

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Sc (Non Medical) (Sem-2)

INTEGRAL CALCULUS

Subject Code : BSNM-205-18

M.Code : 76303

Date of Examination : 17-06-2023

Time : 3 Hrs.

Max. Marks : 50

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying ONE marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Solve :

a) Solve $\int_0^{\pi/2} \cos^8 x dx$

b) Solve $\int_{-5}^5 |x-2| dx$

c) Evaluate $\int_1^2 \int_3^4 (xy + e^y) dy dx$

d) Evaluate $\int_0^1 \int_0^1 \frac{dx}{\sqrt{(1-x^2)(1-y)^2}}$

e) Write relation between cartesian co-ordinates and cylinder co-ordinates.

f) Write formula for volume as a double integral in cylindrical co-ordinate.

g) Write any two properties of definite integral.

h) Write formula for $\int \frac{dx}{\sqrt{x^2 - a^2}}$

i) Evaluate $\int (x+2)\sqrt{x^2 + 4x + 5} dx$

j) Write expression for length of arc of curve in parametric co-ordinates.

SECTION-B

2. Solve $\int \frac{x^2 + 5x + 3}{x^2 + 3x + 2} dx$
3. Solve $\int \frac{\cos \theta}{(2 + \sin \theta)(3 + 4 \sin \theta)} d\theta$
4. Find the reduction formula for $\int \frac{x^m}{(\log x)^n} dx$.
5. Change the order of integration and hence evaluate $\int_0^{4a} \int_{\frac{x^2}{4a}}^{\sqrt[2]{ax}} dy dx$.
6. Evaluate $\iiint \frac{dx dy dz}{(x + y + z + 1)^3}$ over tetrahedron bounded by the coordinate planes and the plane $x + y + z = 1$.

SECTION-C

7. a) Evaluate using spherical polar co-ordinates $\iiint \frac{dx dy dz}{\sqrt{1 - x^2 - y^2 - z^2}}$ the integral being extended to the positive octant of the sphere $x^2 + y^2 + z^2 = 1$.
b) Find the volume enclosed between the cylinders $x^2 + y^2 = 2ax$ and $z^2 = 2ax$.
8. a) Find the area of the surface of revolution formed by revolving the curve $r = 2a \cos \theta$ about the initial line.
b) Find the area of the region bounded by curves $y^2 = 4a(x + a)$ and $y^2 = 4b(b - x)$.
9. Find a reduction formula for $\int e^{ax} \cos^n x dx$ and hence evaluate $\int e^{9x} \cos^4 x dx$.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.