IITIAN'S SPECTRUM
IIT JEE/NEET FOUNDATION

IITIAN'S SPECTRUM
Prudent Minds, Promising Path

Founder-Director
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B.Tech (IIT)

PHYSICS

DPS-1
DAILY PRACTICE SHEET

Class XI

Physical World and Measurement

INSTRUCTIONS

- DPS contains 45 topicwise questions and 5 exam section questions.
- Each question has four options out of which only one option is correct.
- Mark the correct answer in the OMR Sheet given at the end of the DPS.
- Each question carries 4 marks.
- For every incorrect answer deduct 1 mark.

Time : 50 minutes
Marks : 200

Date: .....

Fundamental Forces in Nature

1. What is the range of the gravitational force?
(a) 10^{-2} m (b) 10^{-15} m
(c) Infinite (d) 10^{-10} m

2. Pick out the correct statements about the strong nuclear force from the following.
S1 : It is charge independent.
S2 : It is the strongest force in nature.
S3 : Its range is very large.
S4 : It is responsible for the stability of nuclei.
(a) S1 and S3 (b) S1, S2 and S3
(c) S1, S2 and S4 (d) S2 and S3

The International System of Units

3. Which of the following quantities has the SI unit $kg\ m^2\ s^{-3}\ A^{-2}$?
(a) Resistance (b) Inductance
(c) Capacitance (d) Magnetic flux

4. $N\ m^2\ kg^{-2}$ is a unit of
(a) surface tension (b) permittivity
(c) gravitational constant (d) torque

5. Which of the following units is not a base unit?
(a) Metre (b) Candela (c) Ampere (d) Pascal

6. The SI unit of electron mobility is
(a) $m^2\ s^{-1}\ V^{-1}$ (b) $m\ s\ V^{-1}$
(c) $m\ s^{-1}\ V$ (d) $m^2\ s^{-2}\ V^{-2}$

7. Which one of the following statements is incorrect ?
(a) Direct and indirect methods are used for the measurement of physical quantities.
(b) Scientific notation and the prefixes are used to simplify numerical computation.
(c) A dimensionally correct equation need not be a correct equation.
(d) The SI units is based on six base units.

8. The SI unit of pressure gradient is
(a) $N\ m^{-2}$ (b) $N\ m$
(c) $N\ m^{-1}$ (d) $N\ m^{-3}$

9. The SI unit of power is
(a) joule (b) erg
(c) newton (d) watt

10. The SI unit of velocity is
(a) $m\ s^{-1}$ (b) $m\ s^{-2}$
(c) $m\ hr^{-2}$ (d) $m\ hr^{-1}$

11. The SI unit of entropy is
(a) joule/kelvin (b) newton meter
(c) calorie/second (d) joule/calorie

12. Which of the following is not the name of a physical quantity?
(a) Time (b) Impulse
(c) Mass (d) Kilogram

13. In the equation $\left(P + \frac{a}{V^2}\right)(V - b) = RT$, the SI unit of a is
(a) $N\ m^2$ (b) $N\ m^4$
(c) $N\ m^{-3}$ (d) $N\ m^{-2}$

14. Which of the following systems of units is not based on units of mass, length and time alone?
(a) SI (b) MKS
(c) FPS (d) CGS

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Accuracy, Precession of Instruments and Errors in Measurement

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

(a) 8% (b) 2%
(c) 4% (d) 6%

16. The density of a cube is measured by measuring its mass and length of its sides. If the maximum error in the measurement of mass and lengths are 3% and 2% respectively, the maximum error in the measurement of density would be

(a) 12% (b) 14%
(c) 7% (d) 9%

17. A certain body weighs 22.42 g and has a measured volume of 4.7 cc. The possible error in the measurement of mass and volume are 0.01 g and 0.1 cc. Then maximum error in the density will be

(a) 22% (b) 2%
(c) 0.2% (d) 0.02%.

18. A physical quantity X is related to four measurable quantities a, b, c and d as follows $X = a^2b^3c^{5/2}d^{-2}$. The percentage error in the measurement of a, b, c and d are 1%, 2%, 2% and 4% respectively. What is the percentage error in quantity X?

(a) 15% (b) 17%
(c) 21% (d) 23%

19. In an experiment of simple pendulum, the errors in the measurement of length of the pendulum (L) and time period (T) are 3% and 2% respectively. The maximum percentage error in the value of $\frac{L}{T^2}$ is

(a) 5% (b) 7%
(c) 8% (d) 1%

20. Percentage errors in the measurement of mass and speed are 2% and 3% respectively. The error in the estimation of kinetic energy obtained by measuring mass and speed will be

(a) 8% (b) 2%
(c) 12% (d) 10%

21. The maximum error in the measurement of mass and density of the cube are 3% and 9% respectively. The maximum error in the measurement of length will be

(a) 2% (b) 3%
(c) 6% (d) 9%

22. The voltage $V = (100 \pm 5)$ V and current $I = (10 \pm 0.2)$ A, the percentage error in resistance R is

(a) 5.2% (b) 2.5%
(c) 7% (d) 3.5%

23. The temperatures of two bodies measured by a thermometer are $t_1 = 20\ ^\circ C \pm 0.5\ ^\circ C$ and $t_2 = 50\ ^\circ C \pm 0.5\ ^\circ C$. The temperature difference and the error therein is

(a) $30\ ^\circ C \pm 1\ ^\circ C$ (b) $70\ ^\circ C \pm 0.5\ ^\circ C$
(c) $30\ ^\circ C \pm 0.5\ ^\circ C$ (d) $70\ ^\circ C \pm 1\ ^\circ C$

24. If the time period of oscillation of a pendulum is measured as 2.5 second using a stop watch with the least count $\frac{1}{2}$ second, then the permissible error in the measurement is

(a) 10% (b) 30%
(c) 15% (d) 20%

25. The heat dissipated in a resistance can be obtained by the measurement of resistance, the current and time. If the maximum error in the measurement of these quantities is 1%, 2% and 1% respectively, the maximum error in the determination of the dissipated heat is

(a) 4% (b) 6%
(c) $\frac{4}{3}$% (d) 2%

26. The mass and volume of a body are found to be (5.00 ± 0.05) kg and (1.00 ± 0.05) m^3 respectively. Then the maximum possible percentage error in its density is

(a) 6% (b) 3%
(c) 10% (d) 5%

27. The dimensions of a rectangular block measured with callipers having least count of 0.01 cm are 5 mm × 10 mm × 5 mm. The maximum percentage error in the measurement of the volume of the block is

(a) 5% (b) 10%
(c) 15% (d) 20%

28. Two resistors of resistances $R_1 = (100 \pm 3)\ \Omega$ and $R_2 = (200 \pm 4)\ \Omega$ are connected in parallel. The equivalent resistance of the parallel combination is

(a) $(66.7 \pm 1.8)\ \Omega$ (b) $(66.7 \pm 4.0)\ \Omega$
(c) $(66.7 \pm 3.0)\ \Omega$ (d) $(66.7 \pm 7.0)\ \Omega$

29. A physical quantity Q is found to depend on observables x, y and z, obeying relation $Q = \frac{x^3y^2}{z}$. The percentage error in the measurements of x, y and z are 1%, 2% and 4% respectively. What is percentage error in the quantity Q?

(a) 11% (b) 4%
(c) 1% (d) 3%

30. If $Z = \frac{A^4B^{1/3}}{CD^{3/2}}$ and ΔA, ΔB, ΔC, and ΔD are their absolute errors in A, B, C and D respectively. The relative error in Z is

(a) $\frac{\Delta Z}{Z} = 4\frac{\Delta A}{A} + \frac{1}{3}\frac{\Delta B}{B} + \frac{\Delta C}{C} + \frac{3}{2}\frac{\Delta D}{D}$

(b) $\frac{\Delta Z}{Z} = 4\frac{\Delta A}{A} + \frac{1}{3}\frac{\Delta B}{B} - \frac{\Delta C}{C} - \frac{3}{2}\frac{\Delta D}{D}$

(c) $\frac{\Delta Z}{Z} = 4\frac{\Delta A}{A} + \frac{1}{3}\frac{\Delta B}{B} + \frac{\Delta C}{C} - \frac{3}{2}\frac{\Delta D}{D}$

(d) $\frac{\Delta Z}{Z} = 4\frac{\Delta A}{A} + \frac{1}{3}\frac{\Delta B}{B} - \frac{\Delta C}{C} + \frac{3}{2}\frac{\Delta D}{D}$

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Dimensions of Physical Quantities

31. A dimensionless quantity
(a) never has a unit (b) always has unit
(c) may have a unit (d) does not exist

32. Dimensions of resistance in an electrical circuit, in terms of dimension of mass M, of length L, of time T and of current A, would be
(a) $[ML^2T^{-2}]$ (b) $[ML^2T^{-1}A^{-1}]$
(c) $[ML^2T^{-3}A^{-2}]$ (d) $[ML^2T^{-3}A^{-1}]$

33. μ_0 and ε_0 denote the permeability and permittivity of free space, the dimensions of $\mu_0\varepsilon_0$ are
(a) $[LT^{-1}]$ (b) $[L^{-2}T^2]$
(c) $[M^{-1}L^{-3}T^2]$ (d) $[M^{-1}L^{-3}T^2A^2]$

34. According to Newton, the viscous force acting between liquid layers of area A and velocity gradient $\Delta v/\Delta Z$ is given by $F = -\eta A\frac{\Delta v}{\Delta Z}$, where η is constant called coefficient of viscosity. The dimensional formula of η is
(a) $[ML^{-2}T^{-2}]$ (b) $[M^0L^0T^0]$
(c) $[ML^2T^{-2}]$ (d) $[ML^{-1}T^{-1}]$.

35. If P, Q, R are physical quantities, having different dimensions, which of the following combinations can never be a meaningful quantity?
(a) $\frac{(P-Q)}{R}$ (b) $PQ - R$
(c) $\frac{PQ}{R}$ (d) $\frac{(PR-Q^2)}{R}$

36. P represents radiation pressure, c represents speed of light and S represents radiation energy striking per unit area per second. The non zero integers x, y, z such that $P^xS^yc^z$ is dimensionless are
(a) $x = 1, y = 1, z = 1$ (b) $x = -1, y = 1, z = 1$
(c) $x = 1, y = -1, z = 1$ (d) $x = 1, y = 1, z = -1$

37. The dimension of the quantity $\frac{1}{\varepsilon_0}\frac{e^2}{hc}$ is
(e = charge of electron, h = Planck's constant and c = velocity of light)
(a) $[M^{-1}L^{-3}T^2A]$ (b) $[M^0L^0T^0A^0]$
(c) $[ML^3T^{-4}A^{-2}]$ (d) $[M^{-1}L^{-3}T^4A^2]$

38. The velocity v of a particle at time t is given by $v = at + \frac{b}{t+c}$, where a, b and c are constants. The dimensions of a, b and c are
(a) [L], [LT] and $[LT^{-2}]$ (b) $[LT^{-2}]$, [L] and [T]
(c) $[L^2]$, [T] and $[LT^{-2}]$ (d) $[LT^{-2}]$, [LT] and [L].

39. Dimensions of $\frac{L}{RCV}$ are
(a) $[A^{-1}]$ (b) $[A^{-2}]$
(c) [A] (d) $[A^2]$

40. Dimensional formula of self inductance is
(a) $[MLT^{-2}A^{-2}]$ (b) $[ML^2T^{-1}A^{-2}]$
(c) $[ML^2T^{-2}A^{-2}]$ (d) $[ML^2T^{-2}A^{-1}]$

41. The dimensional formula for the magnetic field is
(a) $[MT^{-2}A^{-1}]$ (b) $[ML^2T^{-1}A^{-2}]$
(c) $[MT^{-2}A^{-2}]$ (d) $[MT^{-1}A^{-2}]$

42. The dimensional formula of permeability of free space μ_0 is
(a) $[MLT^{-2}A^{-2}]$ (b) $[M^0L^1T]$
(c) $[M^0L^2T^{-1}A^2]$ (d) none of these.

43. What are the dimensions of electrical conductivity?
(a) $[ML^{-3}T^3A^2]$ (b) $[M^{-1}L^3T^3A^2]$
(c) $[M^{-1}L^{-3}T^3A^2]$ (d) $[M^{-1}L^{-3}T^3A]$

44. Match correctly Column I and Column II

	Column I		Column II
A.	Linear mass density	P.	$[M^0L^0T^{-1}]$
B.	Velocity gradient	Q.	$[ML^{-1}T^{-2}]$
C.	Pressure	R.	$[ML^{-1}T^{-1}]$
D.	Coefficient of viscosity	S.	$[ML^{-1}T^0]$

(a) A-P, B-Q, C-R, D-S (b) A-S, B-P, C-R, D-Q
(c) A-S, B-Q, C-R, D-P (d) A-S, B-P, C-Q, D-R

45. The dimensions of the quantity $\vec{E} \times \vec{B}$, where $\vec{E}$ represents the electric field and $\vec{B}$ the magnetic field may be given as
(a) $[MT^{-3}]$ (b) $[M^2LT^{-5}A^{-2}]$
(c) $[M^2LT^{-3}A^{-1}]$ (d) $[MLT^{-2}A^{-2}]$

EXAM SECTION

46 Planck's constant (h), speed of light in vacuum (c) and Newton's gravitational constant (G) are three fundamental constants. Which of the following combinations of these has the dimension of length ?
(a) $\frac{\sqrt{hG}}{c^{3/2}}$ (b) $\frac{\sqrt{hG}}{c^{5/2}}$
(c) $\sqrt{\frac{hc}{G}}$ (d) $\sqrt{\frac{Gc}{h^{3/2}}}$
(NEET Phase II 2016)

47. If dimensions of critical velocity v_c of a liquid flowing through a tube are expressed as $[\eta^x\rho^yr^z]$ 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) $-1, -1, 1$ *(AIPMT 2015)*

48. If force (F), velocity (V) and time (T) are taken as fundamental units, then the dimensions of mass are
(a) $[FVT^{-1}]$ (b) $[FVT^{-2}]$
(c) $[FV^{-1}T^{-1}]$ (d) $[FV^{-1}T]$ *(AIPMT 2014)*

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49. In an experiment four quantities a, b, c and d are measured with percentage error 1%, 2%, 3% and 4% respectively. Quantity P is calculated as follows $P = \frac{a^3 b^2}{cd}$. The % error in P is

(a) 7% (b) 4% (c) 14% (d) 10%

(NEET 2013)

50. The pair of quantities having same dimensions is

(a) Impulse and Surface Tension

(b) Angular momentum and Work

(c) Work and Torque

(d) Young's modulus and Energy

(NEET Karnataka 2013)

OMR SHEET

Use HB pencil only and darken each circle completely.
Mark only one choice for each question as indicated.

Correct marking ● ⓑ ⓒ ⓓ
Wrong marking ⊗ ◐ ◑ ⊙

1. ⓐ ⓑ ⓒ ⓓ	7. ⓐ ⓑ ⓒ ⓓ	13. ⓐ ⓑ ⓒ ⓓ	19. ⓐ ⓑ ⓒ ⓓ	25. ⓐ ⓑ ⓒ ⓓ	31. ⓐ ⓑ ⓒ ⓓ	37. ⓐ ⓑ ⓒ ⓓ	43. ⓐ ⓑ ⓒ ⓓ	49. ⓐ ⓑ ⓒ ⓓ
2. ⓐ ⓑ ⓒ ⓓ	8. ⓐ ⓑ ⓒ ⓓ	14. ⓐ ⓑ ⓒ ⓓ	20. ⓐ ⓑ ⓒ ⓓ	26. ⓐ ⓑ ⓒ ⓓ	32. ⓐ ⓑ ⓒ ⓓ	38. ⓐ ⓑ ⓒ ⓓ	44. ⓐ ⓑ ⓒ ⓓ	50. ⓐ ⓑ ⓒ ⓓ
3. ⓐ ⓑ ⓒ ⓓ	9. ⓐ ⓑ ⓒ ⓓ	15. ⓐ ⓑ ⓒ ⓓ	21. ⓐ ⓑ ⓒ ⓓ	27. ⓐ ⓑ ⓒ ⓓ	33. ⓐ ⓑ ⓒ ⓓ	39. ⓐ ⓑ ⓒ ⓓ	45. ⓐ ⓑ ⓒ ⓓ	
4. ⓐ ⓑ ⓒ ⓓ	10. ⓐ ⓑ ⓒ ⓓ	16. ⓐ ⓑ ⓒ ⓓ	22. ⓐ ⓑ ⓒ ⓓ	28. ⓐ ⓑ ⓒ ⓓ	34. ⓐ ⓑ ⓒ ⓓ	40. ⓐ ⓑ ⓒ ⓓ	46. ⓐ ⓑ ⓒ ⓓ	
5. ⓐ ⓑ ⓒ ⓓ	11. ⓐ ⓑ ⓒ ⓓ	17. ⓐ ⓑ ⓒ ⓓ	23. ⓐ ⓑ ⓒ ⓓ	29. ⓐ ⓑ ⓒ ⓓ	35. ⓐ ⓑ ⓒ ⓓ	41. ⓐ ⓑ ⓒ ⓓ	47. ⓐ ⓑ ⓒ ⓓ	
6. ⓐ ⓑ ⓒ ⓓ	12. ⓐ ⓑ ⓒ ⓓ	18. ⓐ ⓑ ⓒ ⓓ	24. ⓐ ⓑ ⓒ ⓓ	30. ⓐ ⓑ ⓒ ⓓ	36. ⓐ ⓑ ⓒ ⓓ	42. ⓐ ⓑ ⓒ ⓓ	48. ⓐ ⓑ ⓒ ⓓ	

SELF CHECK

No. of questions attempted .....
No. of questions correct .....
Marks scored in percentage .....

Check your score! If your score is

> 90%	EXCELLENT WORK !	You are well prepared to take the challenge of final exam.
90-75%	GOOD WORK !	You can score good in the final exam.
74-60%	SATISFACTORY !	You need to score more next time
< 60%	NOT SATISFACTORY!	Revise thoroughly and strengthen your concepts.

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