UNITS AND MEASUREMENT

Test Paper-II

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General Instructions:. Answer all the questions. If you are unable to answer any question, go through the page number that is given against that particular question in the text book. You can find the answer.
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MAX MARKS: 30   **TIME: 90Mts**

1	What is the basis of atomic clock?	P22	1
2	Define second	P22	1
3	Name the institute which has been given the responsibility of maintenance and improvement of physical standards. Give the uncertainty in time realization measured through cesium atomic clocks	P22	1
4	What is meant by error in measurement?	P22	1
5	Distinguish between accuracy and precision	P22	1
6	What are the different types of errors? Briefly explain.	P23	3
7	Briefly explain how you will determine percentage error.	P24	3
8		P25	2

Two clocks are being tested against a standard clock located in a national laboratory. At 12:00:00 noon by the standard clock, the

	Clock I	Clock II
Monday	12:00:05	10:15:06
Tuesday	12:01:15	10:14:59
Wednesday	11:59:08	10:15:18
Thursday	12:01:50	10:15:07
Friday	11:59:15	10:14:53
Saturday	12:01:30	10:15:24
Sunday	12:01:19	10:15:11

If you are doing an experiment that requires precision time interval measurements, which of the two clocks will you prefer?

9   We measure the period of oscillation of a simple pendulum. In successive measurements, the readings turn out to be 2.63s, 2.56s, 2.42s, 2.71s and 2.80s. Calculate the absolute errors, relative error or percentage error.   P25   3

10	Show that when two quantities are added or subtracted, the absolute error in the final result is the sum of the absolute errors in the individual quantities.	P25	2
11	The temperatures of two bodies measured by a thermometer are $t_1=20^oC \pm 0.5^oC$ and $t_2=50^oC \pm 0.5^oC$,. Calculate the temperature difference and error there in.	P26	2
12	Show that when two quantities are multiplied or divided, the relative error in the result is the sum of the relative errors in the multipliers.	P26	2
13	The resistance R=V/I where V=(100±5)V and I=(10±0.2)A. Find the percentage error in R.	P27	2
14	Two resistors of resistances $R_1=100 \pm 3$ ohm and $R_2=200 \pm 4$ ohm are connected (a) in series, (b) in parallel. Find the equivalent resistance of the (a) series combination,(b) parallel combination. Use for (a)(the relation R = R_1 + R_2 and for (b) $\frac{1}{R1} = \frac{1}{R1} + \frac{1}{R2}$ and $\frac{\Delta R\prime}{R\prime^2} = \frac{\Delta R1}{R1^2} + \frac{\Delta R2}{R2^2}$	P27	2
15	a. Show that the relative error in a physical quantity raised to the power of k is the k times the relative error in the individual quantity. b. Find the relative error in Z, if Z=$A^4B^{1/3}$/ C $D^{3/2}$	P27	2 1