



PHYSICS

BOOKS - PREMIERS PUBLISHERS

NATURE OF PHYSICAL WORLD AND MEASUREMENT

Textbook Questions Answers | Multiple Choice Questions

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

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. 8 %

B. 2 %

C. 4 %

D. 6 %

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. 4 %

B. 5 %

C. 6 %

D. 7 %

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. 351 %

B. 1 %

C. 0.28 %

D. 0.035 %

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. 9.860

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 $(\mu_0 \epsilon_0)^{-\frac{1}{2}}$ is

A. length

B. time

C. velocity

D. force

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. $\frac{\sqrt{hG}}{c^{\frac{3}{2}}}$

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

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?

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

$$\text{B. } l = \sqrt{\frac{\epsilon k_0 T}{n q^2}}$$

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

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

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

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

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

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

Answer: B



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Textbook Questions Answers | Short Answer Questions

1. Briefly explain the types of physical quantities.



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2. How will you 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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1. (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. Write a note on triangulation method and radar method to measure larger distances.



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3. Explain in detail the various types of errors.



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4. What do you mean by propagation of errors?

Explain the propagation of errors in addition and multiplication.



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5. Write short notes on the following.

(i) Unit



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6. Write short notes on the following.

(ii) Rounding - off



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7. Write short notes on the following.

(iii) Dimensionless quantities.



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8. Explain the principle of homogeneity of dimensions.

What are its uses? Given example.



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Textbook Questions Answers Iv 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 1460m s^{-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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Textbook Questions Answers V 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 is more useful. Explain.



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Other Important Questions Answers | Multiple Choice Questions

1. Any scientific method involves :

- (i) controlled experimentation
- (ii) calculation of values with least accuracy
- (iii) systematic observation

(iv) mathematical modeling

Which of the following statements are correct?

A. (i), (ii) and (iii) are correct

B. (i), (ii) and (iv) are correct

C. (i), (iii) and (iv) are correct

D. (i) and (ii) are correct

Answer: C



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2. The word physics is derived from Meaning nature.

A. to know

B. fuis

C. knowing the truth

D. prediction

Answer: B



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3. Which of the following is true?

A. dealing with non - living things

B. dealing with living things

C. study with atomic level

D. both (a) and (b)

Answer: A



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

A. unification

B. macrocosm

C. reductionism

D. microcosm

Answer: C



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5. Special theory of relativity is a branch of Physics. It does not deal with:

A. space

B. motion of plantes

C. mass

D. time

Answer: B



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6. The fraction of $\frac{1}{273.16}$ of temperature of the triple point of water is expressed in Scale of temperature.

A. celsius

B. fahrenheit

C. centigrade

D. kelvin

Answer: D



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7. Which one of the following statement correct

- A. Time and mass
- B. Length and time
- C. Area and volume
- D. Mass and time

Answer: C



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8. Which of the following is wrong matched?

- A. Chemistry - arrange elements in periodic table
- B. Geology - crystal structure of various rocks
- C. Oceanography - movements of neurotransmitters
- D. Biology - electron microscope

Answer: C



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9. System of units was accepted by the scientists of the general conference on weights and measures.

A. FPS

B. CGS

C. MKS

D. SI

Answer: D



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10. A source having luminous intensity of one candela emits monochromatic radiation of frequency is :

A. $5.4 \times 10^{14} Hz$

B. $54 \times 10^{14} Hz$

C. $4.5 \times 10^{14} Hz$

D. $\frac{1}{683} Hz$

Answer: A



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11. When a current of 1 ampere flowing through two parallel straight conductors : What amount of force per unit length acts between the conductors?

A. $1 \times 10^{-7} N$

B. $2 \times 10^{-7} N$

C. $3 \times 10^7 N$

D. $4 \times 10^{-7} N$

Answer: B

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12. Match the following physical quantities with respect to relative units:

Column I	Column II
1. Magnetic flux	(i) joule
2. Resistance	(ii) weber

3. Time	(iii) watt
4. Energy	(iv) second
	(v) ohm
	(vi) ohm-metre

A. 1 - (iv), 2 - (v), 3 - (iv), 4 - (ii)

B. 1 - (ii), 2 - (v), 3 - (vi), 4 - (i)

C. 1 - (v), 2 - (i), 3 - (iv), 4 - (vi)

D. 1 - (ii), 2 - (v), 3 - (iv), 4 - (i)

Answer: D



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13. One pico farad is equal to Farad.

A. 10^{-18}

B. 10^{-12}

C. 10^{-6}

D. 10^{-24}

Answer: B



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14. Match the following :

Column I	Column II
1. Atto	(i) 10^{-15}
2. Fermi	(ii) 10^{18}
3. Femto	(iii) 10^6
4. Micro	(iv) 10^{-13}
	(v) 10^{-18}
	(vi) 10^{-6}

A. 1 - (vi), 2 - (iii), 3 - (ii), 4 - (v)

B. 1 - (iv), 2 - (i), 3 - (vi), 4 - (v)

C. 1 - (v), 2 - (iv), 3 - (i), 4 - (vi)

D. 1 - (v), 2 - (ii), 3 - (i), 4 - (iii)

Answer: C



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15. The value of Planck's constant is _____.

A. joule per second

B. joule second

C. metre per second

D. watt second

Answer: B



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16. Universal time is based on :

A. rotation of the earth on its own axis

B. earth's orbital motion around the sun

C. vibration of cesium atom

D. oscillation of quartz clock

Answer: C



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17. 1 pascal is equal to :

A. $1Nm^{-2}$

B. $1Jm^{-2}$

C. $1Nm^{-1}$

D. $1Jm^{-1}$

Answer: A



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18. Choose the correct statement from the following statements :

A. S.I. unit of gravitational potential is J sec

B. S.I. unit of gravitational potential is J kg

C. S.I. unit of gravitational potential is Watt metre

D. S.I. unit of gravitation potential is J kg^{-1}

Answer: D



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19. Which one of the following doesn't has the same unit as others?

A. J - sec

B. watt - sec

C. kWh

D. eV

Answer: A



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20. Which of the following statements are correct?

(i) A physical quantity cannot be measured

(ii) A physical quantity can be measured

(iii) The units of physical quantity can be derived

(iv) A physical quantity can neither be a scalar nor a vector

A. (i) and (ii)

B. (ii) and (iii)

C. (i) and (iv)

D. (ii) and (iv)

Answer: B



21. Inertia has the same unit as:

A. weight

B. force

C. mass

D. acceleration

Answer: C

22. Which of the following pairs of quantities and their units is a proper match?

A. Electric charge - C

B. Pressure - Pa

C. Power - JS^{-1}

D. Moment of inertia - kgm^{-2}

Answer: D



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23. Choose the odd man out from the following physical quantities:

A. Mass

B. Length

C. Velocity

D. Time

Answer: C



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24. Which one of the following relations is wrong?

A. 1 fermi = $10^{-14}m$

B. 1 nanometer = $10^{-9}m$

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

D. 1 parsec = 3.26 light year

Answer: A



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25. 1 CSL is the largest practical unit of :

A. time and length

B. mass only

C. temperature and mass

D. intensity of radiation and length

Answer: B



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26. Match the physical quantities in column I with their S.I. units in column II.

Column I	Column II
1. Magnetic permeability	(i) watt / metre ² / (kelvin) ⁴
2. Power	(ii) newton metre ² / (kg) ²
3. Stefan's constant	(iii) watt metre ²
4. Gravitational constant	(iv) henry metre
	(v) henry/metre
	(vi) watt

A. 1 - (i), 2 - (vi), 3 - (v), 4 - (ii)

B. 1 - (ii), 2 - (v), 3 - (vi), 4 - (i)

C. 1 - (v), 2 - (vi), 3 - (i), 4 - (ii)

D. 1 - (v), 2 - (i), 3 - (ii), 4 - (iii)

Answer: C



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27. 1 minute =rad.

A. 1.745×10^{-2}

B. 4.85×10^{-6}

C. 1.91×10^{-4}

D. 2.91×10^{-4}

Answer: D



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

(II) Least count of vernier calliper is 0.1mm

Which one is correct?

A. 0.01 mm

B. 0.01 cm

C. 0.1 mm

D. 1 cm

Answer: A



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29. From the following statements, choose the incorrect statement:

A. Sonar emits ultra sound waves

B. The size of galaxy is 10^{-2} metre.

C. Sonar emits radio waves

D. The length of a typical virus is 10^{-8} m

Answer: C



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30. Least count of metre scale is :

A. 1 cm

B. 0.1 cm

C. 1 mm

D. 0.1 mm

Answer: C



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31. The ratio of the dimension of planck constant and that of moment of inertia is the dimension of

A. time

B. frequency

C. velocity

D. angular momentum

Answer: B



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32. Select the incorrect statement from the following

statements :

(i) The radius of a rain drop is $10^{-6}m$

(ii) The mass of a neutron is $10^{27}kg$

(iii) The average distance of Pluto's orbit is $10^{12}m$

(iv) The diameter of the hydrogen atom is $10^{-10}m$

- A. Statements (i) and (ii) are incorrect
- B. Statements (ii) and (iii) are incorrect
- C. Statement (ii) only incorrect
- D. Statements (ii) and (iv) are incorrect

Answer: C



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33. The angle subtended by a coin of radius 1 cm held at a distance of 80 cm from your eyes is :

- A. 1.25 rad

B. 0.125 rad

C. 0.0125°

D. 0.025°

Answer: B



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34. The density of a liquid in CGS system is $0.625g/cm^3$. What is its magnitude in SI system?

A. $625kg/m^3$

B. $0.0625kg/m^3$

C. $0.0625\text{kg} / \text{m}^3$

D. $0.00625\text{kg} / \text{m}^3$

Answer: A



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35. From the following units, select the odd man out.

A. Light year

B. Astronomical unit

C. Parsec

D. CSI (Chandrasekar's limit)

Answer: D



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36. If $1 \text{ g cm s}^{-1} = x \text{ newton-second}$, then the number x is equal to:

A. 10^5

B. 10^{10}

C. 10^{15}

D. 10^{-5}

Answer: D



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37. Which one of the following is not the unit of energy ?

- A. Light year
- B. Astronomical unit
- C. Parsec
- D. all of the above

Answer: D



38. The respective number of significant figures for the number 13.013, 0.0003 and 9.1×10^{-3} are respectively:

A. 5, 1, 2

B. 5, 4, 5

C. 5, 5, 2

D. 5, 1, 3

Answer: A



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39. A student measured the length of a wire and wrote it as 2.50 cm. Which instrument did he/she use to measure it?

A. a screw gauge having 50 divisions in the circular scale and pitch as 1 mm.

B. a meter scale

C. a vernier caliper where the 10 divisions in vernier matches with a division in main scale.

D. a screw gauge having 100 divisions in the circular scale and pitch as 1 mm.

Answer: B



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40. If the error in the measurement of radius of a sphere is 3 % then the error in the measurement of volume of the sphere will be :

A. 4 %

B. 6 %

C. 2 %

D. 9 %

Answer: D



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41. The diameter of the steel ball is measured using a vernier caliper which has divisions of 0.1 cm on its main scale and 10 divisions of its vernier scale match 9 divisions on the main scale. Three such measurements for a ball are as follows.

S.No	MS (cm)	VS (divisions)
1	0.5	8
2	0.5	4
3	0.5	6

If the zero error is 0.03cm , then mean corrected diameter is cm.

A. 0.56

B. 0.53

C. 0.59

D. 0.52

Answer: C



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42. If $A = 2.331\text{cm}$ and $C = 2.1\text{cm}$, then

$A + C = \dots\dots\dots\text{cm}$.

A. 4.4

B. 4

C. 4.43

D. 4.431

Answer: A



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43. Match the following units given in the column I with dimensions in the column II.

Column I	Column II
1. joule	(i) $M^1L^{-1}T^{-2}$
2. watt	(ii) $M^0L^0T^{-1}$
3. pascal	(iii) M^0LT^{-2}
4. hertz	(iv) $M^1L^2T^{-3}$
	(v) $M^0L^{-1}T^0$
	(vi) $M^1L^2T^{-2}$

A. 1 - (vi), 2 - (iv), 3 - (i), 4 - (ii)

B. 1 - (v), 2 - (iv), 3 - (ii), 4 - (vi)

C. 1 - (vi), 2 - (i), 3 - (v), 4 - (ii)

D. 1 - (iv), 2 - (iii), 3 - (vi), 4 - (i)

Answer: A



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44. The least count of stop watch is 0.5s. The time of 40 oscillation of the pendulum is found to be 40s. The percentage error in the measurement of time period is %

A. 0.75

B. 0.5

C. 1.25

D. 0.25

Answer: C



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45. Assertion : SI system of units is a coherent system of units.

Reason : In this system, all the derived units can be easily obtained from basic and supplementary units.

A. Assertion is true and reason is false

B. Assertion is false and reason is true.

C. Assertion is true and reason is the correct explanation of assertion

D. Assertion is true and reason is true but not the correct explanation of assertion.

Answer: C

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46. The sum of the numbers 436.32, 227.2 and 0.301 in appropriate significant figure is :

A. 663.82

B. 663.8

C. 664

D. 6663.82

Answer: C



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47. Gross error can be eliminated by :

A. careful observation and mental alert

B. eliminating the cause

C. taking mean

D. measuring with more than one instrument

Answer: A



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48. The unit of permittivity of free space, ϵ_0 is

A. $\text{Coulomb}^2 / (\text{Newton} - \text{metre})^2$

B. $\text{Coulomb} / \text{Newton} - \text{metre}$

C. $\text{Newton} - \text{metre}^2 / \text{Coulomb}^2$

D. $\text{Coulomb}^2 / \text{Newton} - \text{metre}^2$

Answer: D



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49. High precision instruments are used to eliminate
..... Error.

- A. personal
- B. random
- C. chance
- D. least count

Answer: D



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50. Assertion : The length of a cylinder is 23.8 cm. In this measurement there are three significant figures.

Reason : The same length when expressed in millimeter as 23800 mm has four significant figures.

Which of the following is correct?

A. Assertion is true and reason is true.

B. Assertion is true and reason is false

C. Assertion is true and reason is correct explanation for assertion.

D. Assertion is true and reason is true but it is not correct explanation for assertion.

Answer: B



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51. Round off to the number 12.653 upto 3 digits:

A. 12.5

B. 12.0

C. 12.7

D. 12.6

Answer: C



Watch Video Solution

52. If $f = x^2$, then the relative error in f is :

A. $\frac{2\Delta x}{x}$

B. $\frac{(\Delta x)^2}{x}$

C. $\frac{\Delta x}{x}$

D. $(\Delta x)^2$

Answer: A



Watch Video Solution

53. The length and breadth of a rectangle are 6.01 m and 12 m. Taking the significant figure into account the area of the rectangle is :

A. $72.00m^2$

B. $72.1m^2$

C. $72m^2$

D. $72.12m^2$

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Watch Video Solution

54. Which of the following digits are significant?

A. zero digits

B. zeros at the end without a decimal point

C. all zeros between two non - zeros digits,
irrespective of the decimal point

D. all the above

Answer: C



Watch Video Solution

55. Column I gives three physical quantities. Select the appropriate units for the choices given in column II.

Some of the physical quantities may have more than one choice correct.

Column I

Column II

1. Inductance

(i) Ohm (second)

2. Magnetic induction

(ii) Coulomb² (joule)⁻¹

3. Capacitance

(iii) Coulomb (volt)⁻¹

(iv) Newton (ampere metre)⁻¹

(v) Volt second (ampere)⁻¹

A. 1 - (iv), 2 - (iii), 3 - (ii) and (i)

B. 1 - (i) and (v), 2 - (iv), 3 - (ii) and (iii)

C. 1 - (ii) and (v), 2 - (i) and (ii), 3 - (i) and (v)

D. 1 - (iv) and (v), 2 - (ii), 3 - (iii) and (iv)

Answer: B



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56. The dimensional formula for relative density is :

A. ML^{-3}

B. M^0L^{-3}

C. $M^0L^0T^0$

D. $M^0L^0T^{-1}$

Answer: C



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57. The dimensions of Hubble's constant are :

A. $[M^0 L^0 T]$

B. $[M^0 L^0 T^{-1}]$

C. $[MLT^2]$

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

Answer: B



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

A. energy

B. power

C. angular momentum

D. momentum

Answer: C



Watch Video Solution

59. Match the physical quantities given in column I with dimensions given in column II. (Dimension of

charge is Q)

Column I	Column II
1. Torque	(i) ML^2T^{-1}
2. Resistivity	(ii) L^2T^{-2}
3. Angular momentum	(iii) ML^2Q^1
4. Latent heat	(iv) $M^1L^2T^{-2}$
	(v) $ML^3T^{-1}Q^{-2}$
	(vi) $M^1L^2T^{-1}$

A. 1 - (iv), 2 - (iv), 3 - (v), 4 - (ii)

B. 1 - (v), 2 - (iv), 3 - (ii), 4 - (i)

C. 1 - (vi), 2 - (v), 3 - (i), 4 - (ii)

D. 1 - (v), 2 - (i), 3 - (ii), 4 - (iii)

Answer: C



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60. Select the odd man out from the following parameters.

A. Velocity gradient

B. Wave number

C. Decay constant

D. Linear frequency

Answer: B



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61. Dimensions of impulse are :

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

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

C. $[ML^{-1}T^{-3}]$

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

Answer: B



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62. Of the following Has dimensions.

A. strain

B. angle

C. gravitational constant

D. refractive index

Answer: C



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63. Have the same dimensional formula.

A. Force and momentum

B. Density and linear density

C. Light year and wavelength

D. Stress and strain

Answer: C



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64. Which of the following is dimensional constant?

- A. Refractive index
- B. Poisson's ratio
- C. Strain
- D. Gravitational constant

Answer: D



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65. A wire has a mass $0.3 \pm 0.003g$ radius $0.5 \pm 0.005mm$ and length $6 \pm 0.06cm$. The maximum percentage error in the measurement of its density is :

A. 3

B. 4

C. 5

D. 2

Answer: B



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66. The dimension of a quantity $\frac{h\gamma}{c}$ where h is the planck's constants, γ is the frequency and c is the velocity of light are :

A. MT^{-1}

B. MLT^{-1}

C. MLT^{-2}

D. ML^2T^2

Answer: B



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67. In a particular system, the unit of length, mass and time are chosen to be 10cm , 10g and 0.1s respectively.

The unit of force in this system will be equivalent to

A. 0.1N

B. 1N

C. 10N

D. 100N

Answer: A



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68. The dimensional formula of the constant "a" in Vanderwaals gas equation is

$$\left(P + \frac{a}{V^2}\right)(V - b) = RT:$$

A. $ML^{-5}T^2$

B. ML^3T^{-2}

C. ML^2T^{-1}

D. ML^5T^{-3}

Answer: A



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69. Force F is given by $F = at + bt^2$. Where "t" is time.

What are the dimensions of "a" and "cb"?

A. MLT^{-1} and MLT^0

B. MLT^{-3} and MLT^{-4}

C. MLT^{-3} and MLT^4

D. MLT^3 and MLT^{-4}

Answer: B



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70. The radius of a sphere is measured as $(2.1 \pm 0.5) \text{ cm}$. Its surface area with error limits is :

A. $(55.4 \pm 23.4) \text{ cm}^3$

B. $(55.4 \pm 26.4) \text{ cm}^2$

C. $(55.4 \pm 22.4) \text{ cm}^2$

D. $(55.5 \pm 22.6) \text{ cm}^2$

Answer: B



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71. In an experiment four quantities, a, b, c and d are measured with % error 1%, 2%, 3% and 4% respectively. If the quantity A is calculated as $A = \frac{a^3 b^2}{cd}$ the % error in A is :

A. 4%

B. 28%

C. 14%

D. 7%

Answer: C



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72. The frequency of vibration ν of mass m suspended from a spring of spring constant k is given by $f = cm^x k^y$ where c is a dimensional constant. The volumes 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. $x = -\frac{1}{2}, y = -\frac{1}{2}$

Answer: C



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73. The dimensions of $\frac{1}{\sqrt{\mu_0 \epsilon_0}}$ are the same as those of:

A. force

B. acceleration

C. velocity

D. energy

Answer: C



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74. The dimensions of the quantities is one of the following pairs are the same. Identify the correct pair:

- A. Energy and Young's modulus
- B. Angular momentum and work
- C. Time period and frequency
- D. Torque and work

Answer: D



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75. The voltage across a lamp is (6.0 ± 0.2) volt and current that passes through it is (2.0 ± 0.1) ampere.

The power of the lamp in watt is :

A. (6 ± 0.1)

B. (12 ± 0.1)

C. (24 ± 0.1)

D. (4 ± 0.1)

Answer: B



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76. Which of the following will be the same dimension as that of time?

A. $\frac{L}{R}$

B. $\frac{C}{L}$

C. LC

D. $\frac{R}{L}$

Answer: A



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77. The dimensional formula for area is

A. $[M^2L^2T^2]$

B. $[MLT^2]$

C. $[M^0L^2T^2]$

D. $[M^0L^2T^0]$

Answer: D



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78. The dimensional formula for energy density is

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

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

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

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

Answer: C



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79. The dimensional formula for work is

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

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

C. $[MLT^2]$

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

Answer: D



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80. The dimensional formula for pressure is

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

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

C. $[MLT^2]$

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

Answer: B



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81. Special theory of relativity is a branch of Physics. It does not deal with:

A. space

B. motion of plantes

C. mass

D. time

Answer: B



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82. The fraction of $\frac{1}{273.16}$ of temperature of the triple point of water is expressed in Scale of temperature.

A. celsius

B. fahrenheit

C. centigrade

D. kelvin

Answer: D



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83. Which one of the following sets cannot enter into the list of fundamental quantities?

- A. Time and mass
- B. Length and time
- C. Area and volume
- D. Mass and time

Answer: C



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84. The dimensional formula for linear momentum is

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

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

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

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

Answer: C



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85. The dimensional formula for tension is

A. $[MLT]$

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

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

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

Answer: C



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86. The dimensional formula for surface tension is

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

B. $[ML^0T^{-2}]$

C. $[ML^0T^{-3}]$

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

Answer: B



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87. When a current of 1 ampere flowing through two parallel straight conductors : What amount of force per unit length acts between the conductors?

A. $1 \times 10^{-7} N$

B. $2 \times 10^{-7} N$

C. $3 \times 10^7 N$

D. $4 \times 10^{-7} N$

Answer: B



88. Match the following physical quantities with respect to relative units:

Column I	Column II
1. Magnetic flux	(i) joule
2. Resistance	(ii) weber

3. Time	(iii) watt
4. Energy	(iv) second
	(v) ohm
	(vi) ohm-metre

A. 1 - (iv), 2 - (v), 3 - (iv), 4 - (ii)

B. 1 - (ii), 2 - (v), 3 - (vi), 4 - (i)

C. 1 - (v), 2 - (i), 3 - (iv), 4 - (vi)

D. 1 - (ii), 2 - (v), 3 - (iv), 4 - (i)

Answer: D



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89. The dimensional formula for stress is

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

B. $[ML^{-1}T^{-1}]$

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

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

Answer: C



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90. The dimensions of Pressure are same as

A. Force

B. Work

C. Surface tension

D. Stress

Answer: D



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91. The value of Planck's constant is _____.

A. joule per second

B. joule second

C. metre per second

D. watt second

Answer: B



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92. Light year is a unit of

A. Time

B. Mass

C. Distance

D. Energy

Answer: C



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93. 1 pascal is equal to :

A. $1Nm^{-2}$

B. $1Jm^{-2}$

C. $1Nm^{-1}$

D. 1Jm^{-1}

Answer: A



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94. Choose the correct statement from the following statements :

A. S.I. unit of gravitational potential is J sec

B. S.I. unit of gravitational potential is J kg

C. S.I. unit of gravitational potential is Watt metre

D. S.I. unit of gravitation potential is J kg^{-1}

Answer: D



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95. Newton-second is the unit of

A. Velocity

B. Angular momentum

C. Momentum

D. Energy

Answer: C



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96. Which of the following statements are correct?

(i) A physical quantity cannot be measured

(ii) A physical quantity can be measured

(iii) The units of physical quantity can be derived

(iv) A physical quantity can neither be a scalar nor a vector

A. (i) and (ii)

B. (ii) and (iii)

C. (i) and (iv)

D. (ii) and (iv)

Answer: B



97. One nanometre is equal to

A. 10^9 mm

B. 10^{-6} cm

C. 10^{-7} cm

D. 10^{-9} cm

Answer: C



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98. A micron is related to centimetre as

A. $1\text{micron} = 10^{-8}\text{cm}$

B. $1\text{micron} = 10^{-6}\text{cm}$

C. $1\text{micron} = 10^{-5}\text{cm}$

D. $1\text{micron} = 10^{-4}\text{cm}$

Answer: D



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99. Choose the odd man out from the following physical quantities:

A. Mass

B. Length

C. Velocity

D. Time

Answer: C



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100. Which one of the following relations is wrong?

A. $1 \text{ fermi} = 10^{-14} m$

B. $1 \text{ nanometer} = 10^{-9} m$

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

D. 1 parsec = 3.26 light year

Answer: A



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101.1 CSL is the largest practical unit of :

- A. time and length
- B. mass only
- C. temperature and mass
- D. intensity of radiation and length

Answer: B



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102. One exametre is equal to

A. $10^{18}m$

B. $10^{19}m$

C. $10^{21}m$

D. $10^{23}m$

Answer: A



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103. One petametre is equal to

A. $10^{15}m$

B. $10^{18}m$

C. $10^{21}m$

D. $10^{24}m$

Answer: A



Watch Video Solution

104. One petametre related to centimetre as

A. $10^{15}cm$

B. 10^{17} cm

C. 10^{19} cm

D. 10^{21} cm

Answer: B



Watch Video Solution

105. 10 petametre is equal to

A. 10^{15} m

B. 10^{16} m

C. 10^{17} m

D. $10^{18}m$

Answer: B



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106. Least count of metre scale is :

A. 1 cm

B. 0.1 cm

C. 1 mm

D. 0.1 mm

Answer: C



[View Text Solution](#)

107. The ratio of the dimension of planck constant and that of moment of inertia is the dimension of

A. time

B. frequency

C. velocity

D. angular momentum

Answer: B



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108. Select the incorrect statement from the following statements :

(i) The radius of a rain drop is $10^{-6}m$

(ii) The mass of a neutron is $10^{27}kg$

(iii) The average distance of Pluto's orbit is $10^{12}m$

(iv) The diameter of the hydrogen atom is $10^{-10}m$

A. Statements (i) and (ii) are incorrect

B. Statements (ii) and (iii) are incorrect

C. Statement (ii) only incorrect

D. Statements (ii) and (iv) are incorrect

Answer: C



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109. The angle subtended by a coin of radius 1 cm held at a distance of 80 cm from your eyes is :

A. 1.25 rad

B. 0.125 rad

C. 0.0125°

D. 0.025°

Answer: B



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110. The density of a liquid in CGS system is $0.625g/cm^3$. What is its magnitude in SI system?

A. $625kg/m^3$

B. $0.0625kg/m^3$

C. $0.0625kg/m^3$

D. $0.00625kg/m^3$

Answer: A



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111. From the following units, select the odd man out.

A. Light year

B. Astronomical unit

C. Parsec

D. CSI (Chandrasekar's limit)

Answer: D



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112. If $1 \text{ g cm s}^{-1} = x$ newton- second, then the number x is equal to:

A. 10^5

B. 10^{10}

C. 10^{15}

D. 10^{-5}

Answer: D



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113. Which of the following is not the unit of time?

a) Light year b) Astronomical unit c) Parsec d) all of the above

A. Light year

B. Astronomical unit

C. Parsec

D. all of the above

Answer: D



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114. The respective number of significant figures for the number 13.013, 0.0003 and 9.1×10^{-3} are respectively:

A. 5, 1, 2

B. 5, 4, 5

C. 5, 5, 2

D. 5, 1, 3

Answer: A



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115. A student measured the length of a wire and wrote it as 2.50 cm. Which instrument did he/she use to measure it?

A. a screw gauge having 50 divisions in the circular scale and pitch as 1 mm.

B. a meter scale

C. a vernier caliper where the 10 division in vernier matches with a division in main scale.

D. a screw gauge having 100 division in the circular scale and pitch as 1 mm.

Answer: B



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116. If the error in the measurement of radius of a sphere is 3% then the error in the measurement of volume of the sphere will be :

A. 4%

B. 6 %

C. 2 %

D. 9 %

Answer: D



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117. The diameter of the steel ball is measured using a vernier caliper which has divisions of 0.1 cm on its main scale and 10 divisions of its vernier scale match 9 divisions on the main scale. Three such measurements for a ball are as follows.

S.No	MS (cm)	VS (divisions)
1	0.5	8
2	0.5	4
3	0.5	6

If the zero error is 0.03cm , then mean corrected diameter is cm.

- A. 0.56
- B. 0.53
- C. 0.59
- D. 0.52

Answer: C



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118. If $A = 2.331\text{cm}$ and $C = 2.1\text{cm}$, then $A + C = \dots\dots\dots\text{cm}$.

A. 4.4

B. 4

C. 4.43

D. 4.431

Answer: A



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119. Match the following units given in the column I with dimensions in the column II.

Column I	Column II
1. joule	(i) $M^1L^{-1}T^{-2}$
2. watt	(ii) $M^0L^0T^{-1}$
3. pascal	(iii) M^0LT^{-2}
4. hertz	(iv) $M^1L^2T^{-3}$
	(v) $M^0L^{-1}T^0$
	(vi) $M^1L^2T^{-2}$

- A. 1 - (vi), 2 - (iv), 3 - (i), 4 - (ii)
- B. 1 - (v), 2 - (iv), 3 - (ii), 4 - (vi)
- C. 1 - (vi), 2 - (i), 3 - (v), 4 - (ii)
- D. 1 - (iv), 2 - (iii), 3 - (vi), 4 - (i)

Answer: A



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120. The least count of stop watch is 0.5s. The time of 40 oscillation of the pendulum is found to be 40s. The percentage error in the measurement of time period is %

A. 0.75

B. 0.5

C. 1.25

D. 0.25

Answer: C



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121. Assertion : SI system of units is a coherent system of units.

Reason : In this system, all the derived units can be easily obtained from basic and supplementary units.

A. Assertion is true and reason is false

B. Assertion is false and reason is true.

C. Assertion is true and reason is the correct explanation of assertion

D. Assertion is true and reason is true but not the correct explanation of assertion.

Answer: C



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122. The sum of the numbers 436.32, 227.2 and 0.301 in appropriate significant figure is :

A. 663.82

B. 663.8

C. 664

D. 6663.82

Answer: C

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123. Gross error can be eliminated by :

- A. careful observation and mental alert
- B. eliminating the cause
- C. taking mean
- D. measuring with more than one instrument

Answer: A



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124. A box is pulled with a force of 25 N to produce a displacement of 15 m. If the angle between the force

and displacement is 30° . Find the work done by the force ?

A. Assertion is true, reason is true but it is not the correct explanation.

B. Assertion is true, reason is true and it is the correct explanation for assertion.

C. Assertion is true and reason is false.

D. Assertion is false and reason is true.

Answer: B



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125. High precision instruments are used to eliminate Error.

A. personal

B. random

C. chance

D. least count

Answer: D



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126. Assertion : The length of a cylinder is 23.8 cm. In this measurement there are three significant figures.

Reason : The same length when expressed in millimeter as 23800 mm has four significant figures.

Which of the following is correct?

A. Assertion is true and reason is true.

B. Assertion is true and reason is false

C. Assertion is true and reason is correct explanation for assertion.

D. Assertion is true and reason is true but it is not correct explanation for assertion.

Answer: B



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127. Round off to the number 12.653 upto 3 digits:

A. 12.5

B. 12.0

C. 12.7

D. 12.6

Answer: C



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128. If $f = x^2$, then the relative error in f is :

A. $\frac{2\Delta x}{x}$

B. $\frac{(\Delta x)^2}{x}$

C. $\frac{\Delta x}{x}$

D. $(\Delta x)^2$

Answer: A



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129. The length and breadth of a rectangle are 6.01 m and 12 m. Taking the significant figure into account the area of the rectangle is :

A. $72.00m^2$

B. $72.1m^2$

C. $72m^2$

D. $72.12m^2$

Answer: B



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A. zero digits

B. zeros at the end without a decimal point

C. all zeros between two non - zeros digits,
irrespective of the decimal point

D. all the above

Answer: C



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131. Column I gives three physical quantities. Select the appropriate units for the choices given in column

II.

Some of the physical quantities may have more than

one choice correct.

Column I

1. Inductance

2. Magnetic induction

3. Capacitance

Column II

(i) Ohm (second)

(ii) Coulomb²(joule)⁻¹

(iii) Coulomb (volt)⁻¹

(iv) Newton (ampere metre)⁻¹

(v) Volt second (ampere)⁻¹

A. 1 - (iv), 2 - (iii), 3 - (ii) and (i)

B. 1 - (i) and (v), 2 - (iv), 3 - (ii) and (iii)

C. 1 - (ii) and (v), 2 - (i) and (ii), 3 - (i) and (v)

D. 1 - (iv) and (v), 2 - (ii), 3 - (iii) and (iv)

Answer: B



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132. The dimensional formula for relative density is :

A. ML^{-3}

B. M^0L^{-3}

C. $M^0L^0T^0$

D. $M^0L^0T^{-1}$

Answer: C



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133. The dimensions of Hubble's constant are :

A. $[M^0L^0T]$

B. $[M^0 L^0 T^{-1}]$

C. $[MLT^2]$

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

Answer: B



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

A. energy

B. power

C. angular momentum

D. momentum

Answer: C



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135. Match the physical quantities given in column I with dimensions given in column II. (Dimension of charge is Q)

Column I	Column II
1. Torque	(i) ML^2T^{-1}
2. Resistivity	(ii) L^2T^{-2}
3. Angular momentum	(iii) ML^2Q^1
4. Latent heat	(iv) $M^1L^2T^{-2}$
	(v) $ML^3T^{-1}Q^{-2}$
	(vi) $M^1L^2T^{-1}$

A. 1 - (iv), 2 - (iv), 3 - (v), 4 - (ii)

B. 1 - (v), 2 - (iv), 3 - (ii), 4 - (i)

C. 1 - (vi), 2 - (v), 3 - (i), 4 - (ii)

D. 1 - (v), 2 - (i), 3 - (ii), 4 - (iii)

Answer: C



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136. Select the odd man out from the following parameters.

A. Velocity gradient

B. Wave number

C. Decay constant

D. Linear frequency

Answer: B



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137. Dimensions of impulse are :

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

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

C. $[ML^{-1}T^{-3}]$

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

Answer: B



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138. Of the following Has dimensions.

A. strain

B. angle

C. gravitational constant

D. refractive index

Answer: C



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139. Have the same dimensional formula.

- A. Force and momentum
- B. Density and linear density
- C. Light year and wavelength
- D. Stress and strain

Answer: C



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140. Which of the following is dimensional constant?

- A. Refractive index
- B. Poisson's ratio
- C. Strain
- D. Gravitational constant

Answer: D

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141. A wire has a mass $0.3 \pm 0.003g$ radius $0.5 \pm 0.005mm$ and length $6 \pm 0.06cm$. The

maximum percentage error in the measurement of its density is :

A. 3

B. 4

C. 5

D. 2

Answer: B



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142. The dimension of a quantity $\frac{h\gamma}{c}$ where h is the planck's constants, γ is the frequency and c is the

velocity of light are :

A. MT^{-1}

B. MLT^{-1}

C. MLT^{-1}

D. ML^2T^2

Answer: B



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143. If the energy $E = G^p h^q c^r$ where G is the universal gravitational constant, h is the planck's constant and c is the velocity of light, then the values of p , q and r

are respectively:

a) $-1/2, 1/2$ and $5/2$

b) $1/2, -1/2$ and $-5/2$

c) $-1/2, 1/2$ and $3/2$

d) $1/2, -1/2$ and $-3/2$

A. $-\frac{1}{2}, \frac{1}{2}$ and $\frac{5}{2}$

B. $\frac{1}{2}, -\frac{1}{2}$ and $-\frac{5}{2}$

C. $-\frac{1}{2}, \frac{1}{2}$ and $\frac{3}{2}$

D. $\frac{1}{2}, -\frac{1}{2}$ and $-\frac{3}{2}$

Answer: A



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144. The dimensional formula of the constant "a" in Vanderwaals gas equation is

$$\left(P + \frac{a}{V^2}\right)(V - b) = RT:$$

A. $ML^{-5}T^2$

B. ML^3T^{-2}

C. ML^2T^{-1}

D. ML^5T^{-3}

Answer: A



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145. Force F is given by $F = at + bt^2$. Where "t" is time. What are the dimensions of "a" and "cb"?

A. MLT^{-1} and MLT^0

B. MLT^{-3} and MLT^{-4}

C. MLT^{-3} and MLT^4

D. MLT^3 and MLT^{-4}

Answer: B



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146. The radius of a sphere is measured as $(2.1 \pm 0.5) \text{ cm}$. Its surface area with error limits is :

A. $(55.4 \pm 23.4) \text{ cm}^3$

B. $(55.4 \pm 26.4) \text{ cm}^2$

C. $(55.4 \pm 22.4) \text{ cm}^2$

D. $(55.5 \pm 22.6) \text{ cm}^2$

Answer: B



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147. In an experiment four quantities, a, b, c and d are measured with % error 1%, 2%, 3% and 4% respectively. If the quantity A is calculated as $A = \frac{a^3 b^2}{cd}$ the % error in A is :

A. 4%

B. 28%

C. 14%

D. 7%

Answer: C



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148. The frequency of vibration v of mass m suspended from a spring of spring constant k is given by $f = cm^x k^y$ where c is a dimensional constant. The volumes 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. $x = -\frac{1}{2}, y = -\frac{1}{2}$

Answer: C



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149. The dimensions of $\frac{1}{\sqrt{\mu_0 \epsilon_0}}$ are the same as those of:

A. force

B. acceleration

C. velocity

D. energy

Answer: C



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150. The dimensions of the quantities is one of the following pairs are the same. Identify the correct pair:

- A. Energy and Young's modulus
- B. Angular momentum and work
- C. Time period and frequency
- D. Torque and work

Answer: D



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151. The voltage across a lamp is (6.0 ± 0.2) volt and current that passes through it is (2.0 ± 0.1) ampere.

The power of the lamp in watt is :

A. (6 ± 0.1)

B. (12 ± 0.1)

C. (24 ± 0.1)

D. (4 ± 0.1)

Answer: B



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152. Which of the following will be the same dimension as that of time?

A. $\frac{L}{R}$

B. $\frac{C}{L}$

C. LC

D. $\frac{R}{L}$

Answer: A



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Other Important Questions Answers | Very Short Answer Questions

1. What is science?



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2. What are physical and biological sciences ?



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3. What is the origin of the word physics ?



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4. What is the Physics?



[Watch Video Solution](#)

5. Name the main branches of physics.



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6. What are the branches of classical physics?



[Watch Video Solution](#)

7. What are the braches of modern physics?



[Watch Video Solution](#)

8. Distinguish between classical mechanics and quantum mechanics.



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9. What is Thermodynamics?



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10. What is optics?



[Watch Video Solution](#)

11. What are electricity and magnetism?



[Watch Video Solution](#)

12. What si the meaning of Acoustics?



[Watch Video Solution](#)

13. What is Astrophysics?



[Watch Video Solution](#)

14. What is relativity ?





[Watch Video Solution](#)

15. What are atomic and nuclear physics ?



[Watch Video Solution](#)

16. What is condensed matter physics ?



[Watch Video Solution](#)

17. What is high energy physics ?



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



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19. What is the relation of Physics to Biology?



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20. Describe the relation of Physics with mathematics



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



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



[Watch Video Solution](#)

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



[Watch Video Solution](#)

24. Describe the relation of Physics with Psychology.



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25. Define physical quantity.



Watch Video Solution

26. What are fundamental units and derived units?



Watch Video Solution

27. What are fundamental units and derived units?



[Watch Video Solution](#)

28. Define FPS system of units.



[Watch Video Solution](#)

29. What is meant by C.G.S. system of units ?



[Watch Video Solution](#)

30. Define MKS system of units.



[Watch Video Solution](#)

31. Dimensions of stress are :

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

B. $[ML^0T^{-2}]$

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

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

Answer: C



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32. Define one metre.



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



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



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35. Define the SI unit of electric current. (or) What is one ampere in SI system of units? (or) Define one

ampere (S.I standard for current)



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36. Define one kelvin.



[Watch Video Solution](#)

37. Define one mole.



[Watch Video Solution](#)

38. 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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39. What is meant by the triple point of water?

 [Watch Video Solution](#)

40. Define the SI unit of length.

 [Watch Video Solution](#)

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



Watch Video Solution

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



Watch Video Solution

43. Define a radian.



Watch Video Solution

44. Name the supplementary units converted into derived units.



Watch Video Solution

45. Where do we use indirect methods to measure distance ?



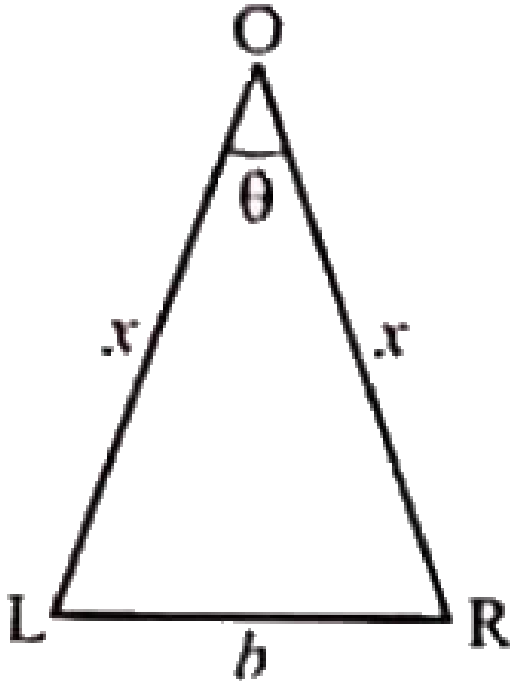
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46. Name the method used in the determination of very large distances.



Watch Video Solution

47. What do you understand by the term parallax angle?



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

Given Data:

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

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



[Watch Video Solution](#)

49. Define a Astronomical Unit.



[Watch Video Solution](#)

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

 [Watch Video Solution](#)

51. Define mass

 [Watch Video Solution](#)

52. Name the instrument to measure sub- atomic particles.

 [Watch Video Solution](#)

53. Define the term time. Give its S.I. unit.



Watch Video Solution

54. List few instruments to measure time.



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



Watch Video Solution

56. What do you understand by term error in measurements ?



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57. What is Absolute Error.



Watch Video Solution

58. What is Mean Absolute error?



Watch Video Solution

59. What do you mean by Relative error ?



Watch Video Solution

60. What do you mean by percentage error ?



Watch Video Solution

61. What is significant figures?



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

 [Watch Video Solution](#)

63. What is meant by dimensional formula ?

 [Watch Video Solution](#)

64. What is dimensional equation? Given an example.

 [Watch Video Solution](#)

65. What is science?



Watch Video Solution

66. What are physical and biological sciences ?



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87. Discuss the relation of physics with oceanography.



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88. Describe the relation of Physics with Psychology.



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89. 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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90. What are fundamental units and derived units?



[Watch Video Solution](#)

91. What are fundamental units and derived units?



[Watch Video Solution](#)

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93. What is meant by C.G.S. system of units ?



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94. Define MKS system of units.



Watch Video Solution

95. What is meant by S.I. unit ?



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96. Define one metre.



Watch Video Solution

97. Define one kilogram.



Watch Video Solution

98. Define one second.





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99. Define Ampere :



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100. What is the SI unit of temperature and define it?

What is one kelvin in SI system of units?



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 [Watch Video Solution](#)

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 [Watch Video Solution](#)

104. Define the SI unit of length.

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105. Define a radian.



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



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107. Obtain the value of 1 radian.



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108. Name the supplementary units converted into derived units.



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109. Where do we use indirect methods to measure distance ?



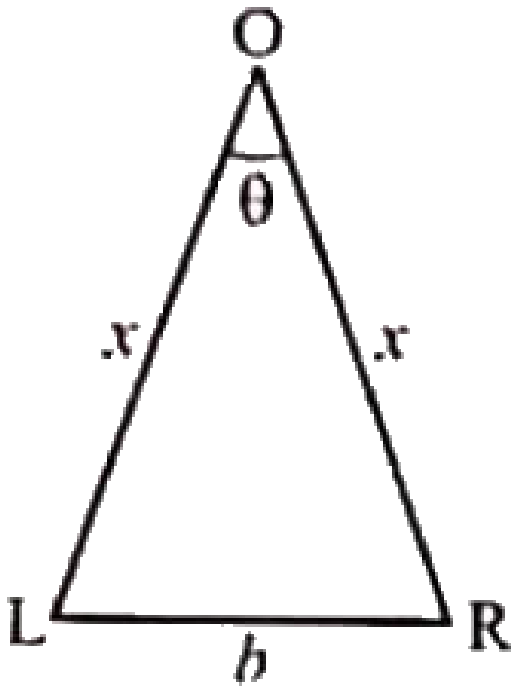
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115. Define mass



Watch Video Solution

116. Name the instrument to measure sub- atomic particles.



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

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122. What is Mean Absolute error?



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123. What is Relative error?



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124. What is Percentage error?



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125. What is significant figures?



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



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127. What is meant by dimensional formula ?



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128. What is dimensional equation? Given an example.



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Other Important Questions Answers Iii Short Answer Questions

1. What is meant by Parallax?



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2. What is meant by Scientific method?



[Watch Video Solution](#)

3. What are the two approaches to be applied while studying physics? Give suitable example for each.



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4. Write a note on scope of physics.

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5. How is physics learning really exiting ?

 [Watch Video Solution](#)

6. "Technological advancements owe a great deal to the developments in physics" - Explain.

 [Watch Video Solution](#)

7. What do you understand by the term measurement ? Explain with example.

 [Watch Video Solution](#)

8. What is the Relation between radians and degrees ?

 [Watch Video Solution](#)

9. Distinguish between macrocosm and microcosm.

 [Watch Video Solution](#)

10. What are the advantages of SI system?



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11. State the rules for finding the significant figures in the addition and subtraction of two numbers, with example.



Watch Video Solution

12. State the rules for finding the significant figures in the multiplication and division of two numbers, with example.



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13. What is meant by Parallax?



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14. What is scientific method ? List the various stages involved in it.



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15. What are the two approaches to be applied while studying physics ? Give suitable example for each.



[Watch Video Solution](#)

16. Write a note on scope of physics.



[Watch Video Solution](#)

17. How is physics learning really exiting ?



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18. "Technological advancements owe a great deal to the developments in physics" - Explain.



[Watch Video Solution](#)

Watch Video Solution

19. What do you understand by the term measurement ? Explain with example.

 [Watch Video Solution](#)

20. Derive the relations between radian, degree and minute.

 [Watch Video Solution](#)

21. Distinguish between macrocosm and microcosm.

 [Watch Video Solution](#)

 [Watch Video Solution](#)

22. What are the advantages of SI system?

 [Watch Video Solution](#)

23. State the rules for finding the significant figures in the addition and subtraction of two numbers, with example.

 [Watch Video Solution](#)

24. State the rules for finding the significant figures in the multiplication and division of two numbers, with example.



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Other Important Questions Answers Iv Long Answer Questions

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



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2. If energy (E), velocity (V) and time (T) are chosen as the fundamental quantities, the dimensional formula of surface tension will be:

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

B. $[EV^{-2}T^{-2}]$

C. $[E^{-2}V^{-1}T^{-3}]$

D. $[EV^{-2}T^{-1}]$

Answer: B



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3. What are the rule for rounding off a number?



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4. If dimensions of critical velocity of a liquid v_c flowing through a tube are expressed as $[\eta^x \rho^y r^z]$, where η , ρ and r are the coefficient of viscosity of liquid, density of liquid and radius of the tube respectively, then the values of x , y and z are given by :

A. -1,-1,1

B. -1,-1,-1

C. 1, 1, 1

D. 1,-1,-1

Answer: D



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



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6. Explain the propagation of errors in subtraction, quotient and power of a quantity.



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

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8. How can we classify variables and constants based on dimension. Give example for each type?

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[Other Important Questions](#) [Answers](#) [V](#) [Numerical Problems](#)

1. The density of material is 0.6 g cm^{-3} express it in S.I. units.

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2. Convert an acceleration of 5 kmh^{-2} into an s^{-2} .

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3. Calculate the angle of

(i) 1° (degree) in radius.

Use $360^\circ = 2\pi \text{ rad}$, $1^\circ = 60'$ and $1' = 60''$

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4. Calculate the angle of

(ii) 1' (minute of arc or arc min) in radius.

Use $360^\circ = 2\pi$ rad, $1^\circ = 60'$ and $1' = 60''$



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5. The dimensions of $(\mu_0\epsilon_0)^{-\frac{1}{2}}$ are

A. $\left[L^{\frac{1}{2}} T^{-\frac{1}{2}} \right]$

B. $\left[L^{-1} T \right]$

C. $\left[L T^{-1} \right]$

D. $\left[L^{-\frac{1}{2}} T^{\frac{1}{2}} \right]$

Answer: C



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6. The angular diameter of the sun is $1920''$. If the distance of the sun from the earth is $1.5 \times 10^9 m$, what is the linear diameter of the sun?



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7. The angular diameter of the sun is $1920''$. If the distance of the sun from the earth is $1.5 \times 10^{12} m$, what is the linear diameter of the sun?





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8. The length of a rod as measured in an experiment was found to be 3.48, 3.46, 3.49m, 3.50m and 3.48m. Find the average length, the absolute error in each observation and percentage error.



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9. A body travels uniformly a distance of $(13.8 \pm 0.2)m$ in a time $(4.0 \pm 0.3)s$. Determine velocity of the body within error limits.



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10. The percentage errors in the measurement of length and time period of a simple pendulum are 2% and 3% respectively. Then find the maximum error in the measurement of acceleration due to gravity.



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11. In the formula, $N = -D \left[\frac{n_2 - n_1}{x_2 - x_1} \right]$, D - Diffusion coefficient, n_1 and n_2 is number of molecules in unit volume along x_1 and x_2 which represents distances where N is number of molecules passing

through per unit area per unit time. Calculate dimensions of D .

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12. The resistance $R = \frac{V}{I}$, where $V = 500 \pm 5V$ and $I = 10 \pm 0.5A$. Find the percentage error in R .

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13. The percentage of error in the measurement of mass and speed are 4% and 5% respectively. How much will be the maximum error in the estimating

kinetic energy obtained by measuring mass and speed?



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14. 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



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15. The heat dissipated in a resistance can be determined by measuring resistance current and time.

If the maximum error in the above quantities are 2% , 3% and 6% respectively. Then calculate the maximum error in the determination of the dissipated heat?



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16. The relative density of a material is found by weighing the body first in air and then in water. If the weight in air is $(20.0 \pm 0.1)N$ and weight and water is $(10.0 \pm 0.1)N$, what would be the maximum percentage error in relative density?



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17. Round off the following numbers as indicated ? (i)

18.35 upto 3 digits

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18. Round off the following numbers as indicated ?

(ii) 143.45 upto 4 digits

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19. Round off the following numbers as indicated ?

(iii) 18967 upto 3 digits

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20. Round off the following numbers as indicated ?

(iv) 12.653 upto 3 digits



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21. Round off the following numbers as indicated ?

(v) 248337 upto 3 digits



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22. Round off the following numbers as indicated ?

(vi) 321.135 upto 5 digits



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23. Round off the following numbers as indicated ?

(vii) 101.55×10^6 upto 4 digits



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24. Round off the following numbers as indicated ?

(viii) 31.325×10^{-5} upto 4 digits.



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25. Add 7.21, 12.141 and 0.0028 and express the result to an appropriate number of significant figures.



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26. Solve the following and express the result to an appropriate number of significant figures.

(i) Add 6.2g, 4.33g and 17.456g



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27. Solve the following and express the result to an appropriate number of significant figures.

(ii) Subtract 63.54 kg from 187.2 kg



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28. Solve the following and express the result to an appropriate number of significant figures.

(iii) $75.5 \times 125.2 \times 0.51$



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29. Solve the following and express the result to an appropriate number of significant figures.

(vi)
$$\frac{2.13 \times 24.78}{485.2}$$



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30. Solve the following and express the result to an appropriate number of significant figures.

$$(v) \frac{2.51 \times 10^{-4} \times 1.81 \times 10^7}{0.4463}$$



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31. Find the number of erg in one Joule.



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32. Value of acceleration due to gravity is $9.8m / \text{sec}^2$.

Find its value in km / hr^2 .



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33. Density of oil is $0.8gm / cm^3$. Find its value in MKS system.



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34. The kinetic energy of rotation K depends on the angular momentum J and moment of inertia I . Find the expression for kinetic energy.



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35. The percentage of error in the measurement of mass and speed are 5 % and 8 % respectively. How much will be the maximum error in the estimating kinetic energy obtained by measuring mass and speed?



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36. Deduce the dimensional formulae of the following physical quantities. (i) Heat



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37. The percentage of error in the measurement of mass and speed are 7% and 9% respectively. How much will be the maximum error in the estimating kinetic energy obtained by measuring mass and speed?

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38. Deduce the dimensional formulae of the following physical quantities. (iii) latent heat

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39. The percentage errors in the measurement of length and time period of a simple pendulum are 3% and 6% respectively. Then find the maximum error in the measurement of acceleration due to gravity.



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40. Deduce the dimensional formulae of the following physical quantities. (v) Boltzmann's constant



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41. The dimension of $\frac{1}{2}\epsilon_0 E^2$, where ϵ_0 is permittivity of free space and E is electric field is :

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

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

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

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

Answer: B



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42. Deduce the dimensional formulae of the following physical quantities. (vii) mechanical equivalent of heat.



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



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44. The value G in CGS system is 6.67×10^{-8} dyne $cm^2 g^{-2}$. Calculate the value in SI units.



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45. If the units of force, energy and velocity are 20N , 200J and 5ms^{-1} , find the unit of length, mass time.



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46. If the dimensions of a physical quantity are given by $M^a L^b T^c$, then the physical quantity will be:

- A. Velocity if $a = 1, b = 0, c = -1$
- B. Acceleration if $a = 1, b = 1, c = -2$
- C. Force if $a = 0, b = -1, c = -2$

D. Pressure if $a = 1$, $b = -1$, $c = -2$

Answer: D



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47. Dimensions of resistance in an electrical circuit, in terms of dimension of mass $[M]$, of length $[L]$, of time $[T]$ and of current $[I]$, would be

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

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

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

D. $[ML^2T^{-3}I^{-1}]$

Answer: C



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48. Find the dimensions of a/b in the equation.

$F = a\sqrt{x} + bt^2$ where F is force, x is distance and t is time.



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49. In the equation : $y = a \sin(\omega t - kx)$, t and x stand for time and distance respectively. Obtain the dimensional formula for ω and k .

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50. A planet moves around the sun in nearly circular orbit. Its period of revolution 'T' depends upon. (i) radius 'r' or orbit, (ii) mass 'm' of the sun and. (iii) The gravitational constant G show dimensionally that $T^2 \propto r^3$.

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51. The escape velocity v of a body depends upon (i) the acceleration due to gravity of the planet and (ii) the radius of the planet R. Establish dimensionally the relationship between v , g and R.



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52. The density of material is 0.6 g cm^{-3} express it in S.I. units.



[Watch Video Solution](#)

53. Convert an acceleration of 3 kmh^{-2} into $\text{cms}^{(-2)}$.



[Watch Video Solution](#)

54. Calculate the angle of

(i) 1° (degree) in radius.

Use $360^\circ = 2\pi$ rad, $1^\circ = 60'$ and $1' = 60''$



[Watch Video Solution](#)

55. Calculate the angle of

(ii) $1'$ (minute of arc or arc min) in radius.

Use $360^\circ = 2\pi$ rad, $1^\circ = 60'$ and $1' = 60''$



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56. Calculate the angle of

(iii) $1''$ (second of arc or arc second) in radius.

Use $360^\circ = 2\pi$ rad, $1^\circ = 60'$ and $1' = 60''$



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57. The angular diameter of the sun is $1920''$. If the distance of the sun from the earth is $1.5 \times 10^{11} m$, what is the linear diameter of the sun?



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58. Which of the following measurements is most precise?



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59. The length of a rod as measured in an experiment was found to be 3.48, 3.46, 3.49m, 3.50m and 3.48m. Find the average length, the absolute error in each observation and percentage error.



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60. A body travels uniformly a distance of $(13.8 \pm 0.2)m$ in a time $(4.0 \pm 0.3)s$. Determine velocity of the body within error limits.



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61. The percentage errors in the measurement of length and time period of a simple pendulum are 1% and 2% respectively. Then find the maximum error in the measurement of acceleration due to gravity.



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62. In the formula, $N = -D \left[\frac{n_2 - n_1}{x_2 - x_1} \right]$, D - Diffusion coefficient, n_1 and n_2 is number of molecules in unit volume along x_1 and x_2 which represents distances where N is number of molecules passing

through per unit area per unit time. Calculate dimensions of D .

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63. The resistance $R = \frac{V}{I}$, where $V = 100 \pm 5V$ and $I = 10 \pm 0.2A$. Find the percentage error in R .

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64. The percentage of error in the measurement of mass and speed are 2% and 3% respectively. How much will be the maximum error in the estimating

kinetic energy obtained by measuring mass and speed?

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65. If the length and time period of an oscillating pendulum have errors of 2% and 5% respectively, what is the error in the estimate of g ?

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66. The heat dissipated in a resistance can be determined by measuring resistance current and time. If the maximum error in the above quantities are

1%, 2% and 1% respectively. Then calculate the maximum error in the determination of the dissipated heat?



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67. The relative density of a material is found by weighing the body first in air and then in water. If the weight in air is $(10.0 \pm .01)N$ and weight in water is $(5.0 \pm 0.1)N$, what would be the maximum percentage error in relative density?



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68. Round off the following numbers as indicated ? (i)

18.35 upto 3 digits



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69. Round off the following numbers as indicated ?

(ii) 143.45 upto 4 digits



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70. Round off the following numbers as indicated ?

(iii) 18967 upto 3 digits



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71. Round off the following numbers as indicated ?

(iv) 12.653 upto 3 digits



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72. Round off the following numbers as indicated ?

(v) 248337 upto 3 digits



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73. Round off the following numbers as indicated ?

(vi) 321.135 upto 5 digits



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74. Round off the following numbers as indicated ?

(vii) 101.55×10^6 upto 4 digits



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75. Round off the following numbers as indicated ?

(viii) 31.325×10^{-5} upto 4 digits.



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76. Add 7.21, 12.141 and 0.0028 and express the result to an appropriate number of significant figures.

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77. Solve the following and express the result to an appropriate number of significant figures.

(i) Add 6.2g, 4.33g and 17.456g

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78. Solve the following and express the result to an appropriate number of significant figures.

(ii) Subtract 63.54 kg from 187.2 kg



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79. Solve the following and express the result to an appropriate number of significant figures.

(iii) $75.5 \times 125.2 \times 0.51$



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80. Solve the following and express the result to an appropriate number of significant figures.

(vi)
$$\frac{2.13 \times 24.78}{485.2}$$



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81. Solve the following and express the result to an appropriate number of significant figures.

$$(v) \frac{2.51 \times 10^{-4} \times 1.81 \times 10^7}{0.4463}$$



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82. Find the number of erg in one Joule.



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83. Value of acceleration due to gravity is $9.8m / \text{sec}^2$.

Find its value in km / hr^2 .



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84. Density of oil is $0.8gm / cm^3$. Find its value in MKS system.



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85. The kinetic energy of rotation K depends on the angular momentum J and moment of inertia I . Find the expression for kinetic energy.



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86. If the constant of gravitation (G), Planck's constant (h) and the velocity of light (c) be chosen as fundamental units. What is the dimension of the radius of gyration?



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87. Deduce the dimensional formulae of the following physical quantities. (i) Heat



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88. Deduce the dimensional formulae of the following physical quantities. (ii) specific heat

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89. Deduce the dimensional formulae of the following physical quantities. (iii) latent heat

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90. Deduce the dimensional formulae of the following physical quantities. (iv) gas constant

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91. Deduce the dimensional formulae of the following physical quantities. (v) Boltzmann's constant



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92. Deduce the dimensional formulae of the following physical quantities. (vi) coefficient of thermal conductivity



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93. Deduce the dimensional formulae of the following physical quantities. (vii) mechanical equivalent of heat.



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94. Taking velocity, time and force as the fundamental quantities, find the dimensions of mass.



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95. The value G in CGS system is 6.67×10^{-8} dyne $cm^2 g^{-2}$. Calculate the value in SI units.



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96. If the units of force, energy and velocity are 20N, 200J and $5ms^{-1}$, find the unit of length, mass time.

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97. Check the dimensional consistency of the following equations.

(i) de - Broglie wavelength, $\lambda = \frac{h}{mv}$.

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98. Check the dimensional consistency of the following equations.

(ii) Escape velocity, $v = \sqrt{\frac{2GM}{R}}$



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99. Find the dimensions of a/b in the equation.

$F = a\sqrt{x} + bt^2$ where F is force, x is distance and t is time.



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100. In the equation : $y = a \sin(\omega t - kx)$, t and x stand for time and distance respectively. Obtain the dimensional formula for ω and k .



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101. A planet moves around the sun in nearly circular orbit. Its period of revolution ' T ' depends upon. (i) radius ' r ' of orbit, (ii) mass ' m ' of the sun and. (iii) The gravitational constant G show dimensionally that $T^2 \propto r^3$.



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102. The escape velocity v of a body depends upon (i) the acceleration due to gravity of the planet and (ii) the radius of the planet R . Establish dimensionally the relationship between v , g and R .



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[Other Important Questions](#) [Answers](#) [Vi](#) [Conceptual Questions](#)

1. Is the measure of an angle dependent upon the unit of length?



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2. Explain the principle of homogeneity of dimensions.

What are its uses? Give example.



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3. The velocity v of a particle at time t is given by

$$v = at + \frac{b}{t + c} \text{ where } a, b \text{ and } c \text{ are constant. The}$$

dimensions of a , b and c respectively are

A. $[L^2, T \text{ and } LT^2]$

B. $[LT^2, LT \text{ and } L]$

C. $[L, LT \text{ and } T^2]$

D. $[LT^{-2}, L \text{ and } T]$

Answer: D



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4. The dimensions of Planck's constant are same as

A. Energy

B. Power

C. Momentum

D. Angular momentum

Answer: D



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5. The dimensional formula for energy is

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

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

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

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

Answer: A



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6. The dimensional formula for velocity is

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

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

C. $[M^0LT^{-1}]$

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

Answer: C



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7. State any three physical quantities having same dimensions and their dimension.



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8. The dimensional formula for acceleration is

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

B. $[M^0LT^{-2}]$

C. $[MLT^2]$

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

Answer: B



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9. How many light years are there in one meter?



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10. The dimensional formula for force is

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

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

C. $[MLT^2]$

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

Answer: B



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11. Is the measure of an angle dependent upon the unit of length?

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12. What is the basis of the principle of homogeneity of dimensions?

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13. Can a quantity have dimensions but still has no units?

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14. Can a quantity have units but still be dimensionless?

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15. Why have scientists and engineers all over the world agreed to use SI units?

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16. While deriving the relationship between physical quantities by dimensional analysis, dimensionless

constant enters into the relationship. Can you find its magnitude by the method of dimensions?

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17. State any three physical quantities having same dimensions and their dimension.

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18. What is the estimated radius of the universe?

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19. How many light years are there in one meter?



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20. The period of oscillation of a simple pendulum is

given by $T = 2\pi\sqrt{\frac{l}{g}}$. In finding the value of g , which

quantity should be measured most accurately and

why?



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