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Problem 1

Answer:

- (1) 1 位 (2) 3 位 (3) 5 位 (4) 8 位
 (5) 3 位 (6) 3 位 (7) 3 位 (8) 4 位

Problem 2

Answer:

- (1) 0.10830 有效数字为 5 位. (2) $P = (3.169 \pm 0.020) \times 10^4 \text{ kg}$
 (3) $d = 10.43 \pm 0.32 \text{ cm}$ (4) $t = 18.55 \pm 0.31 \text{ cm}$
 (5) $D = 18.7 \pm 1.4 \text{ cm}$ (6) $2.730 \pm 0.020 \times 10^5 \text{ km}$
 (7) $R = 6371 \text{ km} = 6.371 \times 10^6 \text{ m} = 6.371 \times 10^8 \text{ cm}$
 (8) $\theta = 60^\circ 0' \pm 2'$

Problem 3

Answer:

$$\ln V = \ln \frac{\pi}{4} + 2 \ln d + \ln h$$

$$\frac{\Delta_V}{V} = \sqrt{\left(\frac{2\Delta_d}{d}\right)^2 + \left(\frac{\Delta_h}{h}\right)^2}$$

Problem 4

Answer:

$$\frac{\Delta_\rho}{\rho} = \sqrt{\left(\frac{\Delta_M}{M}\right)^2 + \left(\frac{2\Delta_D}{D}\right)^2 + \left(\frac{\Delta_H}{H}\right)^2} = 5.616 \times 10^{-3}$$

$$\rho = 6.66 \pm 0.04 \text{ g/cm}^3, D \text{ 的影响最大.}$$

Problem 5

Answer:

$$g = \frac{4\pi^2 l}{T^2}$$

$$\frac{\Delta_g}{g} = \sqrt{\left(\frac{\Delta_l}{l}\right)^2 + \left(\frac{2\Delta_T}{T}\right)^2} = 5.902 \times 10^{-4}$$

$$g = 979.6 \pm 0.6 \text{ cm/s}^2$$

Problem 6

Answer:

- (1) B, D (2) B, D (3) B, C, F A, E, H

Problem 7

Answer:

$$\sum_{i=1}^8 x_i^2 = 21226 \quad \left(\sum_{i=1}^8 x_i\right)^2 = 153507 \quad \sum_{i=1}^8 x_i y_i = 8938.6$$

$$b = \frac{\sum x_i \sum y_i - n \sum x_i y_i}{(\sum x_i)^2 - n \sum x_i^2} = 0.820$$

$$a = \hat{y} - b\hat{x} = 18.37$$

$$r = \frac{\sum \Delta x_i \Delta y_i}{\sqrt{\sum x_i^2 \sum y_i^2}} = 1.000$$

$$y = 0.820x + 18.37$$

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Problem 1

Answer:

$$\Delta_I = 500 \text{ mA} \times 1.0\% = 5 \text{ mA}$$

I(mA)	50	250	500
$\frac{\Delta_I}{I}$	0.1	0.02	0.01

在满足测量需求的前提下, 尽量选择能满偏的量程。

Problem 2-4

Answer:

B B A