

UNITS AND DIMENSIONS

SET 4

Q151. Which of the following has same dimensions as momentum?

- a) Impulse
- b) Force $\times$ time
- c) Mass $\times$ velocity
- d) All of these

Ans: d) All of these

Q152. Which has same dimensions as energy?

- a) Work
- b) Torque
- c) Potential energy
- d) All of these

Ans: d) All of these

Q153. Which of the following is not a dimensionless constant?

- a) π
- b) e
- c) c (speed of light)
- d) 2

Ans: c) c (speed of light)

Q154. Which among the following has no dimension?

- a) Angle
- b) Relative density
- c) Strain
- d) All of these

Ans: d) All of these

Q155. Which is not a coherent unit?

- a) Joule
- b) Newton
- c) Watt
- d) Calorie

Ans: d) Calorie

Q156. Which physical quantity has unit J/kg?

- a) Gravitational potential
- b) Specific energy
- c) Specific potential energy
- d) All of these

Ans: d) All of these

Q157. Which has SI unit same as stress?

- a) Energy density
- b) Pressure

- c) Young's modulus
- d) All of these

Ans: d) All of these

Q158. The dimensional formula of universal gas constant R is:

- a) $[ML^2T^{-2}K^{-1}mol^{-1}]$
- b) $[MLT^{-2}]$
- c) $[ML^2T^{-2}]$
- d) $[ML^2T^{-3}]$

Ans: a) $[ML^2T^{-2}K^{-1}mol^{-1}]$

Q159. Which of the following pairs are not dimensionally same?

- a) Torque and work
- b) Impulse and momentum
- c) Stress and pressure
- d) Force and energy

Ans: d) Force and energy

Q160. SI unit of heat capacity is:

- a) J/kg
- b) J/K
- c) $J\ mol^{-1}\ K^{-1}$
- d) $J\ s^{-1}$

Ans: b) J/K

Q161. SI unit of specific heat capacity is:

- a) $J\ mol^{-1}\ K^{-1}$
- b) $J\ kg^{-1}\ K^{-1}$
- c) $J\ K^{-1}$
- d) $J\ mol\ K^{-1}$

Ans: b) $J\ kg^{-1}\ K^{-1}$

Q162. The dimensional formula of entropy is:

- a) $[ML^2T^{-2}K^{-1}]$
- b) $[MLT^{-2}K^{-1}]$
- c) $[ML^2T^{-2}]$
- d) $[ML^2T^{-3}K^{-1}]$

Ans: a) $[ML^2T^{-2}K^{-1}]$

Q163. Which of the following is dimensionally correct?

- a) $KE = \frac{1}{2}mv^2$
- b) $PE = mgh$
- c) Momentum = mv
- d) All of these

Ans: d) All of these

Q164. Which among the following cannot be checked using dimensional analysis?

- a) $s = ut + \frac{1}{2}at^2$
- b) $T = 2\pi\sqrt{l/g}$
- c) $v^2 = u^2 + 2as$

d) $F = ma$

Ans: b) $T = 2\pi\sqrt{l/g}$

Q165. Which equation is dimensionally inconsistent?

a) $v^2 = u^2 + 2as$

b) $s = ut + \frac{1}{2}at^2$

c) $E = mv + gh$

d) $F = ma$

Ans: c) $E = mv + gh$

Significant Figures & Errors (Q.166 – Q.175)

Q166. 0.000500 has how many significant figures?

a) 2

b) 3

c) 4

d) 5

Ans: b) 3

Q167. Which of the following has 5 significant figures?

a) 0.004567

b) 45.670

c) 4.567×10^3

d) All of these

Ans: d) All of these

Q168. 6.626×10^{-34} has how many significant figures?

a) 3

b) 4

c) 5

d) 6

Ans: b) 4

Q169. 7.000×10^2 has how many significant figures?

a) 2

b) 3

c) 4

d) 5

Ans: c) 4

Q170. 1.732 rounded to 2 s.f. is:

a) 1.7

b) 1.8

c) 1.73

d) 1.74

Ans: a) 1.7

Q171. In subtraction, the result should retain:

a) Least number of significant figures

b) Least number of decimal places

c) Both

d) None

Ans: b) Least number of decimal places

Q172. In multiplication, the result should retain:

a) Least number of significant figures

b) Least number of decimal places

c) Both

d) None

Ans: a) Least number of significant figures

Q173. The uncertainty in 5.6 ± 0.1 m is:

a) 1.8%

b) 2%

c) 1%

d) 0.5%

Ans: b) 2%

Q174. A measurement of 2.00 m has relative error of:

a) 0%

b) 0.5%

c) 1%

d) 2%

Ans: a) 0%

Q175. 3.14159 rounded to 3 s.f. is:

a) 3.14

b) 3.15

c) 3.13

d) 3.140

Ans: a) 3.14

Q176. 1 Watt = ? erg/s

a) 10^3

b) 10^5

c) 10^7

d) 10^9

Ans: c) 10^7

Q177. 1 Joule = ? eV

a) 6.25×10^{18}

b) 1.6×10^{-19}

c) 1.6×10^{-18}

d) 6.25×10^{19}

Ans: a) 6.25×10^{18}

Q178. 1 Pascal = ? dyne/cm²

a) 10

b) 100

c) 10^3

d) 10^5

Ans: d) 10^5

Q179. 1 atmosphere = ? Pa

a) 1.013×10^3

b) 1.013×10^4

c) 1.013×10^5

d) 1.013×10^6

Ans: c) 1.013×10^5

Q180. 1 calorie = ? erg

a) 4.2×10^6

b) 4.2×10^5

c) 4.2×10^7

d) 4.2×10^8

Ans: c) 4.2×10^7

Q181. 1 eV = ? erg

a) 1.6×10^{-12}

b) 1.6×10^{-11}

c) 1.6×10^{-13}

d) 1.6×10^{-15}

Ans: a) 1.6×10^{-12}

Q182. 1 m² = ? cm²

a) 10^2

b) 10^3

c) 10^4

d) 10^6

Ans: c) 10^4

Q183. 1 m³ = ? cm³

a) 10^3

b) 10^4

c) 10^5

d) 10^6

Ans: d) 10^6

Q184. 1 Tesla = ? N/(A·m)

a) 1

b) 10

c) 100

d) 1000

Ans: a) 1

Q185. 1 Newton = ? kgf

a) 0.098

b) 0.98

c) 9.8

d) 98

Ans: a) 0.098

Q186. 1 kgf = ? Newton

a) 9.8

b) 98

c) 0.98

d) 980

Ans: a) 9.8

Q187. Dimensional formula of power is:

a) $[ML^2T^{-3}]$

b) $[ML^2T^{-2}]$

c) $[MLT^{-2}]$

d) $[ML^0T^{-3}]$

Ans: a) $[ML^2T^{-3}]$

Q188. Dimensional formula of energy per unit volume is same as:

a) Stress

b) Pressure

c) Energy density

d) All of these

Ans: d) All of these

Q189. Dimensional formula of charge is:

a) $[AT]$

b) $[ML^2T^{-3}]$

c) $[MLT^{-2}]$

d) $[M^0LT^{-1}]$

Ans: a) $[AT]$

Q190. Dimensional formula of potential difference is:

a) $[ML^2T^{-2}A^{-1}]$

b) $[MLT^{-2}]$

c) $[ML^2T^{-2}]$

d) $[M^0L^2T^{-2}]$

Ans: a) $[ML^2T^{-2}A^{-1}]$

Q191. Which physical quantity has dimension $[M^0L^0T^{-1}]$?

a) Frequency

b) Angular velocity

c) Both a & b

d) None

Ans: c) Both a & b

Q192. Which has dimension $[ML^{-3}T^0]$?

a) Density

b) Pressure

c) Stress

d) Surface tension

Ans: a) Density

Q193. Which equation is dimensionally incorrect?

a) $KE = \frac{1}{2}mv^2$

b) $PE = mgh$

c) $v = u + at^2$

d) $s = ut + \frac{1}{2}at^2$

Ans: c) $v = u + at^2$

Q194. The value of π in pendulum formula $T = 2\pi\sqrt{l/g}$ cannot be checked by:

a) Unit analysis

b) Dimensional analysis

c) Experimental analysis

d) Both a & b

Ans: d) Both a & b

Q195. Which of the following has dimensions of velocity?

a) $\sqrt{g l}$

b) $\sqrt{g/l}$

c) $g l$

d) l/t

Ans: a) $\sqrt{g l}$

Q196. Which is dimensionally same as impulse?

a) Force $\times$ distance

b) Force $\times$ time

c) Energy

d) Power

Ans: b) Force $\times$ time

Q197. Which is not dimensionless?

a) Relative density

b) Strain

c) Poisson's ratio

d) Pressure coefficient of resistance

Ans: d) Pressure coefficient of resistance

Q198. Which pair is not dimensionally same?

a) Angular momentum & Planck's constant

b) Torque & work

c) Stress & pressure

d) Force & energy

Ans: d) Force & energy

Q199. If velocity $= \sqrt{T/\mu}$, where T = tension and μ = mass/length, then the dimensions are:

a) $[LT^{-1}]$

b) $[L^2T^{-2}]$

c) $[MLT^{-2}]$

d) $[M^0LT^{-1}]$

Ans: a) $[LT^{-1}]$

Q200. Dimensional analysis helps in:

- a) Checking correctness of equations
- b) Deducing relations among quantities
- c) Conversion of units
- d) All of these

Ans: d) All of these

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