End-Semester Exam: Question 4
Time: 10.45 am - 11.20 am

Q4. (a) Let γ be the line segment joining from $(0,0,0)$ to $(1,1,1)$. Compute the following line integral:

$$\int_\gamma 3x^2yz\,dx + x^3z\,dy + x^3y\,dz.$$

[4]

(b) Apply Stokes theorem to evaluate the following integral

$$\oint_C x^2y^3\,dx + dy + z\,dz,$$

where C is the closed curve parameterized by $(2\cos t, 2\sin t, \sqrt{12})$, $0 \le t \le 2\pi$. [12]