b) - \phi(a)$

(iii) $f(b) - f(a)$ (iv) $f(a) - f(b)$

(2) In definite integral

(I) Constant is Certainly Added

(II) No Constant is added

(III) May or May not be added

(3) In definite integrals

(I) The range of integration is finite

(II) The range of integration is not Finite

(III) (I) and (II) both are correct.

(IV) (I) is correct but (II) is False.

(4) In definite integral the integrand is

(i) Continuous in the range.

(ii) Discontinuous in the range

(iii) May or may not be continuous in the range

(iv) Discontinuous at certain point or points in the range.

(5) If in an integral, the range is infinite or integrand has an infinite discontinuity in the range, the integral is called

(i) proper integral

(ii) Improper integral

(iii) Infinite integral

(iv) (ii) and (iii) both are true

(6) $\int_a^b f(x)\,dx =$

(i) $\int_a^b f(y)\,dy$

(ii) $-\int_b^a f(x)\,dx$

(iii) $-\int_b^b f(y)\,dy$

(I) $\frac{1}{2a}\log\frac{a+x}{a-x}$ (II) $\frac{1}{2a}\log\frac{a-x}{a+x}$

(III) $\frac{1}{2a}\log\frac{x-a}{x+a}$ (IV) $\frac{1}{2a}\log\frac{x+a}{x-a}$

(8) $\int\frac{dx}{\sqrt{a^2-x^2}}$ =

(I) $\sin^{-1}\frac{x}{a}$ (II) $\cos^{-1}\frac{x}{a}$

(III) $\tan^{-1}\frac{x}{a}$ (IV) $\sec^{-1}\frac{x}{a}$

(9) $\int\sqrt{a^2-x^2}\,dx$ (I) $= \frac{x\sqrt{a^2-x^2}}{2}+\frac{a^2}{2}\sin^{-1}\frac{x}{a}$

(II) $\frac{x\sqrt{x^2-a^2}}{2}-\frac{a^2}{2}\log\frac{x+\sqrt{x^2-a^2}}{a}$

(III) $\frac{x\sqrt{x^2+a^2}}{2}+\frac{a^2}{2}\log\frac{x+\sqrt{x^2+a^2}}{2}$

(IV) $\sec^{-1}\frac{x}{a}$

(10) $\int\frac{dx}{x^2-a^2}$ (I) $= \frac{1}{2a}\log\frac{x-a}{x+a}$

(II) $\frac{1}{2a}\log\frac{x+a}{x-a}$

(III) $\frac{1}{2a}\log\frac{a-x}{a+x}$

(IV) $\frac{1}{2a}\log\frac{a+x}{a-x}$

(11) $\int \frac{dx}{\sqrt{x^2-a^2}} =$

(i) $\log\left(x+\sqrt{x^2-a^2}\right)$

(ii) $\cosh^{-1}\frac{x}{a}$

(iii) $\sinh^{-1}\frac{x}{a}$

(iv) (i) and (ii) is correct-

(12) $\int \sqrt{x^2-a^2}\,dx =$

(i) $\frac{x}{2}\sqrt{x^2-a^2} - \frac{a^2}{2}\cosh^{-1}\left(\frac{x}{a}\right)$

(ii) $\frac{x\sqrt{x^2-a^2}}{2} - \frac{a^2}{2}\log\left[x+\sqrt{x^2-a^2}\right]$

(iii) $\frac{x}{2}\sqrt{x^2-a^2} + \frac{a^2}{2}\sinh^{-1}\frac{x}{a}$

(iv) (i) and (ii) is correct-

(13) $\int \frac{1}{x^2+a^2}\,dx =$

(i) $\frac{1}{a}\tan^{-1}\frac{x}{a}$

(ii) $\tan^{-1}\frac{x}{a}$

(iii) $\frac{1}{2a}\log\frac{a+x}{a-x}$

(iv) $\frac{1}{2a}\log\frac{x-a}{x+a}$

(14) $\int \frac{dx}{\sqrt{x^2+a^2}}$ =

(I) $\log\left[x+\sqrt{x^2+a^2}\right]$

(II) ~~$\log\left[x-\sqrt{x^2+a^2}\right]$~~

(III) $\sinh^{-1}\frac{x}{a}$

(IV) $\operatorname{Sech}^{-1}\frac{x}{a}$.

(V) (I) and (III) is Correct.

(15) $\int \sqrt{x^2+a^2}\,dx$

(I) $= \frac{x\sqrt{x^2+a^2}}{2} + \frac{a^2}{2}\sinh^{-1}\frac{x}{a}$

(II) $\frac{x\sqrt{x^2+a^2}}{2} + \frac{a^2}{2}\log\left[x+\sqrt{x^2+a^2}\right]$

(III) (I) and (II) both are correct

(IV) (I) and (II) both are incorrect.

(16) $\int_a^b f(x)\,dx = \int_a^b f(a+b-x)\,dx$

(II) $\int_a^b f(a-x)\,dx$

(III) $\int f(b-x)\,dx$

(IV) None of above

(17) If $f(x) + f(-x) = 0$

then $\int_{-a}^{a} f(x)\,dx = 0$

(i) $2\int_{0}^{a} f(x)\,dx$

(ii) $\int_{0}^{a} f(x)\,dx$

(iii) $2\int_{-a}^{a} f(x)\,dx$

(18) If $\int_{-a}^{a} f(x) + f(-x) = 0$ then

$\int_{-a}^{a} f(x)\,dx =$

(i) 0 (ii) $2\int_{0}^{a} f(x)\,dx$

(iii) $\int_{0}^{a} f(x)\,dx$ (iv) $\int_{-a}^{0} f(x)\,dx$

(19) $f(x) + f(-x) = 0$

$\Rightarrow f(x)$ is

(i) an odd function

(ii) an even function

(iii) It is impossible to say it is even or odd function

(20) If $f(x) - f(-x) = 0 \Rightarrow$ $f(x)$ is

(i) An odd Function

(ii) An even Function

(iv) it is impossible to say function is even or odd.

(iii)

(21) $\int_0^{\pi/2} \frac{\sin^2 x}{\sin x + \cos x}\, dx =$

(i) $\int_0^{\pi/2} \frac{\cos^2 x}{\sin x + \cos x}\, dx$

(ii) $\int_0^{\pi/2} \frac{\cos ec^2 x}{\cos ec x - \cot x}\, dx$

(iii) $\int_0^{\pi/2} \frac{\cot x}{\cot x + \tan x}$

22. $\int_0^{\pi/2} \frac{\sqrt{\sin x}}{\sqrt{\sin x} + \sqrt{\cos x}}\, dx =$

(i) $\frac{\pi}{4}$ (iii) $\pi/8$

(ii) $\pi/2$ (iv) π.

23. $\int_a^b f(x)\, dx =$ (i) $\lim_{h \to 0} h \sum_{r=0}^{n-1} f(a + rh)$

(ii) $\lim_{h \to 0} h \sum_{r=1}^{n} f(a + rh)$

(iii) (i) and (ii) both are correct

(iv) (i) and (ii) both are incorrect.

(24) $\lim_{n\to\infty} \frac{1}{n+1} + \frac{1}{n+2} + \cdots + \frac{1}{2n}$

= (I) $\log 2$ (II) $\log 3$

(III) $\log 2 - \log 1$ (IV) (I) and (III) is correct.

(25) Γn (I) $\int_0^\infty e^{-x} x^{n-1}\, dx$

(II) $\int_0^\infty e^{x} x^{n-1}\, dx$

(III) $\int_0^\infty e^{-x} x^{1-n}\, dx$

(IV) $\int_0^\infty e^{1-x} x^{1-x}\, dx$

(26) $\beta(m,n)$ (I) $\int_0^1 x^{m-1} (1-x)^{n-1}\, dx$

(II) $\int_0^1 x^{1-m} (1-x)^{n-1}\, dx$

(III) $\int x^{m-1} (x-1)^{n-1}\, dx$

(IV) $\int x^{n-1} (x-1)^{1-n}\, dx$