

SASTRA Deemed to be University
First Year – B.Tech Computer Science and Business Systems
Second Continuous Internal Assessment – Dec 2022
MAT133 Discrete Mathematics

Duration: 90 mts

Marks: 50

PART - A

Answer all the questions.

5x2=10 Marks

1. Evaluate $\lim_{x \rightarrow 0} \frac{1 - \cos x}{x \sin x}$

2. Find $\lim_{x \rightarrow 0} (1 + ax)^{b/x}$

3. Evaluate $\int_0^{\pi \sin \theta} \int_0^r r dr d\theta$

4. Evaluate $\int_0^1 \int_0^z \int_0^{y+z} dz dy dx$

5. Change the order of integration in $\int_0^1 \int_0^{2\sqrt{x}} f(x, y) dy dx$

PART - B

Answer any FOUR questions

4x10=40 Marks

6. Evaluate $\iint xy dx dy$ over the region in the positive quadrant bounded by the line $2x + 3y = 6$.

7. Change the order of integration in $\int_0^1 \int_y^{2-y} xy dx dy$ and hence evaluate.

8. (a) Find the area bounded by the parabolas $y^2 = 4 - x$ and $y^2 = x$ by double integration.
 (b) Find the volume of rectangular parallelopiped bounded by $x = 0, x = a, y = 0, y = b, z = 0$ and $z = c$.

9. Evaluate $\iiint_V \frac{dz dy dx}{\sqrt{1 - x^2 - y^2 - z^2}}$ where V is the region of space

bounded by the coordinate planes and the sphere $x^2 + y^2 + z^2 = 1$ and contained in the positive octant.

10. Using generating function, solve the difference equation $y_{n+2} - y_{n+1} - 6y_n = 0, y_1 = 1, y_0 = 2$
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