Question 2: The integral $\int_1^2 e^x x^x (2+\log_e x)\, dx$ **equals**

(a) $e(4e+1)$

(b) $4e^2 - 1$

(c) $e(4e-1)$

(d) $e(2e-1)$

Answer: c

Solution:

Let $I = \int_1^2 e^x x^x (2+\log_e x)\, dx$

$I = \int_1^2 e^x x^x [1 + (1+\log_e x)]\, dx$

Since $\int e^x [f(x) + f'(x)]\, dx = e^x f(x) + c$

$I = [e^x x^x]_1^2$

$= e^2 \times 4 - e \times 1$

$= 4e^2 - e$

$= e(4e - 1)$

Hence option c is the answer.