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Physics

DPP: 10

Units and Measurements

Q1 The temperature of two bodies measured by a thermometer are t_1 = [20 °C ± 0.5 °C] and t_2 = [50 °C ± 0.5 °C]. The temperature difference and the error therein is
(A) 30 °C ± 1 °C
(B) 70 °C ± 0.5 °C
(C) 30 °C ± 0.5 °C
(D) 70 °C ± 1 °C

Q2 If $Z = \frac{A^4 B^{\frac{1}{3}}}{CD^{\frac{3}{2}}}$ and ΔA, ΔB, ΔC, and ΔD are their absolute errors in A, B, C and D respectively. The relative error in Z is
(A) $\frac{\Delta Z}{Z} = 4\frac{\Delta A}{A} + \frac{1}{3}\frac{\Delta B}{B} + \frac{\Delta C}{C} + \frac{3}{2}\frac{\Delta D}{D}$
(B) $\frac{\Delta Z}{Z} = 4\frac{\Delta A}{A} + \frac{1}{3}\frac{\Delta B}{B} - \frac{\Delta C}{C} - \frac{3}{2}\frac{\Delta D}{D}$
(C) $\frac{\Delta Z}{Z} = 4\frac{\Delta A}{A} + \frac{1}{3}\frac{\Delta B}{B} + \frac{\Delta C}{C} - \frac{3}{2}\frac{\Delta D}{D}$
(D) $\frac{\Delta Z}{Z} = 4\frac{\Delta A}{A} + \frac{1}{3}\frac{\Delta B}{B} - \frac{\Delta C}{C} + \frac{3}{2}\frac{\Delta D}{D}$

Q3 An experiment measured from $x = ab^2c^3$. If the percentage errors in a, b, c are $\pm 1\%, \pm 3\%$ and $\pm 2\%$ respectively, the percentage error in x can be:
(A) 13 %
(B) 7 %
(C) 4 %
(D) 1 %

Q4 A wire has a mass 0.3 ± 0.003g, radius 0.5 ± 0.005 mm and length 6 ± 0.06 cm. The maximum percentage error in the measurement of density is:
(A) 1%
(B) 2%
(C) 3%
(D) 4%

Q5 The least count of a stop watch is 0.1 sec. The time of 20 oscillations of the pendulum is found to be 20 sec. the percentage error in the time period is:
(A) 0.25%
(B) 0.5%
(C) 0.75%
(D) 1.0%

Q6 The mass and volume of body are found to be $5.00 \pm 0.05\ \text{kg}$ and $1.00 \pm 0.05\ \text{m}^3$ respectively. Then the maximum possible percentage error in its density is
(A) 6%
(B) 3%
(C) 10%
(D) 5%

Q7 A physical quantity x is calculated from $x = ab^2\sqrt{c}$. Calculate % error in x, when % error in measuring a, b, c are $4\%, 2\%$ and 3% respectively.
(A) $\pm 9.5\%$
(B) $\pm 9.4\%$
(C) $\pm 9.1\%$
(D) $\pm 4.5\%$

Q8 The length and breadth of a rectangle are (5.7 ± 0.1) cm and (3.4 ± 0.2) cm. The area of rectangle with error limits is approximately:
(A) (19.4 ± 1.5) cm^2
(B) (19.4 ± 2) cm^2
(C) (19.0 ± 2) cm^2
(D) (19 ± 1.5) cm^2

Q9 The resistance is $R = \frac{V}{I}$ where $V = 100 \pm 5$ volts and $I = 10 \pm 0.2$ amperes. What is the total error in R ?
(A) 5%
(B) 7%

(C) 5.2%
(D) $\left(\frac{5}{2}\right)\%$

Q10 Two resistors R_1 (24 ± 0.5) Ω and R_2 (8 ± 0.3) Ω are joined in series. The equivalent resistance is
(A) (32 ± 0.33)Ω
(B) (32 ± 0.8)Ω
(C) (32 ± 0.2)Ω
(D) (32 ± 0.5)Ω

Answer Key

Q1	(A)	Q6	(A)
Q2	(A)	Q7	(A)
Q3	(A)	Q8	(A)
Q4	(D)	Q9	(B)
Q5	(B)	Q10	(B)