One Two academy | Application of Integration

Maximum Mark: 25 **Mathematics** **Time: 50 minutes**

Choose the correct answer: **3 x 1 = 3**

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. The value of $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \sin^2 x \cos x \ \ dx$.is

(a) $\frac{3}{2}$ (b) $\frac{1}{2}$ (c) 0 (d) $\frac{2}{3}$

3. The value of $\int_{0}^{\frac{\pi}{4}} \cos^3 2x \ \ dx$ is

(a) $\frac{2}{3}$ (b) $\frac{1}{3}$ (c) 0 (d) $2\frac{\pi}{3}$

Answer the following: **3 x 2 = 6**

4. Evaluate $\int_{0}^{1} [2x]\, dx$, where [.] is the greatest integer function.

5. Evaluate $\int_{0}^{1} x^3(1-x)^4 dx$.

6. Evaluate: $\int_{0}^{\pi} \frac{\sin 2ax}{sin\ x}\ dx$, a ∈ **N**

Answer any two of the following: **2 x 3 = 6**

7. Find the volume of a right- circular cone of base radius r and height h.

8. Evaluate $\int_{0}^{\pi} x^2 \cos nx \ \ dx$, n is a positive integer.

9. Evaluate: $\int_{0}^{\frac{\pi}{2}} \frac{dx}{1+5\cos^2 x}$.

Answer the following: **2 x 5 = 10**

10. Evaluate: $\int_{0}^{\frac{\pi}{4}} \frac{1}{\sin x+\cos x}\ dx$.

11. Find the area of the region bounded by the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$.

OR

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

All the Best

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Answer Key attached in the next page !!!

This page is to prevent seeing answer key

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https://www.youtube.com/@VVV-j4k

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Answer Key

Q.no	Solution	Marks
1.	**(c)** $\frac{5}{2}$	**1**
2.	(d) $\frac{2}{3}$	**1**
3.	(b) $\frac{2}{3}$	**1**
4.	0.5	**2**
5.	$\frac{1}{280}$	**2**
6.	0 Hint: • $\int_0^a f(x)\,dx = \int_0^a f(a-x)dx$ Sin $(x + 2n\pi)$ = sinx	**2**
7.	$\frac{1}{3}\pi r^2 h$	**3**
8.	$\frac{2\,\pi\,(-1)^n}{n^2}$	**3**
9.	$\frac{\pi}{2\sqrt{6}}$	
10.	$\frac{1}{\sqrt{2}}\,log\,(\sqrt{2}+1)$	**5**
11.	πab **sq. units** **OR** $\frac{4}{3} sq.units$	**5**

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