Model Question Paper

Integral Calculus - Part IV

12th Standard

Maths

Reg.No. :

I.Answer all questions.

II.Use blue pen only.

Time : 01:00:00 Hrs | Total Marks : 100

Section-A

3 x 1 = 3

1) $I_n = \int cos^n x dx$ then $I_n =$

(a) $-\frac{1}{n}\cos^{n-1}x\sin x+\frac{n-1}{n}l_{n-2}$ (b) $\cos^{n-1}x\sin x+\frac{n-1}{n}l_{n-2}$ (c) $\frac{1}{n}\cos^{n-1}x\sin x-\frac{n-1}{n}l_{n-2}$ (d) $\frac{1}{n}\cos^{n-1}x\sin x+\frac{n-1}{n}l_{n-2}$

2) 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 minor axis, (a > b > 0) is

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

3) The surface area of the solid generated by revolving the arc of the parabola y^2=4ax bounded by its L.R about x - axis, is

(a) $\frac{8\pi a^2}{3}\left(2\sqrt{2}-1\right)$ (b) $\frac{4\pi a^2}{3}\left(2\sqrt{2}-1\right)$ (c) $\frac{\pi a^2}{3}\left(2\sqrt{2}-1\right)$ (d) $\frac{8a^2}{3}\left(2\sqrt{2}-1\right)$

Section-B

3 x 3 = 9

4) Evaluate the following problems using second fundamental theorem: $\int_0^{\frac{\pi}{2}} e^{3x} cosx dx$

5) Evaluate: $\int\limits_0^{\frac{\pi}{2}} cos^9 x \ \ dx$

6) Evaluate: $\int\limits_0^{\frac{\pi}{2}} cos^8 x \ \ dx$

Section-C

4 x 6 = 24

7) Evaluate the following Problems using properties of integration $\int\limits_{\frac{\pi}{6}}^{\frac{\pi}{3}} \frac{dx}{1+\sqrt{tanx}}$

8) Evaluate $\int cos^5 x dx$

9) Evaluate : $\int\limits_0^{\frac{\pi}{6}} sin^7 3x dx$

10) Evaluate : $\int\limits_0^{\frac{\pi}{6}} cos^7 3x dx$

Section-D

6 x 10 = 60

11) 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 $2\pi[\sqrt{2}+log(1+\sqrt{2})]$

12) Find the surface area of the solid generated by revolving the cycloid x=a(t+sint), y=a(1+cost) about its base (x- axis).

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

14) Find the length of the curve x=a(t-sin *t*), y=a(1-cos *t)* between t=0 and π .

15) Find the surface area of the solid generated by revolving the arc of the parabola $y^2=4ax$, bounded by its latus rectum about x - axis.

16) Prove that the curved surface area of a sphere of radius r intercepted between two parallel planes at a distance a and b from the centre of the sphere is $2\pi r(b-a)$ and hence deduct the surface area of the sphere $(b>a)$

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