Page No. 1
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20BCS4643

Q. $\int_0^2 \int_1^2 \int_0^{42} xyz \, dx \, dz \, dy$

$= \int_0^2 \int_1^2 \left[\int_0^{42} xyz \, dx \, dz \, dy \right]$

$= \int_0^2 \int_1^2 \left[\int_0^{42} \frac{x^2}{2} (yz) \, dx \right] dz \, dy$

$= \frac{1}{2} \int_0^2 \int_1^2 \left[x^2 \cdot (yz) \right]_0^{42} dz \, dy$

$= \frac{1}{2} \int_0^2 \int_1^2 (y^2 z^2 : yz) \, dz \, dy$

$= \frac{1}{2} \int_0^2 \left[\int_1^2 y^3 z^3 \right] dz \, dy$

$= \frac{1}{2} \int_0^2 \left[\int_1^2 y^3 \cdot \frac{z^4}{4} \, dz \right] dy$

$= \frac{1}{4 \times 2} \int_0^2 \left[(y^3) \left[z^4 \right]_1^2 \right] dy$

$= \frac{1}{8} \int_0^2 \left[\left[y^3 \right] \left[2^4 - 2^1 \right] \right]$

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$$= \frac{1}{8} \int_0^2 \left[y^3 (16 - 2) \right] dy$$

$$= \frac{1}{8} \int_0^2 \left[y^3 \cdot 14 \right] dy$$

$$= \frac{14}{8} \int_0^2 y^3 \, dy$$

$$= \frac{14}{8} \int_0^2 \frac{y^4}{4} \, dy$$

$$= \frac{14}{8 \times 4} \left[y^4 \right]_0^2$$

$$= \frac{14}{8 \times 4} \left[2^4 - 2^0 \right]$$

$$= \frac{14}{8 \times 4} \left[16 - 1 \right]$$

$$= \frac{14}{32} \times 15$$

$$= \frac{7}{16} \times 15$$

$$= \frac{105}{16}$$