**SRM Institute of Science and Technology**
**Department of Mathematics**
**18MAB102T-Advanced Calculus and Complex Analysis**
**2020-2021 Even**
**Unit – I: Multiple Integrals**
**Tutorial Sheet - II**

| S.No. | Questions | Answers |
|---|---|---|
| | **Part – A [ 3 Marks]** | |
| 1 | Find the area bounded by the lines x=0, y=1 and y=x using double integration | $\frac{1}{2}$ *sq.units* |
| 2 | Find the area of a circle of radius 'a' by double Integration in polar coordinates | $\pi a^2$ sq. units |
| 3 | Evaluate $\int\int dxdy$ over the region bounded by x=0, x=2, y=0 and y=2 | 4 |
| 4 | Find the area of the lemniscate $r^2 = a^2 \cos 2\theta$ by double integration | $a^2$ sq. units |
| 5 | Change to polar ordinates : $\int_0^a \int_y^a \frac{x^2 dxdy}{\sqrt{x^2+y^2}}$ | $\int_0^{\pi/4} \int_0^{a\sec\theta} r^2 \cos^2\theta drd\theta$ |
| | **Part – B [6 Marks]** | |
| 6 | Find the smaller of the area bounded by $y = 2 - x$ and $x^2 + y^2 = 4$ | $\pi - 2$ |
| 7 | Evaluate $\iint xy(x+y)dxdy$ over the area between $y = x^2$ and $y = x$ | $\frac{3}{56}$ |
| 8 | Find the area lying inside the circle $r = a \sin\theta$ and the outside the cardioid $r = a(1 - \cos\theta)$ | $\frac{a^2}{2}\left(2 - \frac{\pi}{2}\right)$ |
| 9 | Find $\int\int r^3 drd\theta$ over the area A which is the region between the circles $r = 2\sin\theta$ & $r = 4\sin\theta$. | $\frac{45\pi}{2}$ |
| 10 | Find the area of the cardioid $r = a(1-\cos\theta)$ | $\frac{3\pi a^2}{2}$ *sq.units* |