1. Which of the following statements is correct about conversion of units, for example 1m = 100

(A) Conversion of units have identical dimensions on each side of the equal sign but not the same units.

(B) Conversion of units have different dimensions on each side of the equal sign but have same unit

(C) If a larger unit is used then numerical value of physical quantity is large.

(D) Due to conversion of units physical quantity to be measured will change.

2. The density of a liquid is 1000 kg m^{-3}. Its value in CGS system -

(A) 1 (B) 0.1 (C) 10 (D) 100

3. If the units of mass, length and time are doubled, unit of angular momentum will be -

(A) Doubled (B) Tripled

(C) Quadrupled (D) 8 times the original value

4. In a particular system of unit, if the unit of mass becomes twice & that of time becomes half, then 8 Joules will be written as.... units of work.

(A) 16 (B) 1 (C) 4 (D) 64

5. If the speed of light (c), acceleration due to gravity (g) and pressure (p) are taken as fundamental units, the dimensions of gravitational constant (G) are -

(A) c^0gp^{-3} (B) $c^2g^3p^{-2}$ (C) $c^0g^2p^{-1}$ (D) $c^2g^2p^{-2}$

6. The frequency of oscillation of an object of mass m suspended by means of spring of force constant K is given by $f = Cm^xK^y$, where C is a dimensionless constant. The value of x and y are -

(A) $x = \frac{1}{2}, y = \frac{1}{2}$ (B) $x = -\frac{1}{2}, y = \frac{1}{2}$ (C) $x = \frac{1}{2}, y = -\frac{1}{2}$ (D) $x = -\frac{1}{2}, y = -\frac{1}{2}$

7. The velocity or a body which has fallen under gravity varies as $g^a h^b$, where g is acceleration due to gravity and h is the height. The values of a and b are -

(A) a = 1, b = 1/2 (B) a = b = 1 (C) a = 1/2, b = 1 (D) a = 1/2 ; b = 1/2

8. If force F, acceleration A and time T are basic physical quantities, the dimensions of energy are –

(A) $[F^2A^{-1}T]$ (B) $[FAT^2]$ (C) $[FAT^{-2}]$ (D) $[FA^{-1}T]$

9. The velocity v of waves produced in water depends on their wavelength λ, the density of water ρ, and acceleration due to gravity g. The square of velocity is proportional to

(A) $\lambda^{-1}g^{-1}\rho^{-1}$ (B) λg (C) $\lambda\rho g$ (D) $\lambda^2g^{-2}\rho^{-1}$

10. If area (A), velocity (v) and density (ρ) are taken as the fundamental units, what is the dimensional formula for force

(A) $Av^2\rho$ (B) $A^2v\rho$ (C) $Av\rho^2$ (D) $Av\rho$

11. If force (F), acceleration (a) and time (T) are used as the fundamental units, the dimensional formula for length will be

(A) F^0aT^2 (B) Fa^0T^2 (C) Fa^2T^0 (D) F a T

12. What is the percentage error in the measurement of time period of a pendulum if maximum errors in the measurement of 'ℓ' and 'g' are 2% and 4 % respectively -

(A) 6% (B) 4% (C) 3% (D) 5%

13. The area of a rectangle of size 1.23 × 2.345 cm is -

(A) 2.88 cm^2 (B) 2.884 cm^2 (C) 2.9 cm^2 (D) 2.88435 cm^2

14. The length of a rod is (11.05 ± 0.05) cm. What is the length of two such rods -

(A) (22.1 ± 0.05) cm (B) (22.10 ± 0.05) cm

(C) (22.1 ± 0.05) cm (D) (22.10 ± 0.10 cm)

15. The significant digits in 200.40 are -

(A) 4 (B) 5 (C) 2 (D) 3

16. The percentage error in the measurement of mass and speed are 2% and 3% respectively. How much will be the maximum error in the estimate of kinetic energy obtained by measuring mass and speed -

(A) 11% (B) 8% (C) 5% (D) 4%

17. A physical quantity is represented by the relation $Y = M^a L^b T^{-c}$. If the percentage errors in the measurement of M, L and T are respectively α %, β % and γ %, then the total error will be -

(A) $(\alpha a - \beta b + \gamma c)\%$ (B) $(\alpha a + \beta b - \gamma c)\%$

(C) $(\alpha a + \beta b + \gamma c)\%$ (D) $(\alpha a - \beta b - \gamma c)\%$

18. If x = ab, the maximum percentage error in the measurement of x will be-

(A) $\left(\frac{\Delta a}{a}\times 100\%\right)\times\left(\frac{\Delta b}{b}\times 100\%\right)$ (B) $\left(\frac{\Delta a}{a}\times 100\%\right)\div\left(\frac{\Delta b}{b}\times 100\%\right)$

(C) $\left(\frac{\Delta a}{a}-\frac{\Delta b}{b}\right)\times 100\%$ (D) $\left(\frac{\Delta a}{a}+\frac{\Delta b}{b}\right)\times 100\%$

19. A wire is of mass (0.3 ± .003) gm. The radius is (0.5 ± 0.005) cm and length is (6 ± .06) cm. The maximum percentage error in density is-

(A) 3% (B) 4% (C) 8% (D) 16%

20. An experiment measures quantities a, b, c and x is calculated from $x = \frac{ab^2}{c^3}$. If the percentage error in a, b, c are ± 1%, ± 3%, ± 2% respectively.

(A) The percentage error in x can be ± 13% (B) The percentage error in x can be ± 7%

(C) The percentage error in x can be ± 20% (D) The percentage error in x can be ± 26%

Answers

RACE # 02

1.	(A)	**2.**	(A)	**3.**	(C)	**4.**	(B)	**5.**	(C)	**6.**	(B)	**7.**	(D)	**8.**	(B)	**9.**	(B)	**10.**	(A)
11.	(A)	**12.**	(C)	**13.**	(A)	**14.**	(D)	**15.**	(B)	**16.**	(B)	**17.**	(C)	**18.**	(D)	**19.**	(B)	**20.**	(A)