$\delta a = (\Delta a mean / a mean) \times 100\%.$ 10 Sept 2021. Combination of Error. 15 Error of sum or difference. 1f, z = A + B $\Delta Z = \pm \Delta A + \Delta B.$ $Or, \Delta Z = \Delta A + \Delta B.$

Z = A-B

then.

absolute error ⇒ Z = DA + DB.

· Error of Roduct.

let,

Z = A × B.

Then max relative ever in I,

$$\frac{\Delta Z}{Z} = \frac{\Delta A}{A} + \frac{\Delta B}{B}.$$

· Error of Division.

 $Z = \frac{A}{B}$

Then, max relative ever in 2,

$$\frac{\Delta Z}{Z} = \frac{\Delta A}{A} + \frac{\Delta B}{B}$$

· Error of Power.

then, maximum relative ever in Z,

$$\frac{\Delta Z}{Z} = \rho \frac{\Delta A}{A}$$

In general.

if,
$$z = \frac{A^p \times B^q}{C^r}$$

$$\Rightarrow \frac{\Delta Z}{Z} = P \frac{\Delta A}{A} + q \frac{\Delta B}{B} + \epsilon r \frac{\Delta c}{c}$$

Q. If length of a rectangle is measured as l = 20 ± 0.2 m and breadth = 10±0.3 m. find perimeter, area, with error limits.

> here, length = L = 20±0.2 m breadth = b = 10 ± 0.3 m.

= 0.5 m.

Therefore,

= 60m

- Perimeter = 60 ± 0.5 m.

Area =
$$l \times b$$

$$= 20 \times 10$$

$$= 200 \text{ m}^2$$

$$= 200 \text{ m}^2$$

$$= 200 \text{ m}^2$$

$$= \frac{l}{100} + \frac{3}{100}$$

$$= \frac{l}{100}$$

$$= \frac{l}{100}$$

$$= \frac{l}{100}$$

$$= \frac{l}{100}$$

$$= \frac{l}{100}$$

$$= 0.04$$

:. Area = 200 ± 0.04 m2.

o. If heat dissipated in a resistance can be dermi, determined from the relation, H = 12Rt Joule, if the maximur error in the measurement of current, resistance and time are 2%, 1% and 1% respectively, what would be the maximum error in dissipated heat?

$$H = 1^{2}Rt$$

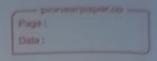
$$\Rightarrow \Delta H = 2. \Delta I + \Delta R + \Delta t$$

$$H = \frac{1^{2}Rt}{L}$$

$$\Rightarrow \frac{\Delta H}{H} \times 100^{\circ} / = 2 \left(\frac{\Delta I}{I} \times 100^{\circ} / \right) + \left(\frac{\Delta R}{R} \times 100^{\circ} / \right) + \left(\frac{\Delta t}{t} \times 100^{\circ} / \right)$$

Significant figures

The reliable digits plus the first uncertain digits are known as significant figures.



Significant figures depends on the least count of the instrument.

- · Rules.
- 1. All non zero digits are significant.
- 2. All zeros between two non zero digits are significant, no matter where the decimal point is.
- 3. If the number is less than I, the zero(s) of the right of decimal point but to the left of the first non-zero digit are not significant.
- 4. The terminal or trailing zero (9) in a number without a decimal point are not significant.
- 5 Trailing zeros in a number with a decimal point are significant.

