SAMPLE CONTENT

Bridge Course

MCQs Navigator Book

MHT-CET

PHYSICS

FOR STRONG FOUNDATION

- Based on Latest Paper Pattern
- Based on complete syllabus of Std. XI
- Important Formulae
- Previous Years' Questions

Includes **Authentic Questions** from Latest **MHT-CET Examination**

Std.XI

Target Publications® Pvt. Ltd.

MHT-CET
Bridge Course MCQs Navigator

PHYSICS

Scan the adjacent QR code to download Solutions to Multiple Choice Questions in PDF format.

Printed at: **Print to Print,** Mumbai

Balbharati Registration No.: 2018MH0022

TEID: 3955

P.O. No. 14103

CONTENTS

Textbook
Chapter No.

01 Units and Measurements

Subtopics

- Introduction
- System of Units
- Measurement of Length
- Measurement of Mass
- Measurement of Time
- Dimensions and Dimensional Analysis
- Accuracy, Precision and Uncertainty in Measurements
- Errors in Measurements
- Significant Figures

Formulae

1. Measure of physical quantity:
$M = nu$
where, n = numerical value, u = unit

2. Relation between numerical value and size of unit:
$n_1u_1 = n_2u_2$

3. Conversion factor of a unit in two system of units:
$$n = \left[\frac{M_1}{M_2}\right]^a \left[\frac{L_1}{L_2}\right]^b \left[\frac{T_1}{T_2}\right]^c$$

4. Plane angle: $d\theta = \frac{ds}{r}$

5. Solid angle: $d\Omega = \frac{dA}{r^2}$

6. Parallax angle: $\theta = \frac{b}{D}$

7. Diameter of planet/star: $d = \alpha D$.

8. Average value or mean value:
$$a_{mean} = \frac{a_1 + a_2 + a_3 + .. + a_n}{n} = \frac{1}{n}\sum_{i=1}^{n} a_i$$

9. Absolute error
$= |$ Average value – Measured value $|$
$|\Delta a_n| = |a_{mean} - a_n|$

10. Mean absolute error:
$$\Delta a_{mean} = \frac{\Delta a_1 + \Delta a_2 + ... + \Delta a_n}{n} = \frac{1}{n}\sum_{i=1}^{n} \Delta a_i$$

11. Relative (fractional) error $= \frac{\Delta a_{mean}}{a_{mean}}$

12. Percentage error $= \frac{\Delta a_{mean}}{a_{mean}} \times 100\,\%$

13. If $Z = A \pm B$, then maximum error:
$\Delta Z = \pm (\Delta A + \Delta B)$

14. If $Z = AB$ or $Z = \frac{A}{B}$ then,
$$\frac{\Delta Z}{Z} = \pm\left(\frac{\Delta A}{A} + \frac{\Delta B}{B}\right)$$

15. If $Z = A^m \times B^n$, then error in measurement:
$$\frac{\Delta Z}{Z} = \frac{m\Delta A}{A} + \frac{n\Delta B}{B}$$

Various prefixes to express a physical quantity:

Prefix	Symbol	Power of 10	Prefix	Symbol	Power of 10
Tera	T	10^{12}	micro	μ	10^{-6}
Giga	G	10^{9}	nano	n	10^{-9}
Mega	M	10^{6}	angstrom	Å	10^{-10}
Kilo	k	10^{3}	pico	p	10^{-12}
milli	m	10^{-3}	femto	f	10^{-15}

• System of Units

1. A set of fundamental and derived units is known as _____.
   (A) supplementary units
   (B) system of units
   (C) complementary units
   (D) metric units

2. The physical quantity having the same unit in all the systems of unit is _____.
   (A) length (B) time
   (C) mass (D) foot

3. Which of the following system of units is not based on units of mass, length and time alone?
(A) S.I. (B) M.K.S
(C) F.P.S (D) C.G.S

• Dimensions and Dimensional Analysis

4. Checking the correctness of physical equations using the method of dimensions is based on
(A) equality of inertial frame of reference.
(B) the type of system of units.
(C) the method of measurement.
(D) principle of homogeneity of dimensions.

5. Dimensional equation CANNOT be used
(A) to check the correctness of a physical quantity.
(B) to derive the relation between different physical quantities.
(C) to find out constant of proportionality which may be pure number.
(D) to change from one system of units to another system.

6. If the dimensions of a physical quantity are given by $[L^aM^bT^c]$, then the physical quantity will be
(A) force, if a = –1, b = 0, c = –2
(B) pressure, if a = –1, b = 1, c = –2
(C) velocity, if a = 1, b = 0, c = 1
(D) acceleration, if a = 1, b = 1, c = –2

7. The fundamental physical quantities that have same dimensions in the dimensional formulae of torque and angular momentum are
(A) mass, time (B) time, length
(C) mass, length (D) time, mole

8. Which of the following represents correct dimensions of the coefficient of viscosity?
(A) $[M^1L^{-1}T^{-2}]$ (B) $[M^1L^{-1}T^{-1}]$
(C) $[M^1L^1T^{-1}]$ (D) $[M^1L^{-2}T^{-2}]$

9. Dimensions of length in electric dipole moment, electric flux and electric field are respectively
(A) L, L^2, L^3 (B) L^3, L^2, L
(C) L^{-1}, L^3, L^3 (D) L, L^3, L

10. Out of the following pairs, which one does NOT have identical dimensions?
(A) Energy and moment of force
(B) Work and torque
(C) Density and surface energy
(D) Pressure and stress

11. The dimensions of $\frac{1}{\sqrt{\varepsilon_0\mu_0}}$ is that of
(A) Velocity (B) Time
(C) Capacitance (D) Distance

12. The terminal velocity v of a small steel ball of radius r falling under gravity through a column of viscous liquid coefficient of viscosity η depends on mass of the ball m, acceleration due to gravity g. Which of the following relation is dimensionally correct?
(A) $v \propto \frac{mgr}{\eta}$ (B) $v \propto mg\eta r$
(C) $v \propto \frac{mg}{\eta r}$ (D) $v \propto \frac{\eta mg}{r}$

13. A force F is given by $F = at + bt^2$, where 't' is time. What are the dimensions of a and b?
(A) $[M^1L^1T^{-1}]$ and $[M^1L^1T^0]$
(B) $[M^1L^1T^{-3}]$ and $[M^1L^1T^{-4}]$
(C) $[M^1L^1T^{-4}]$ and $[M^1L^1T^1]$
(D) $[M^1L^{-3}T^1]$ and $[M^1L^1T^{-4}]$

14. The equation of a wave is given by
$Y = A \sin\omega\left(\frac{x}{v} - k\right)$
where ω is the angular velocity and v is the linear velocity. The dimension of k is
(A) LT (B) T
(C) T^{-1} (D) T^2

15. The quantity $X = \frac{\varepsilon_0 LV}{t}$: ε_0 is the permittivity of free space, L is length, V is potential difference and t is time. The dimensions of X are same as that of
(A) Resistance (B) Charge
(C) Voltage (D) Current

16. The dimensions of K in the equation
$W = \frac{1}{2}Kx^2$ is
(A) $[M^1L^0T^{-2}]$ (B) $[M^0L^1T^{-1}]$
(C) $[M^1L^1T^{-2}]$ (D) $[M^1L^0T^{-1}]$

17. What is dimension of a in Van der Waal's equation?
(A) $[M^1L^{-1}T^{-2}mol^{-2}]$ (B) $[M^1L^3T^{-2}mol^{-2}]$
(C) $[M^1L^5T^{-2}mol^{-2}]$ (D) $[M^1L^3T^{-2}mol^{-1}]$

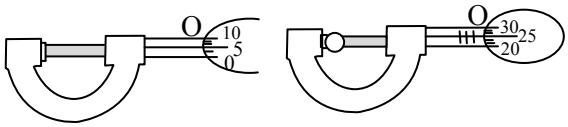
18. If the time period (T) of vibration of a liquid drop depends on surface tension (S), radius (r) of the drop and density (ρ) of the liquid, then the expression of T is
(A) $T = k\sqrt{\rho r^3 / S}$
(B) $T = k\sqrt{\rho^{1/2} r^3 / S}$
(C) $T = k\sqrt{\rho r^3 / S^{1/2}}$
(D) T = None of these

19. In the relation $P = \frac{\alpha}{\beta} e^{\frac{-\alpha Z}{k\theta}}$ P is pressure, Z is the distance, k is Boltzmann's constant and θ is the temperature. The dimensional formula of β will be
(A) $[M^0L^2T^0]$ (B) $[M^1L^2T^1]$
(C) $[M^1L^0T^{-1}]$ (D) $[M^0L^2T^{-1}]$

• Accuracy, Precision and Uncertainty in Measurements

20. The difference between the true value and measured value is called _____.
(A) mistake (B) error
(C) significant figures (D) fault

21. The circular divisions of shown screw gauge are 50. It moves 0.5 mm on main scale in one rotation. The diameter of the ball is



(A) 2.25 mm (B) 2.20 mm
(C) 1.20 mm (D) 1.25 mm

• Errors in Measurements

22. If the pointer of the voltmeter is not exactly at the zero of the scale then the error is called _____.
(A) instrumental error (B) systematic error
(C) personal error (D) random error

23. Accidental error can be minimised by
(A) taking only one reading.
(B) taking small magnitude of the quantity.
(C) selecting instrument with greater least count.
(D) selecting instrument with small least count.

24. The formula for percentage error is
(A) Percentage error = $\frac{|\Delta a_m|}{a_m} \times 100\%$
(B) Percentage error = $\frac{1}{n}\sum_{i=1}^{n}|\Delta a_i| \times 100\%$
(C) Percentage error = $\frac{a_m}{|\Delta a_m|} \times 100\%$
(D) Percentage error = $\frac{1}{n}\sum_{i=1}^{n} a_i \times 100\%$

25. The percentage error in the measurement of radius r of a sphere is 0.1% then the percentage error introduced in the measurement of volume is
(A) 0.1% (B) 0.2%
(C) 0.25% (D) 0.3%

26. The period of oscillation of a simple pendulum is given by $T = 2\pi\sqrt{\frac{l}{g}}$ where l is about 100 cm and is known to have 1 mm accuracy. The period is about 2 s. The time of 100 oscillations is measured by a stop watch of least count 0.1 s. The percentage error in g is
(A) 0.1% (B) 1%
(C) 0.2% (D) 0.8%

27. The heat dissipated in a resistance can be determined from the relation: $H = \frac{I^2Rt}{4.2}$ cal
If the maximum errors in the measurement of current, resistance and time are 2%, 1% and 1% respectively, what would be the maximum error in the dissipated heat?
(A) 5% (B) 4%
(C) 6% (D) 0.5%

28. If radius of the sphere is (5.3 ± 0.1) cm. Then percentage error in its volume will be
(A) $3 + 6.01 \times \frac{100}{5.3}$ (B) $\frac{1}{3} \times 0.01 \times \frac{100}{5.3}$
(C) $\left(\frac{3 \times 0.1}{5.3}\right) \times 100$ (D) $\frac{0.1}{5.3} \times 100$

29. In a vernier callipers, one main scale division is x cm and n divisions of the vernier scale coincide with (n – 1) divisions of the main scale. The least count (in cm) of the callipers is
(A) $\left(\frac{n-1}{n}\right)x$ (B) $\frac{nx}{(n-1)}$
(C) $\frac{x}{n}$ (D) $\frac{x}{(n-1)}$

30. A screw guage gives the following reading when used to measure the diameter of a wire.
Main scale reading : 0 mm
Circular scale reading : 52 divisions
The diameter of wire from the above data is
(A) 0.52 cm (B) 0.052 cm
(C) 0.026 cm (D) 0.005 cm

• Significant Figures

31. Significant figures depends upon the _____ of the measuring instrument.
(A) length (B) readings
(C) number (D) accuracy

32. The number of significant figures in 0.400 is
(A) 1 (B) 2
(C) 3 (D) 4

33. State the number of significant figures in 6.032 J
(A) 4 (B) 3
(C) 2 (D) 1

34. The answer of (9.15 + 3.8) with due regards to significant figure is
(A) 13.000 (B) 13.00
(C) 13.0 (D) 13

35. The sides of a rectangle are 6.01 m and 12 m. Taking the significant figures into account, the area of the rectangle is
(A) 72.00 cm^2 (B) 72.1 cm^2
(C) 72 m^2 (D) 72.12 cm^2

36. Order of magnitude of $(10^6 + 10^3)$ is
(A) 10^{18} (B) 10^9
(C) 10^6 (D) 10^3

37. The charge on the electron is 1.6×10^{-19} C. The order of magnitude is
(A) 10^{19} C (B) 10^{18} C
(C) 10^{-18} C (D) 10^{-19} C

38. The magnitude of any physical quantity can be expressed as $A \times 10^n$ where n is a number called order of magnitude and A is
(A) $0.1 \leq A < 1$ (B) $0.5 \leq A < 5$
(C) $5 \leq A < 9$ (D) $1 \leq A > 9$

39. The order of magnitude of 49 and the order of magnitude of 51
(A) is same. (B) differs by 1.
(C) is 1. (D) is 2.

AVAILABLE BOOKS FOR COMPETITIVE EXAMINATIONS

For NEET-UG & JEE (Main) Exam

ABSOLUTE SERIES
- Physics Vol - I & II
- Chemistry Vol - I & II
- Mathematics Vol - I & II
- Biology Vol - I & II

CHALLENGER SERIES
- Physics Vol - I & II
- Chemistry Vol - I & II
- Mathematics Vol - I & II
- Biology Vol - I & II

PSP SERIES (37 YEARS)
(PREVIOUS SOLVED PAPERS)
- Physics
- Chemistry
- Biology

PSP SERIES (12 YEARS)
(PREVIOUS SOLVED PAPERS)
- Physics
- Chemistry
- Biology

NEET-UG TEST SERIES
- Physics
- Chemistry
- Biology

ADDITIONAL BOOKS
- NEET-UG 10 Mock Tests With Answer Key & Hints
- Previous 12 Years NEET Solved Papers With Solutions
- JEE MAIN Numerical Value Type Questions (NVT)

For MHT-CET Exam

STD. XI & XII TRIUMPH SERIES
- Physics
- Chemistry
- Mathematics
- Biology

SOLUTIONS TO MCQs
- Physics Solutions to MCQs
- Chemistry Solutions to MCQs
- Mathematics Solutions to MCQs
- Biology Solutions to MCQs

MHT-CET TEST SERIES
- Physics With Answer Key & Solutions
- Chemistry With Answer Key & Solutions
- Mathematics With Answer Key & Solutions
- Biology With Answer Key & Solutions

PSP SERIES (26 YEARS)
(PREVIOUS SOLVED PAPERS)
- Physics
- Chemistry
- Mathematics
- Biology

PSP SERIES (10 YEARS)
(PREVIOUS SOLVED PAPERS)
- Physics
- Chemistry
- Mathematics
- Biology

ADDITIONAL BOOKS
- MHT-CET PCB Solved Papers 2024
- MHT-CET PCM Solved Papers 2024
- MHT-CET 10 Model Question Papers (Physics, Chemistry, Biology)
- MHT-CET 10 Model Question Papers (Physics, Chemistry, Mathematics)
- MHT-CET 22 Model Question Papers (Physics, Chemistry, Biology)
- MHT-CET 22 Model Question Papers (Physics, Chemistry, Mathematics)
- MHT-CET 22 Model Question Papers (Physics, Chemistry, Mathematics, Biology)

Visit Our Website

Published by:

Target Publications® Pvt. Ltd.
Transforming lives through learning

Explore our range of
Bridge Course MHT-CET Books

B2, 9th Floor, Ashar, Road No. 16/Z, Wagle Industrial Estate, Thane (W)-400604 | 88799 39712 / 14 | 88799 39713 / 15

www.targetpublications.org mail@targetpublications.org