Model Question Paper

Integral Calculus - Part V

12th Standard

Maths

Reg.No. : | | | | | | |

I.Answer all questions

II.Use blue pen only

Time : 01:00:00 Hrs

Total Marks : 90

Section-A

3 x 1 = 3

1) The area of the region bounded by the line y+3 = x, x=1 and x=5 is

(a) 3 sq. units (b) 4 sq. units (c) 0 sq. units (d) 5 sq. units

2) The area of the curve $y^2=(x - 5)^2(x - 6)$ between x = 5 and x = 6 is

(a) 0 sq. unit (b) 1 sq. unit (c) 4 sq. unit (d) 6 sq. units

3) The volume of the solid that results when the region enclosed by $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ is revolved about the major axis, (a > b > 0) is

(a) $\frac{4}{8}\pi ab^2$ (b) $\frac{4}{3}\pi a^2b$ (c) $\frac{4}{3}\pi ab^2$ (d) $\frac{3}{4}\pi a^2b$

Section-B

3 x 3 = 9

4) Evaluate the following problem using properties of integration: $\int_{-1}^{1} \sin x cos^4 x dx$

5) Evalute : $\int_0^a \sqrt{a^2-x^2}\ dx$

6) Evaluate the following problems using second fundamental theorem: $\int_0^{\frac{\pi}{2}} sin^2 x dx$

Section-C

6 x 6 = 36

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

8) Find the volume of the solid generated when the region enclosed by $y=\sqrt{x}, y=2$ and **x=0** is revolved about the **y**-axis

9) Find the area of the region bounded by the line y=x- 5 and the x-axis between the ordinates x = 3 and x = 7

10) The area of the region bounded by the curve $xy=1$, $x-axis$, $x=1$ and $x=\infty$. Find the volume of the solid generated by revolving the area mentioned about **x** -axis.

11) Evaluate the following problems using second fundamental theorem $\int_0^1 \frac{dx}{x^2+5x+6}$

12) Evaluate the following problems using second fundamental theorem $\int_0^1 \frac{(sin^{-1}x)^3}{\sqrt{1-x^2}}dx$

Section-D

4 x 10 = 40

13) Derive the formula for the volume of a right circular cone with radius ' r ' and height ' h '.

14) Show that the surface area of the solid obtained by revolving the arc of the curve y=sinx from x=0 to $x=\pi$ about x-axis is $2\pi[\sqrt{2}+log(1+\sqrt{2})]$

15) a) Find the perimeter of the circle with radius a.

(OR)

b) Find the volume of the solid obtained by revolving the area of the triangle whose sides are having the equations y=0; x=4 and 3x-4y=0, about x-axis.

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