Physicsaholics

DPP – 3 (Unit & Dimension)

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Q 1. If velocity (V), force (F) and energy (E) are taken as fundamental units, then dimensional formula for mass will be

(a) $V^{-2}F^{0}E^{2}$ (b) $V^{0}FE^{2}$

(c) $VF^{-2}E^{0}$ (d) $V^{-2}F^{0}E$

Q 2. The speed of light (c), gravitational constant (G, Unit = N-m^2/kg^2) and Planck's constant (h, Unit = J-s) are taken as the fundamental units in a system. The dimensions of time in this new system should be

(a) $G^{\frac{1}{2}}h^{\frac{1}{2}}c^{\frac{-5}{2}}$ (b) $G^{-\frac{1}{2}}h^{\frac{1}{2}}c^{\frac{1}{2}}$

(c) $G^{\frac{1}{2}}h^{\frac{1}{2}}c^{-\frac{3}{2}}$ (d) $G^{\frac{1}{2}}h^{\frac{1}{2}}c^{\frac{1}{3}}$

Q 3. If the time period (T) of vibration of a liquid drop depends on surface tension (S, Unit = N/m), radius (r) of the drop and density (ρ) of the liquid, then the expression of T is: (k is dimensionless constant)

(a) $T = k\sqrt{\rho r^3/s}$ (b) $T = k\sqrt{\rho^{\frac{1}{2}} r^3/s}$

(c) $T = k\sqrt{\rho r^3/s^{\frac{1}{2}}}$ (d) None of these

Q 4. If the capacitance of a nanocapacitor (Unit = $coulamb^2/J$) is measured in terms of a unit 'u' made by combining the electric charge 'e', Bohr radius 'a_o', Planck's constant 'h' (Unit = J-s) and speed of light 'c' then

(a) $u = \frac{e^2h}{a_o}$ (b) $u = \frac{hc}{e^2a_o}$

(c) $u = \frac{e^2c}{ha_o}$ (d) $u = \frac{e^2a_o}{hc}$

Q 5. Pressure inside a gas container is P = 5 kPa. Its value in CGS system will be:

(a) $5 \times 10^{-6}\ dyn - cm^{-2}$ (b) $5 \times 10^{4}\ dyn - cm^{-2}$

(c) $10^{6}\ dyn - cm^{-2}$ (d) $5 \times 10^{-6}\ dyn - m^{-2}$

Q 6. What will be the value of momentum 1 kg-m/s in CGS system:

(a) 10^{-6} gm-cm/s (b) 10^{5} gm-cm/s

(c) 10^{6} gm-cm/s (d) 5×10^{5} gm-cm/s

Q 7. A bicycle has a speed of 6 m/s. What is its speed in km/h?

(a) 21.6 km/h (b) 16.67 km/h

(c) 2.16 km/h (d) 1.67 km/h

Q 8. The area of a room is 10 m^2 The same in $feet^2$ is:
Hint:- 1m=3.28ft
(a) 107.6 $feet^2$ (b) 77 $feet^2$
(c) 77.6 $feet^2$ (d) none of these

Q 9. What is the value of gravitational constant G in CGS system?
($\boldsymbol{G} = 6.67 \times 10^{-11}\ N\,m^2/kg^2$)
(a) 6.674×10^{-11} $cm^3\cdot\mathbf{g}^{-1}\cdot s^{-2}$ (b) 6.674×10^{-8} $cm^3\cdot\mathbf{g}^{-1}\cdot s^{-2}$
(c) 6.674×10^{-8} $cm^3\cdot\mathbf{g}\cdot s^{-2}$ (d) 6.674×10^{-8} $cm^3\cdot\mathbf{g}^{-1}\cdot s^{-1}$

Q 10. If work done is $W = 20\ Joule$, then work done in CGS system will be:
(a) $2 \times 10^7\ erg$ (b) $20 \times 10^8\ erg$
(c) $2 \times 10^8\ erg$ (d) $10^8\ erg$

Q 11. If minute is the unit of time, 10 m/s^2 s the unit of acceleration and 100 kg is the unit of mass, then the value of one joule in new unit of work is:
(a) 10^6 new unit (b) $\frac{1}{10^6}$ new unit
(c) $\frac{1}{36\times10^6}$ new unit (d) 36×10^6 new unit

Q 12. Young's modulus of steel is $2 \times 10^{11} N/m^2$. Its numerical value in CGS unit will be
(a) 2×10^{12} (b) 2×10^{11}
(c) 4×10^{12} (d) 4×10^{11}

Q 13. The value of g is 9.8 m/s^2. Its value in a new system in which the unit of length in kilometer and that of time in minute, is:
(a) 35.3 km-minute^{-2} (b) 3.53 km-minute^{-2}
(c) 353 km-minute^{-2} (d) 0.353 km-minute^{-2}

Q 14. If unit of mass become 2 times, the unit of length becomes 4 times and the unit of time becomes 4 times in the unit of Plank's constant(J-s). Due to this, unit of plank's constant becomes n times. The value of n is
(a) 3 (b) 5
(c) 6 (d) 8

Q 15. In a new system of units, unit of mass is 10 kg, unit of length is 100 m, unit of time is 1 minutes. The magnitude of 1 N force in new system of units will be
(a) 36 (b) 60
(c) 3.6 (d) 0.06

Answer Key

Q.1 d	**Q.2 a**	**Q.3 a**	**Q.4 d**	**Q.5 b**
Q.6 b	**Q.7 a**	**Q.8 a**	**Q.9 b**	**Q.10 c**
Q.11 c	**Q.12 a**	**Q.13 a**	**Q.14 d**	**Q.15 c**