DPP
DAILY PRACTICE PROBLEMS

CLASS : XITH **SUBJECT : PHYSICS**
DATE : **DPP NO. : 10**

Topic :- UNITS AND MEASUREMENTS

1. A resistor of 4 kΩ with tolerance 10% is connected in parallel with a resistor of 6 kW with tolerance 100%. The tolerance of the parallel combination is nearly
a) 10% b) 20% c) 30% d) 40%

2. An important milestone in the evolution of the universe just after the Big Bang is the Planck time t_P, the value of which depends on three fundamental constants-speed c of light in vacuum, gravitational constant G and Planck's constant h. Then, $t_P \propto$
a) $G\mathrm{h}c^5$ b) $\frac{c^5}{G\mathrm{h}}$ c) $\frac{G\mathrm{h}}{c^5}$ d) $\left(\frac{G\mathrm{h}}{c^5}\right)^{1/2}$

3. IF L, C and R denote the inductance, capacitance and resistance respectively, the dimensional formula for C^2LR is
a) $[ML^{-2}T^{-1}I^0]$ b) $[M^0L^0T^3I^0]$ c) $[M^{-1}L^{-2}T^6\,I^2]$ d) $[M^0L^0T^2I^0]$

4. The unit of $e.m.f.$ is
a) $Joule$ b) $Joule$ - $coulomb$ c) $Volt$ - $coulomb$ d) $Joule/coulomb$

5. Students I, II and III perform an experiment for measuring the acceleration due to gravity (g) using a simple pendulum. They use different lengths of the pendulum and/or record time for different number of oscillations. The observations are shown in the table
Least count for length $= 0.1\ cm$
Least count for time $= 0.1\ s$

Student	Length of the pendulum (cm)	Numberofoscillation(n)	Total time for ($n$oscillations (s)	Time period (s)
I	64.0	8	128.0	16.0
I	64.0	4	64.0	16.0
III	20.0	4	36.0	9.0

If E_{I}, E_{II} and E_{III} are the percentage errors in g, *i.e.*, $\left(\frac{\Delta g}{g} \times 100\right)$ for students I, II and III, respectively
a) $E_{\mathrm{I}} = 0$ b) E_{I} is minimum c) $E_{\mathrm{I}} = E_{\mathrm{II}}$ d) E_{II} is maximum

6. One million electron $volt$ $(1\ MeV)$ is equal to
   a) $10^5\ eV$ b) $10^6\ eV$ c) $10^4\ eV$ d) $10^7\ eV$

7. If the units of M and L are increased three times, then the unit of energy will be increased by
   a) 3 times b) 6 times c) 27 times d) 81 times

8. The velocity of a body is given by the equation $v = \frac{b}{t} + ct^2 + dt^2$
   The dimensional formula of b is
   a) $[M^0LT^0]$ b) $[ML^0T^0]$ c) $[M^0L^0T]$ d) $[MLT^{-1}]$

9. Unit of magnetic moment is
   a) $Ampere\text{ - }metre^{\ 2}$ b) $Ampere - metre$ c) $Weber - metre^2$ d) $Weber/metre$

10. The resistance $R = \frac{V}{i}$ 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) $\frac{5}{2}$%

11. The least count of a stop watch is 0.2 s. The time of 20 oscillations of a pendulum is measured to be 25 s. The percentage error in the measurement of time will be
    a) 8% b) 1.8% c) 0.8% d) 0.1%

12. If C is capacitance and q is charge, then the dimension of q^2/C is same as that of
    a) Work b) Angular momentum c) Force d) Torque

13. The dimension of $\frac{1}{2}\epsilon_0 E^2$, where ϵ_0 is permittivity of free space and E is electric field, is
    a) MLT^1 b) ML^2T^{-2} c) $ML^{-1}T^{-2}$ d) ML^2T^{-1}

14. If L, C and R denote inductance, capacitance and resistance respectively, then which of the following combination has the dimension of time?
    a) $\frac{C}{L}$ b) $\frac{1}{RC}$ c) $\frac{L}{R}$ d) $\frac{RL}{C}$

15. If E,m,J and G represent energy, mass, angular momentum and gravitational constant respectively, then the dimensional formula of EJ^2/m^5G^2 is
    a) $[MLT^{-2}]$ b) $[M^0L^0T]$ c) $[M^0L^2T^0]$ d) Dimensionless

16. 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
    a) 8% b) 2% c) 4% d) 6%

17. The density of a solid ball is to be determined in an experiment. The diameter of the ball is measured with a screw gauge, whose pitch is 0.5 mm and there are 50 divisions on the circular scale. The reading on the main scale is 2.5 mm and that on the circular scale is 20 divisions. If the measured mass of the ball has a relative error of 2%, the relative percentage error in the density is

a) 0.9% b) 2.4% c) 3.1% d) 4.2%

18. If force (F), length (L) and time (T) are assumed to be the fundamental units, then the dimensional formula of the mass will be

a) $[FL^{-1}T^{2}]$ b) $[FL^{-1}T^{-2}]$ c) $[FL^{-1}T^{-1}]$ d) $[FL^{2}T^{-2}]$

19. A student performs an experiment for determination of $g = \frac{4\pi^2 l}{T^2}$ and he commits an error of Δl. For that he takes the time of n oscillations with the stop watch of least count ΔT and he commits a human error of 0.1 sec. For which of the following data, the measurement of g will be most accurate

	Δl	ΔT	n	Ampli. of oscill.
a)	5 mm	0.2sec	10	5mm
b)	5 mm	0.2sec	20	5mm
c)	5 mm	0.1sec	20	1mm
d)	1 mm	0.1sec	50	1mm

20. Write dimensional formula for the intensity of radiation

a) $M^1L^0T^3$ b) $M^1L^0T^{-3}$ c) $M^1L^2T^{-2}$ d) $M^1L^2T^{-3}$