

Mathematics
chapter - 9

Marks: 70
Time: 2½ hrs.

Class: XII - Sci.

PART - A (Answer any seven only)

7X5=35.

1. Find the area of the region bounded by the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$.
2. Find the area of the region common to the circle $x^2 + y^2 = 16$ and the parabola $y^2 = 6x$.
3. Evaluate: $\int_0^{2a} x \sqrt{2ax - x^2} dx$.
4. Evaluate: $\int_0^{\pi/2} \frac{dx}{5 + 4 \sin^2 x}$.
5. Prove that $\int_0^{\pi/4} \log(1 + \tan x) dx = \frac{\pi}{8} \log 2$.
6. Find the area of the region bounded between the curves $y = \sin x$ and $y = \cos x$ and the lines $x = 0$ and $x = \pi$.
7. Find the area of the region bounded by the curve $2 + x - x^2 + y = 0$, x -axis, $x = -3$ and $x = 3$.
8. Find the area of the region bounded between the parabolas $y^2 = 4x$ and $x^2 = 4y$.

PART - B (Answer any seven only)

7X3=21

1. Find the volume of a sphere of radius a .
2. Evaluate: $\int_0^{\pi/2} \sin^{10} x dx$.
3. Evaluate: $\int_0^{1.5} \lceil x^2 \rceil dx$, where $\lceil x \rceil$ is the greatest integer function.
4. Evaluate: $\int_0^9 \frac{1}{x + \sqrt{x}} dx$.
5. Evaluate: $\int_0^1 |5x - 3| dx$.

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

7. Evaluate: $\int_0^1 x^5 (1-x^2)^5 dx$

8. Find the volume of the spherical cap of height h cut off from a sphere of radius r .

PART - C (Answer any seven only)

1. Evaluate: $\int_0^{\infty} x^5 e^{-2x} dx$ $7 \times 2 = 14$

2. Evaluate: $\int_0^{\pi/2} (\sin^2 x + \cos^4 x) dx$

3. Evaluate: $\int_3^4 \frac{dx}{x^2 - 4}$

4. Evaluate: $\int_{-\pi/2}^{\pi/2} x \cos x dx$

5. Evaluate: $\int_0^1 [2x] dx$ where $[\cdot]$ is the greatest integer function.

6. Evaluate: $\int_{-\log 2}^{\log 2} -|x| dx$

7. Show that $\int_0^{2\pi} f(\cos x) dx = 2 \int_0^{\pi} f(\cos x) dx$ where $f(\cos x)$ is a function of $\cos x$.

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

S. GILBERT GNANA OZI
M.Sc., M.Phil., M.Ed.,
PRINCIPAL & P.G. ASST.
Maths
Al-Aman Matric Hr. Sec. School
Sankarapandal.