MEASUREMENTS PRACTICE QUESTIONS.

1) **The dimension of energy density is same as that of**
(a) pressure ✓
(b) force
(c) (velocity)^2
(d) acceleration

$\rho_E = \frac{E}{V}$ in 3D

$E = F \cdot d = Kg\frac{m}{s^2} \cdot m = Kg\frac{m^2}{s^2}$

$[V] = m^3$

$[\rho_E] = \frac{Kg\,m^2/s^2}{m^3} = \frac{Kg/s^2}{m} = \frac{Kg}{ms^2}$ ✓

$P = \frac{F}{A} \Rightarrow \frac{Kg\,m/s^2}{m^2} = \frac{Kg}{ms^2}$ ✓

2) **$(5.0\times10^4)\times(3.0\times10^6)=$**
(a) 1.5×10^9
(b) 1.5×10^{11} ✓
(c) 1.5×10^{10}
(d) 1.5×10^{21}

$15.0 \times 10^4 \times 10^6 = 15.0\times10^{10} = 1.5\times10^{11}$

3) **For what physical quantity is the pascal a unit?**
(a) stress
(b) pressure
(c) Young's modulus
(d) all of these ✓

$\sigma = F/A \Rightarrow [\sigma] = Pa$

$E = \frac{\sigma}{\epsilon}$ $\epsilon = \frac{\Delta L}{L}$ $\frac{m}{m}$

4) **1024 can be written in scientific notation as**
(a) $1.024\text{x}10^3$ ✓
(b) 2^{10}
(c) 0.000976
(d) 1/0.00097

$1.024 \times 10^{+3} = 1024$

5) **In any measurement the significant figures are**
(a) all accurately known and all doubtful digits
(b) only accurately known digits
(c) only doubtful digits
(d) all accurately known digits and the first doubtful digit ✓

6) **A digit zero in a measurement**
(a) may be significant or may not be significant ✓
(b) always significant
(c) always insignificant
(d) significant only if left to a significant figure

7) **Number of significant figures in 0.0173 are**
(a) three ✓
(b) four
(c) five
(d) two

8) **Smaller the least count of the instrument more is the measurement**
(a) accurate
(b) precise ✓
(c) accurate and precise
(d) none of these

9) **The number of significant figures in 15.0 is/are**
(a) 2
(b) 6
(c) 1
(d) 3 ✓

10) **What comparing systematic and random errors, the following pairs of properties of errors in an experimental measurement may be contrasted:**
P_1: error can possibly be eliminated
P_2: error cannot possibly be eliminated ✓
Q_1: error is of constant sign and magnitude
Q_2: error is of varying sign and magnitude ✓
R_1: error will be reduced by averaging repeated measurements ✓
R_2: error will not be reduced by averaging repeated measurements
Which properties apply to random error?
(a) P_1, Q_1, R_2
(b) P_2, Q_2, R_1 ✓
(c) P_1, Q_2, R_2
(d) P_2, Q_1, R_1

$P_2\ Q_2\ R_1$

11) **Which equation is not dimensionally correct?**
(a) $E=mc^2$ ✓
(b) $V_f=V_i+at$ ✓
(c) $S=Vt^2$ ✓
(d) $S=\frac{1}{2}at^2$ ✓

$[S]=m$
$[V]=m/s$
$[t]=s \longrightarrow [t^2]=s^2$

$m \neq \frac{m}{s} s^2 = ms$

12) **Which experimental technique reduces the systematic error of the quantity being investigated?**
(a) Adjusting an ammeter to remove its zero error before measuring a current ✓
(b) Measuring several inter-nodal distance on a standing wave to find the mean inter-nodal distance ✗
(c) Measuring the diameter of a wire repeatedly and calculating the average ✗
(d) Timing a large number of oscillations to find a period ✗