ONE TWO ACADEMY

Unit Test - 09

TOTAL:- 45 **GENERAL MATHEMATICS** **STD XII**

Application of Integration

Choose the correct answer:- ***5 x 1 = 5***

1. The value of $\int_{-1}^{2} |x|\,dx$ is ……

(a) $\frac{1}{2}$ (b) $\frac{3}{2}$ (c) $\frac{5}{2}$ (d) $\frac{7}{2}$

2. If f(x) = $\int_{0}^{x} t\ cost$ dt, then $\frac{df}{dx}$ = ……..

(a) cosx - sinx (b) sinx + cosx (c) x cosx (d) x sinx

3. The value of $\int_{0}^{1} (\sin^{-1}x)^2$ dx is ……

(a) $\frac{\pi^2}{4}$ - 1 (b) $\frac{\pi^2}{4}$ + 2 (c) $\frac{\pi^2}{4}$ + 1 (d) $\frac{\pi^2}{4}$ - 2

4.The area of the region bounded by the graph y = sin x and y = cos x between x = 0 and x = $\frac{\pi}{4}$

Is …….

(a) $\sqrt{2}$ (b) $\sqrt{2}$ – 1 (3) $2\sqrt{2}$ - 2 (d) $2\sqrt{2}$ + 2

5. If $\frac{\gamma n + 2}{\gamma n}$ = 90 then n is ……..

(a) 10 (b) 5 (3) 8 (d) 9

Answer any 5 of the following (Question no 8 is compulsory):- ***5 x 2 = 10***

6) $\int_{\frac{-\pi}{2}}^{\frac{\pi}{2}} x^5 + x\cos x + +\tan^3 x + 1)dx$

7) $\int_{3}^{4} \frac{1}{x^2 - 4} dx$

8) Find, by integration, the volume of the solid generated by revolving about the x-axis , the region enclosed by $y=2x^2$, y = 0 and x = 1.

9) Find the volume of solid right circular cone with base radius ‘r’ and height ‘h’.

10)Find an approximate value of $\int_1^{1.5} x dx$ by applying the left-end rule with the partition {1.1, 1.2, 1.3, 1.4, 1.5}.

11) Prove that $\int_a^b f(x)dx = -\int_b^a f(x)dx$.

12) Find $\int_{-5}^{5} x\cos x dx$.

13)Evaluate $\int_0^1 x(1-x)^n dx = \frac{1}{(n+1)(n+2)}$.

Answer any 5 of the following (Question no 21 is compulsory):- ***7 x 3 = 21***

14) Evaluate $\int_{\frac{\pi}{8}}^{\frac{3\pi}{8}} \frac{1}{1+\sqrt{\cot x}} dx$

15)Evaluate $\int_b^{\infty} \frac{1}{x^2+a^2} dx$, a > 0, b is a real number and hence deduce the value of $\int_0^{\infty} \frac{1}{x^2+a^2} dx$.

16)Evaluate $\int_0^{2\pi} \sin^7 \frac{x}{4} dx$.

17)Evaluate $\int_0^{\frac{\pi}{2}} \sin^5 x \cos^4 x dx$.

18) Evaluate $\int_0^1 |5x-3| dx$

19) Evaluate $\int_0^{\infty} x^5 e^{-3x} dx$.

20)Find the area of the region bounded by y = tan x and y = cot x and the lines x = 0, x = $\frac{\pi}{2}$, y=0.

21) Prove that $\int_0^{\frac{\pi}{4}} \log(1+\tan x) = \frac{\pi}{8}\log 2$.

Answer the following:- **3 x 5 = 15**

22).Find the area region common to the circle $x^2 + y^2 = 16$ and the parabola $y^2 = 6x$

[OR]

The slope of the curve $y = (x-2)^2 + 1$ has a minimum point at P. The point Q on the curve is such that the slope of PQ is 2. Find the area bounded by the curve and the chord PQ.

23) Evaluate $\int_0^{\frac{\pi}{2}} \frac{1}{1+5cos^2x} dx$.

[OR]

Evaluate $\int_2^3 \frac{\sqrt{x}}{\sqrt{5-x}+\sqrt{x}} dx.$

24) Using integration prove that the area of the triangle whose vertices are given by (0,0) , (5,0) and (2,3) is 7.5 sq units.

[OR]

Evaluate the following integrals as the limits of sums $\int_0^1 (5x+4)\, dx.$

All the best