## 2021 Ph H1 Q11

**Section:** Our Dynamic Universe
**Topic:** The Expanding Universe

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The redshift of light from a distant galaxy is $z = 0.125$.
What is the approximate distance to this galaxy?

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### Step-by-step solution:

#### 🟥 Step 1 – Use redshift to calculate recessional velocity:

$v = z \cdot c = 0.125 \cdot 3.00 \times 10^8 = 3.75 \times 10^7 \text{ m/s}$

#### 🟦 Step 2 – Use Hubble's Law to calculate distance:

$$v = H_0 d \quad \Rightarrow \quad d = \frac{v}{H_0} = \frac{3.75 \times 10^7}{2.3 \times 10^{-18}} = 1.63 \times 10^{25} \text{ m}$$

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### Final Answer:

$D$

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### Revision Tips:

- $z = \frac{v}{c}$ is a good approximation when $z < 1$
- Hubble's Law: $v = H_0 d$
- Use standard value $H_0 = 2.3 \times 10^{-18} \text{ s}^{-1}$
- Always express final answers in standard form

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