(5) Evaluate $\int_0^3 \int_0^2 \int_0^1 (x+y+z)\, dz\, dx\, dy$

$$\Rightarrow \int_0^3 \int_0^2 \int_0^1 (x+y+z)\, dz\, dx\, dy$$

$$= \int_0^3 \int_0^2 \left[ (x+y)z + \frac{z^2}{2} \right]_0^1 dx\, dy$$

$$= \int_0^3 \int_0^2 \left[ (x+y)(1-0) + \frac{1}{2}[1-0] \right] dx\, dy$$

$$= \int_0^3 \int_0^2 \left[ x+y+\frac{1}{2} \right] dx\, dy$$

$$= \int_0^3 \left[ \frac{x^2}{2} + \left(y+\frac{1}{2}\right)x \right]_0^2 dy$$

$$= \int_0^3 \left[ \frac{1}{2}[4-0] + \left[y+\frac{1}{2}\right](2-0) \right] dy$$

$$= \int_0^3 (2 + 2y + 1)\, dy$$

$$= \int_0^3 (2y+3)\, dy$$

$$= \frac{2y^2}{2} + 3y \Big|_0^3$$

$$= (9-0) + 3(3-0)$$

$$= 18$$