1. If the present units of length, time and mass (m, s, kg) are changed to 100m, 100s, and $\frac{1}{10}$kg, then

   a) The new unit of velocity is increased 10 times

   b) The new unit of force is decreased $\frac{1}{100}$ times

   c) The new unit of energy is increased 10 times

   d) The new unit of pressure is increased 1000 times

2. Suppose we employ a system in which the unit of mass equals 100 kg, the unit of length equals 1 km and the unit of time 100 s an call the unit of energy joule (joule written in reverse order), then

   a) 1 joule = 10^4 joule b) 1 joule = 10^{-3} joule

   c) 1 joule = 10^{-4} joule d) 1 joule = 10^3 joule

3. If 1 g cm s^{-1} = x Ns, then number x is equivalent to

   a) 1 x 10^- b) 3 x 10^{-3} c) 6 x 10^{-4} d) 1 x 10^{-5}

4. A highly rigid cubical block A of small mass M and side L is fixed rigidly onto another cubical block B of the same dimensions and of low modulus of rigidity η such that the lower face of A completely covers the upper face of B. The lower face of B is rigidly held on a horizontal surface. A small force F is applied perpendicular to one of the side faces of A. After the force is withdrawn block A executes small oscillations. The time period of which is given by

   a) $2\pi\sqrt{\frac{M\eta}{L}}$ b) $2\pi\sqrt{\frac{L}{M\eta}}$ c) $2\pi\sqrt{\frac{ML}{\eta}}$ d) $2\pi\sqrt{\frac{M}{\eta L}}$

5. If the velocity of light (c), gravitational constant (G) and Plancks' constant (h) are chosen as fundamental units, then the dimensions of mass in new system is

   a) $c^{\frac{1}{2}}G^{\frac{1}{2}}h^{\frac{1}{2}}$ b) $c^{\frac{1}{2}}G^{-\frac{1}{2}}h^{\frac{1}{2}}$ c) $c^{\frac{1}{2}}G^{\frac{1}{2}}h^{-\frac{1}{2}}$ d) $c^{-\frac{1}{2}}G^{\frac{1}{2}}h^{\frac{1}{2}}$

6. If P represents radiation pressure, C represents speed of light and Q represents radiation energy striking a unit area per second, the non-zero integers x, y an z such that $P^xQ^yC^z$ is dimensionless, are

   a) x = 1 , y = 1 , z = –1 b) x = 1, y = –1 , z = 1

   c) x = –1 , y = 1 , z = 1 d) x = 1, y = 1 , z = 1

7. The volume V of water passing through a point of a uniform tube during t seconds is related to the cross-sectional area A of the tube and velocity u of water by the relation $V \propto A^\alpha u^\beta t^\gamma$, which one of the following will be true

   a) $\alpha = \beta = \gamma$ b) $\alpha \neq \beta = \gamma$ c) $\alpha = \beta \neq \gamma$

   d) $\alpha \neq \beta \neq \gamma$

8. Given that the amplitude A of scattered light is

   i) directly proportional to the amplitude (A_o) of incident light

ii) directly proportional to the volume (V) of the scattered particle
iii) inversely proportional to the distance (t) from the scattered particle
iv) depends upon the wavelength (λ) of the scattered light then

a) $A \propto \frac{1}{\lambda}$ b) $A \propto \frac{1}{\lambda^2}$ c) $A \propto \frac{1}{\lambda^3}$ d) $A \propto \frac{1}{\lambda^4}$

9. Each side a cube is measured to be 7.203 m. The volume of the cube up to appropriate significant figures is
a) 373.714 b) 373.71 c) 373.7 d) 373
10. Candela is the unit of
a) acoustic intensity b) electric intensity
c) luminous intensity d) magnetic intensity
11. The time taken by sunlight to penetrate a window pane is of the order of
a) 10^{-5} s b) 10^{-7} s c) 10^{-11} s d) 10^{-19} s
12. Which of the following is the unit of latent heat?
a) J b) J mol^{-1} c) Jkg^{-1} d) Jkg^{-1} mol^{-1}
13. The energy E radiated per unit area per second by a black body at temperature T is given by $E = \sigma T^4$, where σ is the Stefan's constant. The dimensions of σ are
a) MT^2K^{-2} b) $MT^{-3}K^{-4}$ c) MT^3K^{-4} d) $ML^4T^{-3}K^{-1}$
14. If length (L), mass (M) and force (F) are taken as fundamental quantities, then the dimensions of time will be
a) $M^{\frac{1}{2}}L^{\frac{1}{2}}F^{-\frac{1}{2}}$ b) $M^{-\frac{1}{2}}L^{\frac{1}{2}}F^{\frac{1}{2}}$ c) $M^2L^2F^{-2}$ d) $MLF^{\frac{1}{2}}$
15. The surface tension of a liquid is 70 $dynecm^{-1}$. It may be expressed in MKS as
a) 70 Nm^{-1} b) 7 x 10^{-2} Nm^{-1} c) 7 x 10^2 Nm^{-1} d) 7 x 10^3 Nm^{-1}
16. Temperature can be expressed as a derived quantity in terms of any of the following
a) length and mass b) mass and time
c) length, mass and time d) in terms of none of these
17. The density of material is 8 sec^{-1}. In a system in which the unit of length is 5 cm and unit of mass is 20g, the density of material will be
a) 40 b) 50 c) 24 d) 80
18. $ergm^{-1}$ can be the unit of the measure of
a) force b) momentum c) power d) acceleration
19. Which one of the following has the dimensions of pressure?
a) $\frac{M}{L^2T^2}$ b) $\frac{M}{LT}$ c) $\frac{ML}{T^2}$ d) $\frac{M}{LT^2}$

20. In a particular system, the units of length, mass and time are chosen to be 10 cm, 10 g and 0.1 s respectively. The unit of force in this system will be equivalent to
a) 0.1 N b) 1 N c) 10 N d) 100 N

21. The dimensions of resistivity in terms of M, L, T and Q are
a) $ML^3T^{-1}Q^{-2}$ b) $ML^3T^{-2}Q^{-1}$ c) $ML^2T^{-1}Q^{-1}$
d) $MLTQ^{-1}$

22. The SI unit of pressure is
a) Dyne cm^{-2} b) atmosphere c) pascal d) cm of Hg

23. A certain physical quantity is calculated from the formula $\frac{\pi}{3}(a^2 - b^2)$ h, where h, a and b are all lengths. The quantity being calculated is
a) Velocity b) Length c) Area d) Volume

24. Joule second is a unit of
a) Energy b) momentum c) power d) angular momentum

25. If $x = at + bt^2 + c$, where x is in metre and t in hour (hr), then the unit of a, b and c are
a) m , m hr^{-1}, m hr^{-2} b) mhr^{-1}, mhr^{-2}, m
c) m^2hr^{-1}, mhr^{-1}, m d) mhr^{-2}, mhr^{-1}, m