YAKEEN NEET 2.0

2026

Units and Measurements

PHYSICS | Lecture – 10

By – Saleem Ahmed Sir

Todays Goal

Error Questions Practice

QUESTION

A physical quantity z depends on four observables a, b, c and d, as $z = \frac{a^2 b^{\frac{2}{3}}}{\sqrt{c d^3}}$. The percentages of error in the measurement of a, b, c and d are 2%, 1.5%, 1% and 2.5% respectively. The percentage of error in z is: [Main Sep. 05, 2020 (I)]

1. 12.25%
2. 16.5%
3. 13.5%
4. 14.5%

Ans. (4)

$$z = \frac{a^2 b^{2/3}}{\sqrt{c d^3}}$$

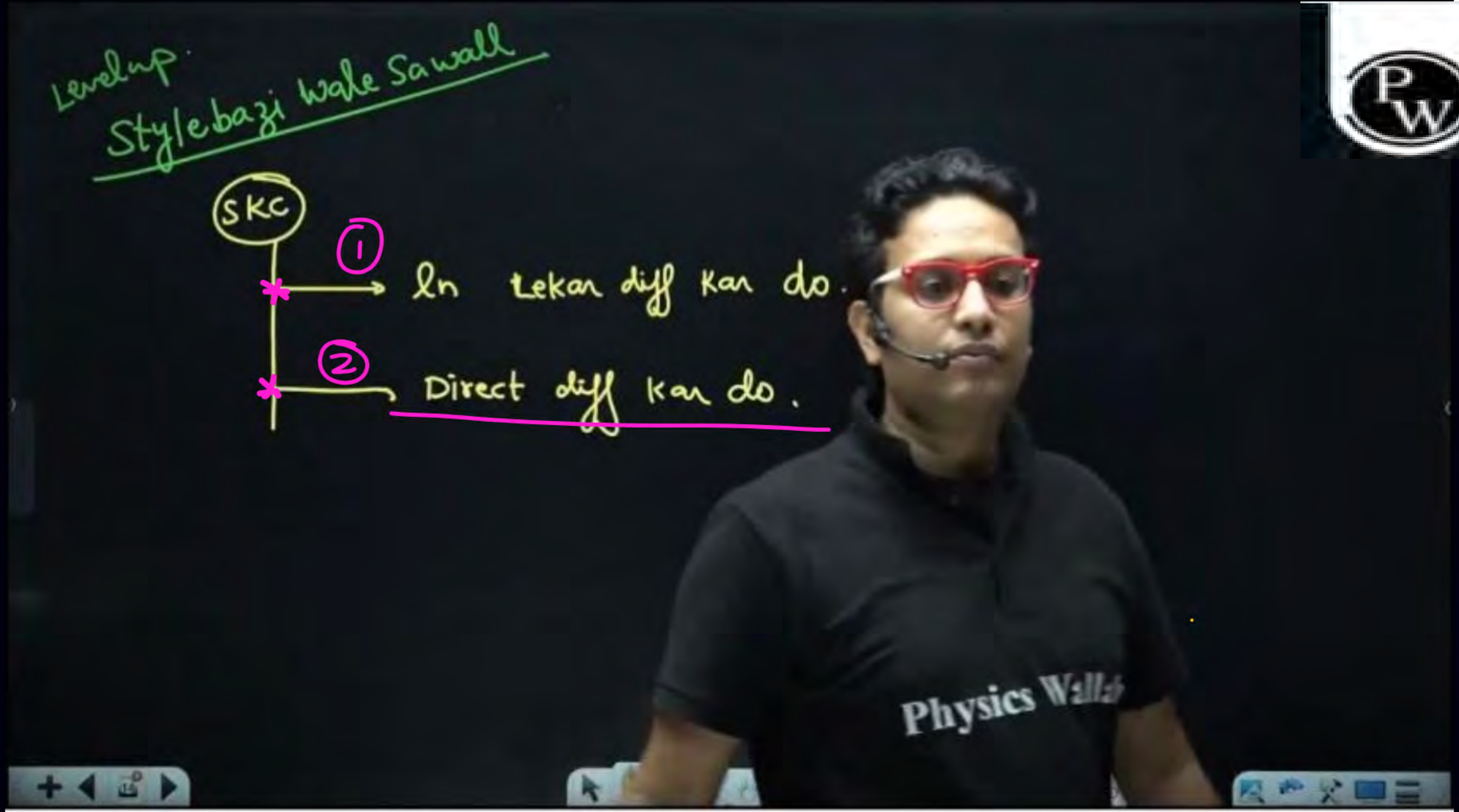
$$2 \times 2 + \frac{2}{3} \times \frac{1.5}{\frac{1}{2}} + \frac{1}{2} \times 4 + \frac{3}{2} \times 2.5$$

$$1.5 \times 2.5 = 3.75$$

$$= 4 + 1 + 2 + 3.75$$

$$= 10.25\%$$

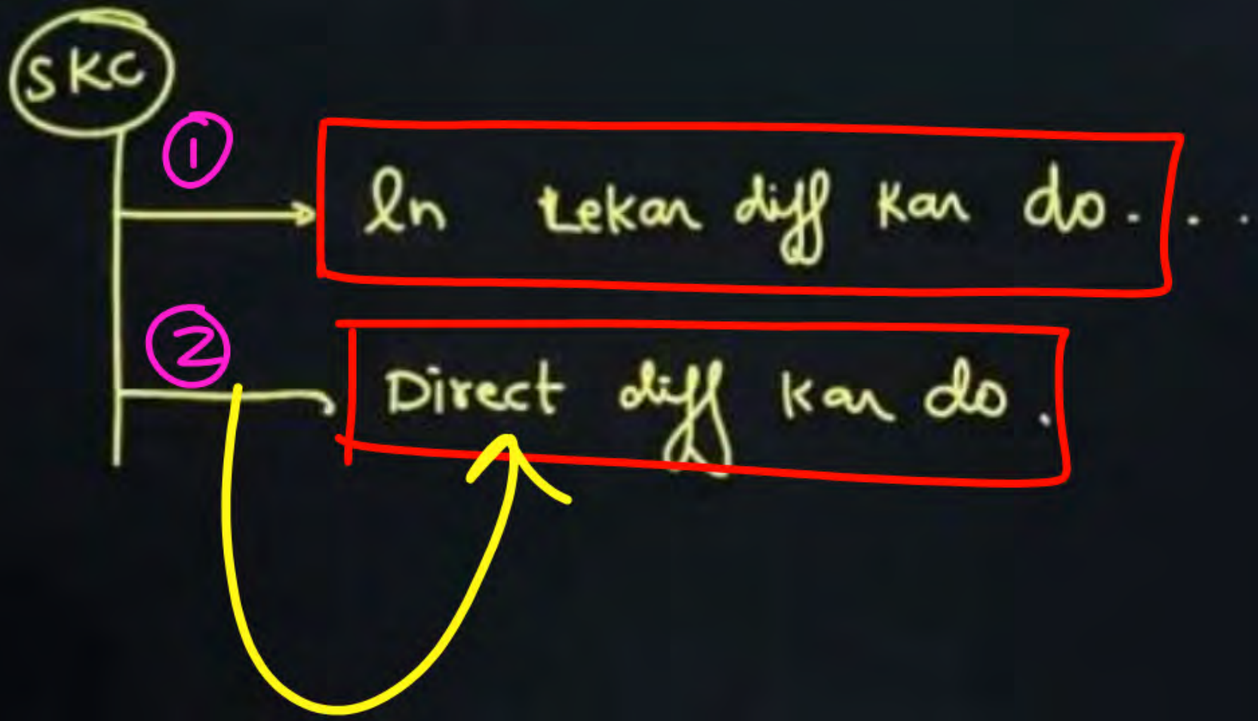
Sir I think the answer of this question is wrong!!
Please explain it 🙏
@saleem.nitt



Units and Measurements 09 : Propagation of error ||

Level up

Stylebazi wale Sawall



distance = speed × time

Q A particle is moving on a straight line with speed $(100 \pm .1)$ m/s for time $(10 \pm .5)$ sec.
find distance trawl by the particle.

Sol^n

$v = 100$
$t = 10$
$x = vt = 1000$

$$x = vt$$

$$\frac{\Delta x}{x} = \frac{\Delta v}{v} + \frac{\Delta t}{t}$$

$$\frac{\Delta x}{1000} = \frac{.1}{100} + \frac{.5}{10} = \frac{1}{1000} + \frac{5}{100}$$

$$\therefore \Delta x = 1 + \frac{5000}{100} = 51$$

$$x \equiv (1000 \pm 51)$$

$$\% \text{ error in } x = \frac{51}{1000} \times 100$$

$$= 5.1\ \%$$

SKC **

* Sabse pahle error ko bhool jao. & solve
* Fir error par attack karo...

$$y = \frac{a^2 b^3}{c^4}$$

$$\left(\frac{\Delta y}{y}\right)_{max} = 2\frac{\Delta a}{a} + 3\frac{\Delta b}{b} + 4\frac{\Delta c}{c}$$

$$y = a \cdot b$$

$$\frac{\Delta y}{y} = \frac{\Delta a}{a} + \frac{\Delta b}{b}$$

$$y = a^2 b^3$$

$$\frac{\Delta y}{y} = 2\frac{\Delta a}{a} + 3\frac{\Delta b}{b}$$

$$y = \frac{a}{b} = a b^{-1}$$

$$\boxed{\frac{\Delta y}{y} = \frac{\Delta a}{a} + \frac{\Delta b}{b}}$$

Q A particle is moving in a straight line path & travel (100 ± 2) m in $(10 \pm .1)$ sec.

find its velocity.

Soln (SKC ≡ error Bhool jao)

$S = 100$

$t = 10$

$v = \frac{100}{10} = 10 \text{ m/s}$

$v = \frac{S}{t}$

$\frac{\Delta V}{V} = \frac{\Delta S}{S} + \frac{\Delta t}{t}$

$\frac{\Delta V}{10} = \frac{2}{100} + \frac{.1}{10}$

$\frac{\Delta V}{10} = \frac{3}{100}$

$\Delta V = .3$

ΔV

$v = (10 \pm .3)$

Relative error in $V = \frac{\Delta V}{V} = \frac{.3}{10}$

% error $= \frac{.3}{10} \times 100$

$= 3\%$

Q $x = \frac{a^2 b^3}{c^4}$

$a = 10 \pm .1$

$b = 20 \pm .3$

$c = 10 \pm .4$

find ① x

② % error in x

③ Relative error in x

Sol* ① $x = ?$

② % error in x

$$\frac{\Delta x}{x} = 2\frac{\Delta a}{a} + 3\frac{\Delta b}{b} + 4\frac{\Delta c}{c}$$

$$= 2 \times \frac{.1}{10} + 3 \times \frac{.3}{20} + 4 \times \frac{.4}{10}$$

$$= \frac{2}{100} + \frac{9}{200} + \frac{16}{100}$$

$$\frac{\Delta x}{x} = \frac{45}{200} = \text{Relative error.}$$

$$\frac{\Delta x}{x} \times 100 = \frac{45}{2} = 22.5\ \%$$

Q $x = \frac{a^2 b^3}{c^4}$

$a = 10 \pm \cdot 1$

$b = 20 \pm \cdot 3$

$c = 10 \pm \cdot 4$

find x

Sol^n $x = \frac{10^2 \times (20)^3}{(10)^4} = \frac{800000}{10000} = 80$

$x = (80 \pm \Delta x)$ → ?

$\frac{\Delta x}{x} = 2\frac{\Delta a}{a} + 3\frac{\Delta b}{b} + 4\frac{\Delta c}{c}$

$\frac{\Delta x}{80} = 2\left(\frac{\cdot 1}{10}\right) + 3\left(\frac{\cdot 3}{20}\right) + 4\left(\frac{\cdot 4}{10}\right)$

$\frac{\Delta x}{80} = \frac{45}{200}$ $\Delta x = 18$

SSSQ

Q $y = \frac{ab^2}{c^3}$

where

$a = 10 \pm \cdot 1$

$b = 40 \pm 2$

$c = 20 \pm \cdot 4$

① Find % error in a

Sol" $\frac{\cdot 1}{10} \times 100 = 1\%$

② Find relative error in a

$\frac{\Delta a}{a} = \frac{\cdot 1}{10} = \frac{1}{100}$

③ Find relative error & percentage error in b

$\frac{\Delta b}{b}$ = Relative error $= \frac{2}{40}$

% error $= \frac{2}{40} \times 100 = 5\%$

③ Find relative error & percentage error in 'c'

$\frac{\Delta c}{c} = \frac{\cdot 4}{40}$ % error in 'c' $= \frac{\cdot 4}{20} \times 100 = 2\%$

***

④ Find relative error and % error in 'y'

$$\frac{\Delta y}{y} = \frac{\Delta a}{a} + 2\frac{\Delta b}{b} + 3\frac{\Delta c}{c}$$

$$\frac{\Delta y}{y} = \frac{\cdot 1}{10} + 2 \times \frac{2}{40} + 3 \times \frac{\cdot 4}{20} = \frac{17}{100}$$

$$\% \text{ error} = \frac{\Delta y}{y} \times 100 = \frac{17}{100} \times 100 = 17\%$$

SSSQ

Q $y = \frac{ab^2}{c^3}$

where

$a = 10 \pm .1$

$b = 40 \pm 2$

$c = 20 \pm .4$

Ans

$\boxed{y = 2 \pm .34}$

⑤ find value of y in proper error limit

Soln error Bhod jaw

$$y = \frac{10 \times (40)^2}{(20)^3} = \frac{16000}{8000} = 2$$

$$y = (2 \pm \Delta y)$$

$$\frac{\Delta y}{y} = \frac{\Delta a}{a} + 2\frac{\Delta b}{b} + 3\frac{\Delta c}{c}$$

$$\frac{\Delta y}{2} = \frac{.1}{10} + 2 \times \frac{2}{40} + 3 \times \frac{.4}{20} = .17$$

$\boxed{\Delta y = 2 \times .17 = .34}$

Q $y = \frac{a^2\sqrt{b}}{c^3}$

$a = 10 \pm \cdot 1$

$b = 100 \pm \cdot 4$

$c = 10 \pm \cdot 2$

find Value of y in proper limit

Soln $y = \frac{100 \times \sqrt{100}}{(10)^3} = 1$

$\frac{\Delta y}{y} = 2 \times \frac{\cdot 1}{10} + \frac{1}{2}\frac{\cdot 4}{100} + 3 \times \frac{\cdot 2}{10}$

$\Delta y = \frac{82}{1000} = \cdot 08 \simeq \cdot 1$

Q $R_1 = (30 \pm .2)\,\Omega$

$R_2 = (60 \pm .5)\,\Omega$

① find R_{eq} when resistance are in series.

So! $R_{eq} = R_1 + R_2 = 90$

$R_{eq} = (90 \pm .7)\,\Omega$

(b) when R_1 & R_2 are in parallel.

$$\frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2}$$

$$-\frac{1}{R_{eq}^2}\cdot dR_{eq} = -\frac{1}{R_1^2}\,dR_1 - \frac{1}{R_2^2}\,dR_2$$

$$\frac{\Delta R_{eq}}{R_{eq}^2} = \frac{\Delta R_1}{R_1^2} + \frac{\Delta R_2}{R_2^2}$$

$$\frac{\Delta R_{eq}}{(20)^2} = \frac{.2}{(30)^2} + \frac{.5}{(60)^2}$$

$\Delta R_{eq} =$ ✓

Error Bhool jao

$R_1 = 30$, $R_2 = 60$

$$\frac{1}{R_{eq}} = \frac{1}{30} + \frac{1}{60} = \frac{1}{20}$$

$R_{eq} = 20$

SKC

SSS Box

Kam Ka dabba

very imp tool

$$\frac{1}{z} = \frac{1}{x} + \frac{1}{y}$$

$$\frac{1}{z^2}\,dz = \frac{1}{x^2}\,dx + \frac{1}{y^2}\,dy$$

$$\frac{\Delta z}{z^2} = \frac{\Delta x}{x^2} + \frac{\Delta y}{y^2}$$

→ Resis. in parallel

→ Capaciter in series

$$\frac{1}{C_{eq}} = \frac{1}{C_1} + \frac{1}{C_2}$$

→ Mirror Formula

$$\frac{1}{v} + \frac{1}{u} = \frac{1}{f}$$

→ Lens Formula

$$\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$$

Q $R_1 = 10 \pm .1$

$R_2 = 30 \pm .2$

R_1 & R_2 are in parallel. find R_{eq}.

Soln $R_{eq} = \frac{300}{40} = 7.5$

$$\frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2}$$

$$\frac{1}{R_{eq}^2}\Delta R_{eq} = \frac{1}{R_1^2}\Delta R_1 + \frac{1}{R_2^2}\Delta R_2$$

$$\frac{\Delta R_{eq}}{(7.5)^2} = \frac{.1}{100} + \frac{.2}{900}$$

$y = x^2$

$\frac{dy}{dx} = 2x$

$dy = 2x\,dx$

$y = x^2$

$dy = 2x\,dx$

Q2 $y = x^6$

$dy = 6x^5\,dx$

$y = \sin x$

$dy = \cos x\,dx$

$y = e^x$

$dy = e^x\,dx$

Q $y = \frac{a^2 b}{c^3}$

$a = 20 \pm \cdot 2$

$b = 40 \pm \cdot 1$

$c = 10 \pm \cdot 5$

(1) Find relative error

$$\frac{\Delta y}{y} = 2\frac{\Delta a}{a} + \frac{\Delta b}{b} + \frac{3\Delta c}{c}$$

$$\frac{\Delta y}{y} = 2 \times \frac{\cdot 2}{20} + \frac{\cdot 1}{40} + \frac{3 \times \cdot 5}{10}$$

$$\frac{\Delta y}{y} = \frac{4}{200} + \frac{1}{400} + \frac{15}{100} = \checkmark$$

(2) % error in y

$$\frac{\Delta y}{y} = 2\frac{\Delta a}{a} + \frac{\Delta b}{b} + \frac{3\Delta c}{c}$$

$$\frac{\Delta y}{y} = 2 \times \frac{\cdot 2}{20} + \frac{\cdot 1}{40} + \frac{3 \times \cdot 5}{10}$$

$$\frac{\Delta y}{y} \times 100 = \frac{4}{2} + \frac{1}{4} + 15 = \checkmark$$

QUESTION

A physical quantity z depends on four observables a, b, c and d, as $z = \frac{a^2 b^{\frac{2}{3}}}{\sqrt{c}d^3}$. The percentages of error in the measurement of a, b, c and d are 2%, 1.5%, 4% and 2.5% respectively. The percentage of error in z is:

[Main Sep. 05, 2020 (I)]

1. 12.25%
2. 16.5%
3. 13.5%
4. 14.5%

$$\frac{a^2 b^{2/3}}{\sqrt{c}\,d^3} = 2\times 2 + \frac{2}{3}\times\frac{3}{2} + \frac{1}{2}\times 4 + \frac{3}{2}\times 2.5 = 10.75\%$$ check

$$\frac{a^2 b^{2/3}}{\sqrt{c}\,d^3} = 2\times 2 + \frac{2}{3}\times\frac{3}{2} + \frac{1}{2}\times 4 + 3\times 2.5$$

$$= 4 + 1 + 2 + 7.5 = 14.5$$

Ans: (4)

20. The energy of a system as a function of time t is given as $E(t) = A^2\exp(-\alpha t)$, where $\alpha = 0.2s^{-1}$. The measurement of A has an error of 1.25%. If the error in the measurement of time is 1.50%, the percentage error in the value of E(t) at t = 5 s is. **[JEE-Advance 2015]**

एक निकाय की समय t पर ऊर्जा $E(t) = A^2\exp(-\alpha t)$ फलन द्वारा दी जाती है, जहाँ $\alpha = 0.2s^{-1}$ है। A के मापन में 1.25% की प्रतिशत त्रुटि है। यदि समय के मान में 1.50% की त्रुटि है तब t = 5s पर E(t) के मान में प्रतिशत त्रुटि होगी।

Ans. 4

26. Two resistance are measured in ohm and is given as:

$R_1 = 3\Omega \pm 1\%$

$R_2 = 6\Omega \pm 2\%$

When they are connected in parallel, the percentage error in equivalent resistance is

(1) 3% (2) 4.5%

(3) 0.67% (4) 1.33%

Ans. (4)

6. In an experiment, the percentage of error occurred in the measurement of physical quantities A, B, C and D are 1%, 2%, 3% and 4% respectively. Then the maximum percentage of error in the measurement of X, where $X = \frac{A^2 B^{1/2}}{C^{1/3} D^3}$ will be:

NEET [2019]

(1) 10%

(2) $\left(\frac{3}{13}\right)\%$

(3) 16%

(4) −10%

7. In an experiment, four quantities a, b, c and d are measured with percentage error 1%, 2%, 3% and 4% respectively. Quantity P is calculated as follows $p = \frac{a^3 b^2}{cd}$. % error in P is:

H/w

NEET [2013]

(1) 7%
(2) 4%
(3) 14%
(4) 10%

9. If the error in the measurement of radius of a sphere is 2%, then the error in the determination of volume of the sphere will be:

NEET **[2008]**

(1) 8%
(2) 2%
(3) 4%
(4) 6%

5. A metal wire has mass (0.4 ± 0.002) g, radius (0.3 ± 0.001) mm and length (5 ± 0.02) cm. The maximum possible percentage error in the measurement of density will nearly be:

NEET **[2023]**

(1) 1.6%
(2) 1.4%
(3) 1.2%
(4) 1.3%

11. Taking into account of the significant figures, what is the value of 9.99 m – 0.0099 m?

NEET **[2020]**

(1) 9.9801 m
(2) 9.98 m
(3) 9.980 m
(4) 9.9 m

10. The area of a rectangular field (in m^2) of length 55.3 m and breadth 25 m after rounding off the value for correct significant digits is:

NEET **[2022]**

(1) 138×10^1 (2) 1382

(3) 1382.5 (4) 14×10^2

. The resistance $R = V/i$, where $V = 100 \pm 5$ V and $i = 10 \pm 0.2$ A. What is the total error in R? Ans 7%.

ghar pan

$R = 10 \pm .7$

$$R = \frac{V}{i} = \frac{100}{10} = 10$$

$$\frac{\Delta R}{R} = \frac{\Delta V}{V} + \frac{\Delta i}{i}$$

$$\frac{\Delta R}{10} = \frac{5}{100} + \frac{.2}{10}$$

$$\Delta R = .7$$

$$\% R = \frac{\Delta R}{R} \times 100$$

$$= \frac{.7}{10} \times 100$$

$$= 7\%$$

In Ohm's law experiment, the potential drop across a resistance was measured as $V = 5.0$ V and the current was measured as $i = 2.00$ A. Find the maximum permissible error in resistance.

HW

Ans $R = (2.5 \pm 2.5\%)$

The distance covered by a body in time (5.0 ± 0.6) s is (40.0 ± 0.4) m. Calculate the speed of the body. Also determine the percentage error in the speed.

HW

Ans (8.0 ± 1.04), 13%

13. Two resistance R_1 and R_2 are connected in (i) series and (ii) parallel. What is the equivalent resistance with limit of possible percentage error in each case of $R_1 = 5.0 \pm 0.2\,\Omega$ and $R_2 = 10.0 \pm 0.1\,\Omega$.

Ans ① 15 ± 2%. ② 3.3Ω ± 3%

H/W

Copy

Q $S = x\cos\theta$

$x = (2 \pm .2)$

$\theta = (53 \pm 2^\circ)$

Find value of S in proper limit.

Error ko bhool jao - -

$S = 2\cos 53 = 2 \times \frac{3}{5}$

$= 1.2$

Sol^n

$\ln S = \ln x + \ln \cos\theta$

$\frac{1}{S}\Delta S = \frac{1}{x}\Delta x - \frac{1}{\cos\theta} \times \sin\theta \ \Delta\theta$

$\frac{\Delta S}{1.2} = \frac{.2}{2} + \frac{4}{3} \times 2 \times \frac{\pi}{180}$

$\frac{\Delta S}{1.2} = .1 + .0465$

$\Delta S = .1758 \approx .18$

Ans $(1.2 \pm .18)$

copy Q ⑧

$S = x\cos\theta$

$x = (2 \pm .2)$

$\theta = (53 \pm 2^\circ)$

find value of ΔS in proper limit.

Error ko bhool jao - -

$S = 2\cos 53 = 2 \times \frac{3}{5}$

$= 1.2$

Sol^n

$dS = x(-\sin\theta)\,d\theta + (\cos\theta)\,dx$

$\Delta S = 2 \times \sin 53 \times \frac{2\pi}{180} + \cos 53 \times .2$

$= \frac{4}{5} \times 2 \times \frac{2\pi}{180} + .2 \times \frac{3}{5}$

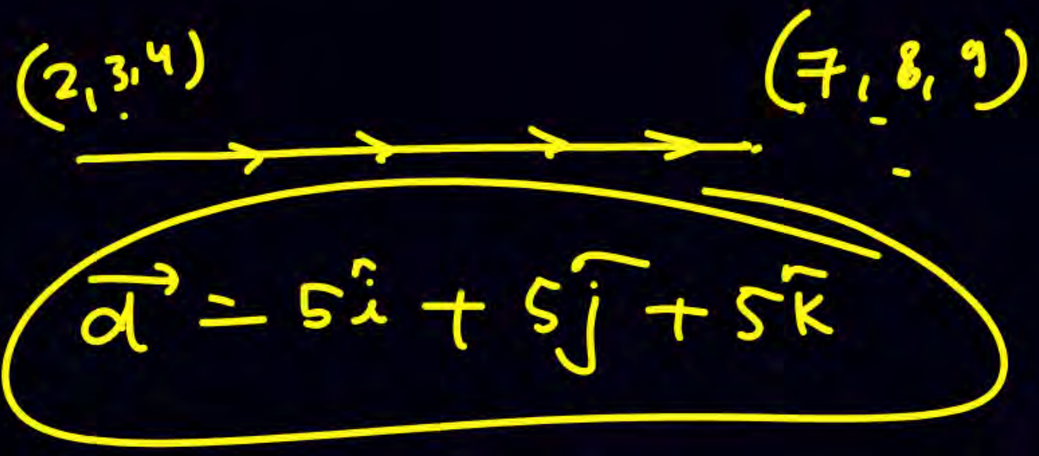
$= .0558 + .12$

$= .1758 = \underline{\underline{.18}}$

* Simple pendulum base ques. ≡ 15 min
* Vernier Calliper ⟶ 1:30hour
* Screw guge ⟶ 45 min
* Accuracy / Precision ⟶ 5min

≡ Before next sunday

* Vector
* Position vector
* $\hat{i}, \hat{j}, \hat{k}$
* Co-ordinate Likhna
* Dot product.



2. The edge of a cube is $a = 1.2 \times 10^{-2}$ m. Then its volume will be recorded as : **[JEE 2003]**

किसी घन की भुजा $a = 1.2 \times 10^{-2}$ m है तो इसका आयतन होगा:- **[JEE 2003]**

(A) 1.7×10^{-6} m^3

(B) 1.70×10^{-6} m^3

(C) 1.70×10^{-7} m^3

(D) 1.78×10^{-6} m^3

Ans. (A)

$V = (1.2 \times 10^{-2})^3 = 1.2 \times 1.2 \times 1.2 \times 10^{-6}$

The percentage errors in the measurement of mass and speed are 2% and 3%, respectively. How much will be the maximum error in the estimation of KE obtained by measuring mass and speed?

(1) 5%

(2) 1%

(3) 8%

(4) 11%

H.W

Soln :- $KE = \frac{1}{2}mv^2$

$\frac{\Delta K}{K} = 2 + 2 \times 3 = 8\%$.

20. In an experiment to determine the acceleration due to gravity g, the formula used for the time period of a periodic motion is $T = 2\pi\sqrt{\frac{7(R-r)}{5g}}$. The values of R and r are measured to be (60 ± 1) mm and (10 ± 1) mm, respectively. In five successive measurements, the time period is found to be 0.52 s, 0.56 s, 0.57s, 0.54 s and 0.59 s. The least count of the watch used for the measurement of time period is 0.01 s. Which of the following statement(s) is(are) true? **[JEE-Advance 2016]**

(1) The error in the measurement of r is 10%
(2) The error in the measurement of T is 3.57 %
(3) The error in the measurement of T is 2%
(4) The error in the determined value of g is 11%

Ans. (1, 2, 4)

Q.12

A single slit diffraction experiment is performed to determine the slit width using the equation, $\frac{bd}{D} = m\lambda$, where b is the slit width, D the shortest distance between the slit and the screen, d the distance between the m^{th} diffraction maximum and the central maximum, and λ is the wavelength. D and d are measured with scales of least count of 1 cm and 1 mm, respectively. The values of λ and m are known precisely to be 600 nm and 3, respectively. The absolute error (in μm) in the value of b estimated using the diffraction maximum that occurs for $m = 3$ with $d = 5$ mm and $D = 1$ m is ___

$\Delta b = ?$

JEE 2025

Answer: [75 to 79]

$\frac{bd}{D} = m\lambda$

$b = \frac{Dm\lambda}{d}$

$\Delta D = 1$ cm.

$\Delta d = 1$ mm

$\lambda \rightarrow$ const

$m \rightarrow$ const

b kivalu

$b = \frac{1 \times 3 \times 600 \times 10^{-9}}{5 \times 10^{-3}}$

$b = \checkmark$

$\frac{\Delta b}{b} = \frac{\Delta D}{D} + \frac{\Delta d}{d}$

$\frac{\Delta b}{b} = \frac{1}{100} + \frac{1\text{ mm}}{5\text{ mm}}$

20%

1. A wire has a mass 0.3 ± 0.003 g, radius 0.5 ± 0.005 mm and length 6 ± 0.06 cm. The maximum percentage error in the measurement of its density is :- **[JEE 2004]**

एक तार का द्रव्यमान (0.3 ± 0.003)g, त्रिज्या (0.5 ± 0.005) mm तथा लम्बाई (6 ± 0.06) cm है। इसके घनत्व के मापन में अधिकतम प्रतिशत त्रुटि होगी- **[JEE 2004]**

(A) 1 (B) 2 (C) 3 (D) 4

Ans. (D)

Notes

$\rho \equiv$

5 kC

$$\rho = \frac{m}{\pi r^2 l}$$

$$\frac{\Delta\rho}{\rho} = \frac{\Delta m}{m} + \frac{2\Delta r}{r} + \frac{\Delta l}{l}$$

$$= \frac{.003}{.3} + \frac{2 \times .005}{.5} + \frac{.06}{6}$$

$$= \frac{1}{100} + \frac{2}{100} + \frac{1}{100} \equiv 4/100$$

17. Using the expression $2d \sin\theta = \lambda$, one calculates the values of d by measuring the corresponding angles θ in the range 0 to 90°. The wavelength λ is exactly known and the error in θ is constant for all values of θ. As θ increases from 0° :- **[JEE-Advance 2013]**

(A) the absolute error in d remains constant (B) the absolute error in d increases

(C) the fractional error in d remains constant (D) the fractional error in d decreases

व्यंजक $2d \sin 0 = \lambda$ का उपयोग करते हुए हम θ को माप कर d का मान जानना चाहते है। θ का मान 0 व 90° के बीच में है। तरंग दैर्ध्य का मान हमें परिशुद्धत: ज्ञात है तथा θ के मापन में त्रुटि θ के सभी मानों के लिए समान है। जैसे θ का मान 0° से बढ़ता है तब **[JEE-Advance 2013]**

(A) d में निरपेक्ष त्रुटि स्थिर रहती है। (B) d में निरपेक्ष त्रुटि बढ़ती है।

(C) d में भिन्नात्मक त्रुटि स्थिर रहती है। (D) d में भिन्नात्मक त्रुटि घटती है।

Ans. (D)

Q Q.10 In an experiment for determination of the focal length of a thin convex lens, the distance of the object from the lens is 10 ± 0.1 cm and the distance of its real image from the lens is 20 ± 0.2 cm. The error in the determination of focal length of the lens is n %. The value of n is _____.

2022

JEE Adv. 2023

$\frac{2}{20} \rightarrow \frac{20}{x}$ $\quad \Delta f \quad \frac{\Delta f}{f} \times 100$

Sol $u = 10 \pm .1$

$V = 20 \pm .2$

① Error Ko bhool jao

$u = -10, \; v = +20$

$\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$

$\frac{1}{20} - \frac{1}{-10} = \frac{1}{f}$

$f = \frac{20}{3}$

$\frac{1}{v^2}\Delta v + \frac{1}{u^2}\Delta u = \frac{1}{f^2}\Delta f$

$\frac{.2}{400} + \frac{.1}{100} = \left(\frac{\Delta f}{f}\right) \times \frac{1}{f}$

$\frac{20}{3}\left(\frac{2}{4000} + \frac{1}{1000}\right) = \left(\frac{\Delta f}{f}\right)$

$\left(f = \frac{20}{3} \pm \Delta f\right)$

Ans $\frac{\Delta f}{f} \times 100 = 1\%$

44. Consider the ratio $r = \dfrac{(1-a)}{(1+a)}$ to be determined by measuri

dimensionless quantity a. If the error in the measurement of Δa ($\Delta a/a << 1$), then what is the error Δr in determining r?

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(a) $\dfrac{\Delta a}{(1+a)^2}$ (b) $\dfrac{2\Delta a}{(1+a)^2}$ (c) $\dfrac{2\Delta a}{(1-a)^2}$ (d) $\dfrac{2a\Delta a}{(1-a^2)}$

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notes

$$r = \frac{1-a}{1+a}$$

find Δr

Sol

SKC

Sol

$$r = \frac{1-a}{1+a} + 1 - 1$$

$$r = \frac{2}{1+a} - 1$$

$$\frac{dr}{da} = -\frac{2}{(1+a)^2}$$

$$\boxed{dr = \frac{-2}{(1+a)^2}\,da}$$

Thoda dimag Lagao... yar

Gadho wali mehnat Nahi

Ha... ha...

Try to think beyond internet sol^{n} & book sol^{n}...

HomeWork

- Revise all notes (Error)
- KPP (PYQ) will be provided soon . . .
- module (Except Vernier Calliper & Screw guage you can solve.)

THANK YOU