



PHYSICS

BOOKS - SURA PHYSICS (TAMIL ENGLISH)

NATURE OF PHYSICAL WORLD AND MEASUREMENT

Mcq Type

1. One of the combinations from the fundamental physical constants is $\frac{hc}{G}$. The unit of this expression is

A. kg^2

B. m^3

C. s^{-1}

D. m^2

Answer: A



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2. If the error in the measurement of radius is 2%, then the error in the determination of volume of the sphere will be

A. 0.08

B. 0.02

C. 0.04

D. 0.06

Answer: D



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3. If the length and time period of an oscillating pendulum have errors of 1% and 3% respectively then the error in measurement of acceleration due to gravity is

A. 0.04

B. 0.05

C. 0.06

D. 0.07

Answer: D



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4. The length of a body is measured as 3.51m, if the accuracy is 0.01 m, then the percentage error in the measurement is

A. 3.51

B. 0.01

C. 0.285%

D. 0.00035

Answer: C



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5. Which of the following has the highest number of significant figures?

A. $0.007m^2$

B. $2.64 \times 10^{24}kg$

C. $0.0006032m^2$

D. $6.3200J$

Answer: D



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6. If $\pi = 3.14$, then the value of π^2 is

A. 9.8596

B. 9.85

C. 9.86

D. 9.9

Answer: C



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7. Which of the following pairs of physical quantities have same dimension?

- A. force and power
- B. torque and energy
- C. torque and power
- D. force and torque

Answer: B



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8. The dimensional formula of Planck's constant h is

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

B. $[ML^2T^{-3}]$

C. $[MLT^{-1}]$

D. $[ML^3T^{-3}]$

Answer: A



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9. The velocity of a particle v at a instant t is given by $v = at + bt^2$. The dimension of b is

A. $[L]$

B. $[LT^{-1}]$

C. $[LT^{-2}]$

D. $[LT^{-3}]$

Answer: D



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10. The dimensional formula for gravitational constant G is

A. $[ML^3T^{-2}]$

B. $[M^{-1}L^3T^{-2}]$

C. $[M^{-1}L^{-3}T^{-2}]$

D. $[ML^{-3}T^2]$

Answer: B



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11. The density of material in CGS system of units is $4gcm^{-3}$. In a system of units in which unit of length is 10 cm and unit of mass is 100 gm, then the value of density of material will be

A. 0.04

B. 0.4

C. 40

D. 400

Answer: C



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12. If the force is proportional to square of velocity, the the dimensional of proportionality constant is

A. $[MLT^0]$

B. $[MLT^{-1}]$

C. $[ML^{-2}T]$

D. $[ML^{-1}T^0]$

Answer: D



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13. The dimension of $(\mu_0 \epsilon_0 E_0)^{-\frac{1}{2}}$ is

A. length

B. time

C. velocity

D. force and torque

Answer: C



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14. Plank's constant (h), speed of light in vacuum (c) and Newton's gravitational constant (G) are taken as three fundamental constants.

Which of the following combinations of these has the dimensions of length?

A. $\frac{hc}{G}$

B. $\frac{\sqrt{hG}}{c^{\frac{5}{2}}}$

C. $\sqrt{\frac{hc}{G}}$

D. $\sqrt{\frac{Gc}{h^{\frac{3}{2}}}}$

Answer: A



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15. A length -scale (l) depends on the permittivity (ϵ) of a dielectric material, Boltzmann constant (k_B), the absolute temperature (T), the number pr unit volume (n) of certain charged paticles, and the charge (q) carried by each of the particles. Which of the following expression for l is dimensionally correct?

$$\text{A. } l = \sqrt{\frac{nq^2}{sk_B T}}$$

$$\text{B. } l = \sqrt{\frac{\epsilon k_B T}{nq^2}}$$

$$\text{C. } l = \sqrt{\frac{q^2}{\epsilon n^{\frac{2}{3}} k_B T}}$$

$$\text{D. } l = \sqrt{\frac{q^2}{\epsilon n k_B T}}$$

Answer: B



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Short Answer Questions

1. Briefly explain the types of physical quantities.



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2. How will measure the diameter of the Moon using parallax method?



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3. Write the rules for determining significant figures.



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4. What are the limitations of dimensional analysis?



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5. Define precision and accuracy. Explain with one example.



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Long Answer Questions

- (i) Explain the use of screw gauge and vernier caliper in measuring smaller distances.
(ii) Write a note on triangulation method and radar method to measure larger distances.



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2. Explain in detail the various types of errors.



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3. What do you mean by propagation of errors? Explain the propagation of errors in addition and multiplication.



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4. Write short notes on the following:

a. Unit

b. Rounding -off

c. Dimensionless quantities



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5. Explain the principle of homogeneity of dimensions. What are its uses? Give example.



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Numerical Problems

1. In a submarine equipped with sonar, the time delay between the generation of a pulse and its echo after reflection from an enemy submarine is observed to be 80 sec. If the speed of sound in water is 1460ms^{-1} . What is the distance of enemy submarine?



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2. The radius of the circle is 3.12 m. Calculate the area of the circle with regard to significant figures.



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3. Assuming that the frequency γ of a vibrating string may depend upon (i) applied force (F) (ii) length (l) (iii) mass per unit length (m), prove that $\gamma \propto \frac{1}{l} \sqrt{\frac{F}{m}}$ using dimensional analysis.



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4. Jupiter is at a distance of 824.7 million km from the Earth. Its angular diameter is measured to be 35.72". Calculate the diameter of Jupiter.



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5. The measurement value of length of a simple pendulum is 20 cm known with 2 mm accuracy. The time for 50 oscillations was

measured to be 40 s within 1s resolution.
Calculate the percentage accuracy in the determination of acceleration due to gravity g from the above measurement.



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Conceptual Questions

1. Why is it convenient to express the distance of stars in terms of light year (or) parsec rather than in km?



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2. Show that a screw gauge of pitch 1 mm and 100 divisions is more precise than a vernier caliper with 20 divisions on the sliding scale.



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3. If humans were to settle on other planets, which of the fundamental quantities will be in trouble? Why?



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4. Having all units in atomic standards in more useful. Explain.



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5. Why dimensional methods are applicable only up to three quantities?



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Additional Questions

1. A substance whose mass is 4.27 g occupies 1.3cm^3 . The number of significant figures in density is

A. 1

B. 2

C. 3

D. 4

Answer: D



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2. Triple point of water is :

A. 273.16k

B. 237.16c

C. 273.16c

D. 0k

Answer: A



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3. Mass, temperature, electric current are

A. fundamental quantities

B. scalar quantities

C. vector quantities

D. both a and b

Answer: D



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4. The word scientia is meaning to _____

A. exact

B. to know

C. control

D. implement

Answer: B



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5. Astronomical Scale is dealt with the_____Physics

A. mesoscopic

B. Microscopic

C. macroscopic

D. None

Answer: C



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6. Microscopic group of Physics dealt with the study of _____

A. classical physics

B. statistical mechanics

C. fluid mechanics

D. quantum physics

Answer: D



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7. Which deals with the study of materials of an intermediate length scale

- A. Mesoscopic physics
- B. Macroscopic physics
- C. Microscopic physics
- D. All the above

Answer: A



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8. What is the range of astronomical time scales to microscopic scale?

A. $10^{15} s$ to $10^{-15} s$

B. $10^9 s$ to $10^{-18} s$

C. 10^{18} to $10^{-22} s$

D. $10^{11} s$ to $10^{-16} s$

Answer: C



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9. The law of electricity and magnetism is used to

A. Wireless communication

B. Nuclear reactor

C. Steam engine

D. Aeroplaned

Answer: A



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10. How many gram make ` deca gram?

A. 10g

B. 100g

C. 1kg

D. 100kg

Answer: A



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11. 1 nano second is equivalent to

A. 10^{-6}s

B. 10^{-3}s

C. 10^{-15}s

D. 10^{-9}s

Answer: D



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12. Which unit is used to measure size of a nucleus?

A. Angstrom

B. Micron

C. nano

D. Fermi

Answer: D



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13. One paralactic second is

A. $3.08 \times 10^{16} m$

B. $1.49 \times 10^{11} m$

C. $9.46 \times 10^{15} m$

D. $1.6 \times 10^{-27} m$

Answer: A



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14. How many light years make 1 parsec?

A. 3.26

B. 6.67

C. 1.5

D. 9.4

Answer: A



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15. How many AU makes one metre?

A. $3.26 \times 10^{11} AU$

B. $1.496 \times 10^{11} AU$

C. $3.08 \times 10^{16} AU$

D. $6.684 \times 10^{-12} AU$

Answer: D



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16. One lunar month is equal to _____

A. 29 days

B. 27.3 days

C. 365 days

D. 30 days

Answer: B



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17. What is the value of one light year in tera metre?

A. $9.46 \times 10^6 Tm$

B. $9.46 \times 10^9 Tm$

C. $9.46 \times 10^2 Tm$

D. $9.46 \times 10^3 Tm$

Answer: D



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18. The acceleration of $20m / s^2$ in km / h^2 is

A. $2.59 \times 10^5 km / h^2$

B. $1.29 \times 10^5 km / h^2$

C. $2.0 \times 10^3 km / h^2$

D. $3.5 \times 10^5 k \frac{m}{h^2}$

Answer: A



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19. Which devices is used for measuring the mass of atoms/

A. Spectrograph

B. Fermi

C. Telescope

D. Microscope

Answer: A



20. Which of the following statement is wrong?

A. one fermi = 10^{15} m

B. All non-zero digits are significant

C. $1\text{AU} = 1.496 \times 10^{11} \text{m}$

D. Speed is a derived unit

Answer: A



21. Which of the following statement is wrong?

A. Strain is a dimensionless quantity.

B. Fundamental quantify is also called the
base quantity.

C. Force = mass \times acceleration

D. 1 solar year = 1500 days

Answer: D



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22. Which of the following statement is true?

A. Velocity is a fundamental unit.

B. 1 Solar day = 24 hours

C. 1 Shake = 10^4 s

D. mass is a derived unit

Answer: B



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23. The number of significant figures in 0.0006012m is

A. 3

B. 4

C. 7

D. 5

Answer: B



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24. The number of significant figures in $2.64 \times 10^4 \text{ kg}$ is

A. 2

B. 4

C. 5

D. 3

Answer: D



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25. The displacement of a particle moving along x-axis with respect to times is given by $x = at + bt^2 - ct^3$. The dimensions of b are

A. L^0T^{-3}

B. L^0T^{-3}

C. LT^{-2}

D. LT^{-3}

Answer: C



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26. If E and B respectively, represent electric field and magnetic induction field, then the ratio E and B has the dimensions of

A. angle

B. acceleration

C. velocity

D. displacement.

Answer: C



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27. If force $|F|$, velocity $|v|$ and time $|T|$ are taken as to fundamental units then the dimensions of mass are

A. $Fv^{-1}T$

B. $Fv^{-1}T$

C. FvT^{-1}

D. FvT^{-2}

Answer: B



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28. The dimensions of K.E. is

A. $M^2L^2T^{-1}$

B. $M^1L^1T^1$

C. $M^1L^2T^{-2}$

D. $M^2L^2T^{-2}$

Answer: C



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29. The dimensionis of universal gravitational constant is

A. $M^{-2}L^3T^{-2}$

B. $M^{-2}L^2T^{-1}$

C. $M^{-1}L^3T^{-2}$

D. ML^2T^{-1}

Answer: C



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30. The density of a cube is measured by measuring its mass and length of its side. If the maximum error in the measurement of mass and length are 5% and 3% respectively, the maximum error in the measurement of density is

A. 0.09

B. 0.08

C. 0.14

D. 0.02

Answer: C



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31. The fractional error $\left(\frac{\Delta x}{x}\right)$

A. $\pm \left(\frac{\Delta a}{a}\right)$

B. $\pm n \left(\frac{\Delta a}{a}\right)$

C. $\pm n \log_e \left(\frac{\Delta a}{a}\right)$

D. $\pm n \frac{\log_{10}(\Delta a)}{a}$

Answer: B



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32. How many light years make 1 parsec?

A. 3.26 LY

B. 6.67LY

C. 1.5LY

D. 9.4LY

Answer: A



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33. If $\pi = 3.14$, then the value of π^2 is

A. 9.8596

B. 9.86

C. 9.86

D. 9.9

Answer: C



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34. Which of the following pairs of physical quantities have same dimension?

A. force and power

B. Stress and Pressure

C. Momentum and Moment of force

D. Torque and impulse of force

Answer: B



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35. The Dimensional formula for Boltzmann constant is

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

B. $[AT\text{mol}^{-1}]$

C. $[ML^2T^{-2}K^{-1}]$

D. None of these

Answer: C



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36. Specific gravity (Relative Density) is an example for

- A. Dimensional Variables
- B. Dimensionless Variables
- C. Dimensional Constant
- D. Dimension less Constant

Answer: B



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37. 8.250 can be Rounded off to

A. 8.3

B. 8.2

C. 8.25

D. 8.26

Answer: B



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38. If E and B respectively represent electric field and magnetic field of Induction, then the ratio of E and B has the dimensional formula of

A. $[LT^{-2}]$

B. $[MLT^{-2}]$

C. $[LT^{-1}]$

D. $[MLT^{-1}]$

Answer: C



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39. Which one has more significant figures

A. 600800

B. 5213

C. 2.65×10^{24}

D. 0.0006032

Answer:



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40. Angle of 1 Second of arc is

A. 48.5×10^{-6} rad

B. 0.485×10^{-5} rad

C. 4.85×10^{-6} rad

D. 48500×10^{-6} rad

Answer: C



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41. 1 Yotta = _____

A. 10^{21}

B. 10^{-24}

C. 10^{-21}

D. 10^{24}

Answer: D



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42. If mass of an electron is 9.11×10^{-31} kg then how many electrons would weight in 1 mg?

A. 1.68×10^{18}

B. 1.097×10^{24}

C. 1.45×10^{22}

D. 1.970×10^{23}

Answer: B



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43. An attempt to explain a Macroscopic system in terms of its Microscopic constituents is _____.

A. unification

B. Reductionism

C. Microphysics

D. Macrophysics

Answer: B



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44. The range of masses from heavenly bodies to electro is __

A. 10^{52} kg to 10^{-28} kg

B. 10^{55} kg to 10^{+28} kg

C. 10^{55} kt to 10^{-31} kg

D. 10^{-55} kg to 10^{31} kg

Answer: C



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45. The CGS, MKS and SI system of units are _____ system of units.

A. metric

B. cubic

C. periodic

D. atomic

Answer: A



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46. The temperature at which Saturated vapour, pure and melting ice are all in equilibrium is called _____

- A. sublimation
- B. melting point
- C. Triple point of water
- D. heat capacity

Answer: C



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47. The expression for Solid Angle is _____

- A. rad/s

B. surface area/(radius)²

C. (radius)²

D. surface area/radius

Answer: B



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48. $JKg^{-1}K^{-1}$ is the unit for _____.

A. Heat capacity

B. Latent heat

C. Specific heat

D. Energy

Answer: C



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49. 1 degree = _____ rad

A. 1.754×10^{-2}

B. 1.745×10^2

C. 1.745×10^{-2}

D. 1.547×10^{-2}

Answer: C



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50. _____ means a large world in which both objects and distances are large - sized.

A. Macrocosm

B. Micorcosm

C. Astronomy

D. Universe

Answer: A



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51. The largest practical unit of mass is _____

A. CSL

B. Par sec

C. Ly

D. AU

Answer: A



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52. The error caused due to the sheer carelessness of an observer is called _____

A. Absolute Error

B. Gross Error

C. Instrumental Error

D. Zero Error

Answer: B



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53. Quantities which have constant values and also have no dimensions are called _____.

A. Dimensionless Constants

B. Dimensionale variables

C. Dimensionaless constants

D. Derived quantities

Answer: A



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54. Dimensional formula for Magnetic

Induction is _____.

A. MT^2A^{-1}

B. $MT^2 - A$

C. $MT^{-2}A^{-1}$

D. MA^{-1}

Answer: C



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55. Formula (or) expression for surface energy

is _____.

A. work/length

B. force/length

C. work/time

D. work/area

Answer: D



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56. Relative error is also called as _____

A. Gross error

B. Percentage Error

C. Absolute Error

D. Fractional Error

Answer: D



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57. The name Physics was introduced by _____ in 350 B.C

A. Thalys

B. Ptolemy

C. Aristotle

D. Copernicus

Answer: C



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58. CHOOSE THE ODD ONE OUT:

A. Specific gravity

B. Strain

C. refractive index

D. Planck's constant

Answer: D



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59. CHOOSE THE ODD ONE OUT:

A. Absolute Error

B. Relative Error

C. Percentage Error

D. Gross Error

Answer: D



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60. CHOOSE THE ODD ONE OUT:

- A. Solar clock
- B. Electronic Oscillators
- C. Radio active dating
- D. Electronic balance

Answer: D



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61. CHOOSE THE ODD ONE OUT:

A. Energy

B. Weork

C. Torque

D. Force

Answer: D



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62. CHOOSE THE ODD ONE OUT:

A. length

B. Mass

C. Time

D. Volume

Answer: D



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63. CHOOSE THE ODD ONE OUT:

A. f.p.s

B. c.g.s

C. m.k.s

D. r.m.s

Answer: D



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64. CHOOSE THE ODD ONE OUT:

A. Optics

B. Acoustics

C. Astrophysics

D. Nuclear Physics

Answer: D



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65. CHOOSE THE ODD ONE OUT:

A. Force constant

B. Planck's constant

C. Boltzmann constant

D. Refractive Index

Answer: D



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66. CHOOSE THE INCORRECT PAIR:

A. Work-Energy

B. Stress-Pressure

C. Force-Tension

D. Surface Tension-Force

Answer: D



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67. CHOOSE THE INCORRECT PAIR:

A. Velocity -Angular velocity

B. Force-Torque

C. Mass-Moemnt of Inertia

D. Frequency-Wavelength

Answer: D



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68. CHOOSE THE INCORRECT PAIR:

A. Density-Relative Density

B. Strain-refractive Index

C. $\pi - e$

D. Planck's constant-Stefan's constant

Answer: D



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69. CHOOSE THE INCORRECT PAIR:

A. Heat-Energy

B. Mass-Inertia

C. Charge-Current

D. Moment of force-Torque

Answer: C



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70. CHOOSE THE CORRECT PAIR:

A. 30.00-2009

B. 0.00345-2.6

C. 0.040500-20100m

D. 153-3072

Answer: A



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71. CHOOSE THE CORRECT PAIR:

A. Telescope-Microscope

B. Screw gauge-Radar Method

C. Parallax Method -Vernier Caliper

D. Spring balance -Common balance

Answer: D



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72. CHOOSE THE CORRECT PAIR:

A. Torque-Nm

B. Planck's constnat-J/s

C. Specific heat - $Jkgk^{-1}$

D. Momentum of Inertia - kg / m^2

Answer: A



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73. Assertion: Attempting to explain diverse physical phenomena with a few concepts and laws is unification.

Reason: Attempting to explain a macroscopic system in terms of its microscopic constituents is reductionism.

A. Assertion and reason are correct and

Reason is correct explanation of

Assertion.

B. Assertion and Reason are true but

Reason is the false explanation of the

Assertion

C. Assertion is true but Reason is false

D. Assertion is false but Reason is true

Answer: B



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74. Assertion: Study of light is called optics

Reason: Properties of light is studied in optics.

They are Reflection, Refraction etc.

A. Assertion and Reason are correct and Reason is correct explanation of Assertion.

B. Assertion and Reason are true but Reason is the false explanation of Assertion.

C. Assertion is true but Reason is false.

D. Assertion is false but Reason is true.

Answer: A



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75. Assertion: Quantities that can be expressed in terms of fundamental quantities are derived quantities.

Reason: Examples are Mass, Length, Time etc.



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76. Assertion: In centimeter the spelling meter is internationally accepted.

Reason: Metre is internationally used unit whereas meter is used by Americans.



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77. Assertion: Mass due to rotational motion is moment of Inertia.

Reason: Rotational mass explains about radius of Gyration.



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78. Assertion: Very large distances such as distance of a planet or star can be measured by parallax method.

Reason: For measuring small masses of atomic/ sub-atomic particles, mass spectrograph is used.



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79. Assertion: The least value that can be measured using screw gauges, vernier calipers is called least count.

Reason: The magnitude of difference between the true value and the measured value is called relative error or fractional error.



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80. Assertion: The rounding off of 27.653 upto 3 digits is 27.7

Reason: 10200 has three significant figures

A. Assertion and Reason are correct and Reason is correct explanation of Assertion.

B. Assertion and Reason are True but Reason is the False explanation of the Assertion.

C. Assertion is true but Reason is false.

D. Assertion is false but Reason is true.

Answer: d



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81. Assertion: Dimensional analysis method is used to convert a physical quantity from one system of units to another.

Reason: $\frac{1}{2}mv^2 = mgh$

A. Assertion is true but Reason is false.

B. Assertion is false but Reason is true.

C. Assertion and Reason are correct and

Reason is correct explanation of

Assertion.

D. Assertion and Reason are true but Reason is the false explanation of Assertion.

Answer: d



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82. (I) RADAR method is used for measurement of length in the case of long distances

(II) The uncertainty in a measurement is called

error:

Which statement is correct?

A. I only

B. II only

C. Both are correct

D. None

Answer: C



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83. (I) $G_{CGS} = 6.6 \times 10^{-8} \text{ dyne } Cm^2g^{-2}$

(II) $T = 2\pi \sqrt{\frac{g}{l}}$

Which statement is correct?

A. I only

B. II only

C. Both are correct

D. Non

Answer: A



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84. (I) Expression for charge is current/time

(II) Expression for Faraday constant is

Avagadro constant \times elementary charge

Which statement is correct?

A. I only

B. II only

C. Both are correct

D. None

Answer: B



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85. (I) Force constant and Faraday constant are examples for Dimensional constant

(II) Radius of gyration does not depend on moment of Inertia.

Which statement is incorrect?

A. I only

B. II only

C. Both are correct

D. None

Answer: B



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86. (I) The ratio of mean absolute error to the mean value is called fractional error

(II) Due to the wrong observations Recording, Random errors occur.

Which statement is correct?

A. I only

B. II only

C. Both are correct

D. None

Answer: A



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87. (I) Distance of moon from earth is 10^{11} m

(II) Mass of a cell is 10^{-10} kg

Which statement is incorrect?

A. I only

B. II only

C. Both are correct

D. None

Answer: A



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88. (I) Least count of screw gauge is 0.01 mm

(II) Least count of vernier calliper is 0.1mm

Which one is correct?

A. I only

B. II only

C. Both are correct

D. None

Answer: C



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89.

(I) Parallax

angle

$$\theta = \frac{\text{Unknown distance}(x)}{\text{base}(b)}$$

(II) Distance of the planet

$d = \text{Velocity of radio wave } (V^e) \times \text{time taken } (t)$

Which statement is incorrect?

A. I only

B. II only

C. Both are correct

D. None

Answer: A



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90. (I) Frequency and angular velocity has same dimensional formula

(II) Torque is also called as rotational force

Which one is correct?

A. I only

B. II only

C. Both are correct

D. None

Answer: C



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91. Check the dimensional correctness for the given equation.

(a) $v = u + at$

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



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92. Round off to required significant figures.

a. $3.1 + 1.780 + 2.046$ b. $12.637 - 2.42$

c. 1.21×36.72 d. $36.72 \div 1.2$



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93. What are random errors? How to minimise it?



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94. Write down the number of significant figures in the following (i) 0.007 (ii) 400



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95. What are the advantages of SI system?



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96. What is the fractional error?



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97. What is science?



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98. What are the steps involved in scientific method? (or) What are the general features of scientific method?



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99. What is the Physics?



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100. What is mechanics?





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101. Write a note on scope of physics.



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102. What is MKS system?



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103. What is the aim of our Science Education?





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104. Name three practical units to measure mass.



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105. Define Solar Year.



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106. What is Leap year?



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107. Name three practical units to measure Area.



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108. What is the importance of physical quantity? What are its types?



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109. Define unit of a physical quantity.



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110. What are the things needed to express the measurement of a physical quantity?



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111. Name the prefixes for powers of ten with its symbol.



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112. Name four units to measure extremely small distances.



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113. Name three units to measure extremely large distances.



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114. What is an error? Name the three Errors in Measurement.



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115. What is Absolute Error.



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116. What is Mean Absolute error?



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117. What is Relative error?



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118. What is Percentage error?



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119. What is significant figures?



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120. What is meant by the dimensions of a physical quantity?



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121. What are Dimensional variables? Give example.



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122. What is meant by Dimensionless variables? Give example.



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123. Define Dimensional Constant. Give example.



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124. What is meant by Scientific method?



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125. What do you mean by unification and reductionism?



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126. What is Classical mechanics?



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127. What is Thermodynamics?



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128. What is the meaning of Acoustics?



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129. What is Astrophysics?



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130. What is meant by Quantum mechanics?



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131. Which branches of physics deal at the level of atom & nucleus?



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132. What are types of discoveries in physics?



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133. What is meant by Range of time scales?



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134. What is meant by Range of masses?



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135. How physics is related to technology and define technology with respect to Physics.



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136. In what ways physics is in relation to astronomy?



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137. Define the SI unit of length.



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138. Define the SI unit of mass (or) What is one kilogram in SI system of units?



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139. Define the SI unit of time. (or) What is one second in SI system of units?



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140. Define the SI unit of electric current. (or)
What is one second in SI system of units? (or)
Define one ampere (S.I standard for current)



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141. What is the SI unit of temperature and define it? What is one kelvin in SI system of units?



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142. What is the SI unit of amount of substance?

(or) What is one mole in SI system of units?

(or) Define one mole (S.I standard for amount of substance)



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143. What meant by one candela? And Which base quantity is measured by this unit? (or) Define one candela (S.I standard for Luminous intensity)



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144. What is meant by the triple point of water?



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145. What is meant by Parallax?



[Watch Video Solution](#)

146. What is 1 Light year?



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147. Define a Astronomical Unit.





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148. What is parsec? (or) Define one parsec (parallactic second)



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149. Why is the cylinder used in defining kilogram made up of platinum-iridium alloy?



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150. Write the largest and the smallest practical unit of mass and time respectively.

(or) define Chandrasekar Limit (CSL)



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151. Define mass



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152. Write the masses of tiny as well as huge matter?



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153. Write the methods to determine the masses of objects?



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154. What is clock? Write the principle and its types.



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155. Which units are used to measure large distance i.e. distance of planets and stars?

Which method is used for measurement?



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156. Is it possible to have length and velocity both as fundamental quantities? Why?



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157. Which of these unit is largest: AU, light year and parsec. Express the average distance of earth from the sun in (i) light year (ii) per sec.



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158. The radius of gold nucleus is 41.3 Fermi. Express its volume in m^3



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159. Describe the relation of Physics with mathematics



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160. What is the difference between Accuracy and Precision?



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161. Describe the Personal errors.





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162. Describe the errors due to external causes.



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163. What is dimensionai equation? Given an example.



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164. Define FPS system of units.



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165. Define CGS system of units.



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166. Define MKS system of units.



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167. Define one radian (S.I standard for plane angle)



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168. Define one steradian(S.I standard for solid angle)



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169. Write a note on radar method to measure larger distances.



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170. The voltage across a wire is $(100 \pm 5)v$ and the current passing through it is $(10 \pm 0.2)A$.



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171. Check the correctness of the equation $E = mc^2$ using dimensional analysis method.



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172. Two resistances $R_1(100 \pm 3)\Omega$ and $R_2 = (150 \pm 2)\Omega$ are connected in series. What is their equivalent resistance?



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173. Find the dimensional formula of hC/G .



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174. Given any application of physics in our society.



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175. What are fundamental quantities and derived quantities?



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176. What are fundamental units and derived units?



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177. Define the SI unit of electric current. (or)

What is one second in SI system of units? (or)

Define one ampere (S.I standard for current)



[Watch Video Solution](#)

178. What is meant by one candela? And which

base quantity is measured by this unit? (or)

Define one candela (S.I standard for Luminous intensity)



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179. Give the values for the following units with prefixes

(i) 1 Mega ohm (ii) 1 milliampere

(iii) 1 deca ram (iv) 1 nano second

(v) 1 micro volt (vi) 1 centimetre.



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180. What are the advantages of SI system?



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181. Distinguish between fundamental and derived units.



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182. Given any three practical units of time.



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183. What is Gross Error & How can it be minimised?



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184. Explain Random errors.



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185. Explain unification with example.





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186. Explain reductionism with example.



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187. How are theoretical predictions useful?



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188. In what way physics is exciting us?





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189. Write the role of Physics in Technology.



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190. In what way Physics is in relation to Chemistry.



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191. What is the relation of Physics to Biology?



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192. How is physics useful in geology and oceanography? (or) Describe the relation of Physics with geology.



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193. How can the systematic errors be minimised?



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194. What are systematic errors? (or) What are the Classifications of Systematic errors?



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195. Describe the relation of Physics with Psychology.



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196. Describe Instrumental errors. How is it minimised?



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197. Write a note on parallax method.



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198. The force F acting on a body moving in a circular path depends on mass of the body (m) velocity(v) and radius (r) of the circular path. Obtain the expression for the force by dimensional analysis method ($k = 1$)



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199. Obtain an expression for the time period T of a simple pendulum. [The time period T depend upon (i) mass l of the bob (ii) length m of the pendulum and (iii) acceleration due to gravity g at the place where pendulum is suspended.]

Assume the constant $k = 2\pi$



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200. In a series of successive measurements in an experiment, the readings of the period of oscillation of a simple pendulum were found to be 2.63s, 2.56s, 2.42, 2.71s and 2.80 s`.

Calculate

- (i) the mean value of the period of oscillation
- (ii) the absolute error in each measurement
- (iii) The mean absolute error (iv) the relative error (v) the percentage error. Express the results in proper form.



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201. Give some examples for different branches of modern science.



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202. Discuss the relation of physics with other branches of science.



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203. Explain propagation of errors in the difference of two quantities and also in the division of two quantities.



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204. Write to causes of errors in measurement.



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205. Write the rules of "Rounding off" with example.



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206. Write the rules for determining significant figures.



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207. Find the value of one AU in 1000 km

A. $1.5 \times 10^5 m$

B. $2.5 \times 10^6 m$

C. $1.5 \times 10^{11} m$

D. $2.5 \times 10^{10} m$

Answer: A



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208. How many AU present in one light year?

A. $6.30 \times 10^4 m$

B. $9.46 \times 10^{15} m$

C. $6.2 \times 10^2 m$

D. $9.4 \times 10^{16} m$

Answer: A



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209. How many μm present in one metre?

A. $10^{-6} \mu m$

B. $10^6 \mu m$

C. $10^{-3} \mu m$

D. $10^{-2} \mu m$

Answer: B



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210. Express the derived unit of pressure



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211. What is the formula representation of mean Absolute error?



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212. The speed of an object $v = 40ms^{-1}$. The same quantity of speed in kmh^{-1} is

A. 60

B. 160

C. 40

D. 144

Answer: D



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213. The speed of an object $v = 90k \frac{m}{h}$. The same quantity of speed in m/s is

A. 90

B. 25

C. 45

D. 180

Answer: B



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214. 3.5 kg mass of a metal plate has the volume of $1.5m^3$. Find the density of metal plate.

A. $1.5kgm / s^{-3}$

B. $2.3kg / m^3$

C. $3.4\text{kg}/\text{m}^3$

D. $4.8\text{kg}/\text{m}^3$

Answer: B



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215. The value of 1° is

A. $1.745 \times 10^{-2}\text{rad}$

B. $1.946 \times 10^{-11}\text{rad}$

C. 3.6rad

D. 3600 rad

Answer: A



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216. How many parsec are there in one kilometer?

A. 3.084×10^{-16}

B. 3008×10^8

C. 3.24×10^{-14}

D. None

Answer: C



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217. The angle of an object is 18.2° . What is the angular diameter of the object in radians?

A. 36.4 rad

B. 3.64×10^{-2} rad

C. 31.74×10^{-2} rad

D. 3.17rad

Answer: C



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218. If a circle with 10 m radius and angle 60° at centre, then what will be the length of arc?

A. 5.24m

B. 6.21m

C. 7.1mm

D. 10.46m

Answer: D



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219. The mass of an iron sheet is 0.250 kg and volume of the sheet is $1.5m^3$. Then what is the density of the iron sheet? Express the result in SI unit system.

A. $0.267kgm^{-3}$

B. 0.167kgm^{-3}

C. 0.255kgm^{-3}

D. 0.285kgm^{-3}

Answer: B



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220. What is the SI unit of linear momentum?

A. ms^{-1}

B. ms^{-2}

C. $kgms^{-1}$

D. kgm^2s^{-1}

Answer: C



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221. What is the SI unit of Area?

A. m

B. m^2

C. Nm^{-1}

D. cm^{-1}

Answer: B



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222. SI unit of the universal constant of gravitation

A. $kg^{-2}m^{-2}$

B. $kgms^{-1}$

C. Nm^2kg^{-2}

D. Nm^{-1}

Answer: C



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223. Using a screw gauge the thickness of a wire was measured as 5 mm. Calculate (i) the fractional error (ii) the percentage error.

Given data:

Thickness of wire (t) = 5 mm

Accuracy $\Delta t = 0.01mm$



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224. If a mass of a proton is $1.67 \times 10^{-27} \text{ kg}$,
how many protons will be present in 1 kg?

Given data:

Mass of a proton = $1.67 \times 10^{-27} \text{ kg}$

$1.67 \times 10^{-27} \text{ kg}$ is mass of 1 proton.



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225. Calculate angle of 1 second of arc.



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226. The radius of a nucleus is $1.5 \times 10^{-15} m$ of the order fermi. Find the volume of the nucleus.



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227. A beam of metal has length, breadth and height as 4m, 3m and 5m respectively. Then what will be the volume of the metal beam? Express the result in SI unit system.



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228. Find the SI unit of moment of inertia. 5.64 kg mass of a object is moving uniformly. The radius of gyration is measured as 30 cm of an object. Then what is the moment of Inertia?



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229. The ratio of stresses and strain of a wire is 3:2. Find the co-efficient of elasticity. Express the result in SI unit system.



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230. In the following physical units, how many units are there in 1 metre?

(i) 1 Astronomical unit ($AU = 1.496 \times 10^{11}m$)

(ii) 1 light year $= 9.467 \times 10^{15}m$

(iii) 1 micron (μ) $= 10^{-6}m$

(iv) 1 parallacti second (parsec)

$$= 3.08 \times 10^{16}m$$

Given data:

$$1Au = 1.496 \times 10^{11}m$$

$$1ly = 9.467 \times 10^{15}m$$

$$1\text{mm} = 10^{-6}m$$

$$1\text{ parsec} = 3.08 \times 10^{16}m$$



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231. How many parallaxic second are there in one Astronomical unit?

$$1\text{ parallaxic second} = 3.08 \times 10^{16}m$$

$$1\text{ Astronomical unit} = 1.496 \times 10^{11}m$$



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232. If mass of an electron is 9.11×10^{-31} kg, how many electrons would weigh in 1 mg?

Given data:

$$\text{Mass of an electron} = 9.11 \times 10^{-31} \text{ kg}$$

$$= 9.11 \times 10^{-31} \text{ kg is the mass of 1 electron}$$



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233. The unit of length convenient on the atomic scale is known as angstrom and is denoted by Å. The size of a helium atom is

about 30 pico meter. What is the total atomic volume in metre^3 of one mole of helium atom?



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234. The radius of the platinum atom in a nucleus is 60.2 fermi. Find the volume of the nucleus.

Why fermii is used to measure size of a nucleus?



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235. Monica was watching the night sky. She saw a star , moving towards her, with increase in brightness. After some few minutes when she watched closely, she found it was the light from a flight in the sky. Whe was surprised, but initially the flight looked stationary, after soem time it was glowing brightly miving towards her. So she went and asked her father. Why this effect occured?



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236. Is RADAR used in launching a missile from the ground to hit the target (i.e. fight aircraft)?



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237. Why has second been defined in terms of periods of radiations from cesium -133?



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238. How many Astronomical units are there in one light year?

Given Data:

$$1 \text{ Astronomical unit} = 1.496 \times 10^{11} m$$

$$1 \text{ light year} = 9.46 \times 10^{15} m$$



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239. When the planet Jupiter is at a distance of 824.7 million kilometers from the earth, its

angular diameter is measured to be 35.72 of arc. Calculate the diameter of Jupier.



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240. In a submarine fitted with a SONAR the time delay between generation of a signal and reception of its echo from an enemy ship is 110.3 seconds. If speed of sound in water is 1450ms^{-1} then caculate the distance of the enemy ship from the submarine.



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241. In an ocean surveillance system of a ship fitted with a (RADAR) the time delay between generation of a radio wave reflected from an enemy ship is observed to be 5.6s. Calculate the distance of the enemy ship from the surveillance ship.



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