Exercise - I (Conceptual Questions) Build Up Your Understanding

UNIT

1. Which of the following system of units is not based on units of mass, length and time alone ?
(1) SI (2) MKS
(3) FPS (4) CGS
PPM001

2. Which of the following is not a fundamental physical quantity ?
(1) Mass (2) Length
(3) Temperature (4) Density
PPM002

3. Which of the following is not the name of a physical quantity :-
(1) kilogram (2) impulse
(3) energy (4) density
PPM003

4. Which of the following is not a unit of time ?
(1) microsecond (2) leap year
(3) lunar month (4) light year
PPM004

5. Unit of energy in SI system is :-
(1) erg (2) calorie
(3) joule (4) electron volt
PPM005

6. In the SI system, the unit of temperature is :-
(1) Degree centrigrade
(2) Degree Celsius
(3) Kelvin
(4) Degree Fahrenheit
PPM006

7. The SI unit of momentum is :-
(1) $\frac{kg}{m}$ (2) $\frac{kg.m}{sec}$
(3) $\frac{kg.m^2}{sec}$ (4) kg × newton
PPM007

8. SI unit of pressure is :-
(1) pascal (2) Dyne/cm^2
(3) cm of Hg (4) atmosphere
PPM008

9. kg m/s^2 stand for the unit of :-
(1) Energy (2) acceleration
(3) Force (4) Momentum
PPM009

10. N kg^{-1} is the unit of :-
(1) velocity (2) energy
(3) acceleration (4) force
PPM010

11. If the unit of length is micrometre and unit of time is microsecond, the unit of velocity will be :-
(1) 100 m/s (2) 10 m/s
(3) micrometre/s (4) m/s
PPM011

12. The unit of power is :-
(1) kilowatt (2) kilowatt-hour
(3) dyne (4) joule
PPM012

13. Kilowatt-hour is a unit of :-
(1) electrical charge (2) energy
(3) power (4) force
PPM013

14. One nanometer is equal to :-
(1) 10^9 mm (2) 10^{-6} cm
(3) 10^{-7} cm (4) 10^{-9} cm
PPM014

15. The units nanometre, fermi, angstrom and attometre, arranged in decreasing order will read as :-
(1) angstrom, nanometre, fermi, attometre
(2) fermi, attometre, angstrom, nanometre
(3) nanometre, angstrom, fermi, attometre
(4) attometre, angstrom, fermi, nanometer
PPM015

16. Which is the correct unit for measuring nuclear radii:-
(1) micron (2) millimetre
(3) agnstrom (4) fermi
PPM016

17. Which of the following is usually a derived quantity?
(1) Mass (2) Velocity
(3) Length (4) Time
PPM017

18. Temperature can be expressed as a derived quantity in terms of which of the following ?
(1) Length and mass
(2) Mass and time
(3) Length. mass and time
(4) None of these
PPM018

19. Which of the following sets can not enter into the list of fundamental quantities in any system of units?
(1) length, mass, velocity
(2) length, time, velocity
(3) length, time, mass
(4) mass, time, velocity

PPM019

20. The density of a liquid is 1000 kg m^{-3}. Its value in CGS system :-
(1) 1 gcm^{-3} (2) 0.1 gcm^{-3}
(3) 10 gcm^{-3} (4) 100 gcm^{-3}

PPM020

21. The surface tension of a liquid is 70 dynes/cm. It may be expressed in M.K.S. system as :-
(1) 70 N/m (2) 7×10^{-2} N/m
(3) 7×10^{2} N/m (4) 7×10^{3} N/m

PPM021

22. Units of length, velocity and force are doubled. Which of the following is correct :-
(1) Units of time is doubled
(2) Unit of mass is doubled
(3) Unit of momentum is doubled
(4) Unit of energy is doubled

PPM022

23. If the units of length, velocity and force are half, then the units of Power will be :-
(1) doubled
(2) halved
(3) one fourth
(4) remains unaffected

PPM023

DIMENSIONS

24. A dimensionless quantity
(1) Never has a unit (2) Always has a unit
(3) May have a unit (4) Does not exist

PPM024

25. A unitless quantity
(1) Does not exist
(2) Always has a nonzero dimension
(3) Never has a nonzero dimension
(4) May have a nonzero dimension

PPM025

26. Which of the following physical quantities has neither dimensions nor unit ?
(1) angle
(2) Luminous intensity
(3) coefficient of friction
(4) Electric current

PPM026

27. Dimensions of relative density is
(1) kg m^{-3} (2) $[ML^{-3}]$
(3) dimensionless (4) $[M^2 L^{-6}]$

PPM027

28. Which of the following does not have dimensions of length ?
(1) fermi (2) micron
(3) angstrom (4) radian

PPM028

29. The quantity having dimension –2 in the time is :-
(1) force
(2) pressure
(3) gravitational constant
(4) all of these

PPM029

30. The dimensional formula $[ML^2T^{-2}]$ represents :-
(1) pressure
(2) linear momentum
(3) power
(4) energy

PPM030

31. Which pair has the same dimensions ?
(1) Work and power
(2) Density and relative density
(3) Momentum and impulse
(4) Latent heat and specific heat

PPM031

32. Dimensions of one pair is same. Identify the pair:-
(1) Torque and energy
(2) Angular momentum and work
(3) Energy and pressure
(4) Light year and solar day

PPM032

33. The method of dimensional analysis can be used to derive which of the following relations ?
(1) $N_0e^{-\lambda t}$
(2) $A \sin(\omega t + kx)$
(3) $\frac{1}{2}mv^2 + \frac{1}{2}I\omega^2$
(4) None of the above

PPM033

34. If dimensions of A and B are different, then which of the following operation is valid ?
(1) $\frac{A}{B}$ (2) $e^{-A/B}$ (3) A – B (4) A + B

PPM034

35. Which of the following is incorrect statement
(1) A dimensionally correct equation may be correct
(2) A dimensionally correct equation may be incorrect
(3) A dimensionally incorrect equation may be correct
(4) A dimensionally incorrect equation is incorrect

PPM035

36. Which of the following is incorrect ?
(1) All derived quantities may be represented dimensionally in terms of the base quantities
(2) A base quantity cannot be represented dimensionally in terms of other base quantities
(3) The dimension of a derived quantity is never zero in any base quantity
(4) The dimension of a base quantity in other base quantities is always zero.

PPM036

37. If $x = at + bt^2$, where x is in metre and t is in hour(hr), then unit of b will be :-
(1) m^2/hr (2) m
(3) m/hr (4) m/hr^2

PPM037

38. A force is given by $F = at + bt^2$, where t is time. The dimensions of a and b are
(1) $[M\ L\ T^{-3}]$ and $[M\ L\ T^{-4}]$
(2) $[M\ L\ T^{-4}]$ and $[M\ L\ T^{-3}]$
(3) $[M\ L\ T^{-1}]$ and $[M\ L\ T^{-2}]$
(4) $[M\ L\ T^{-2}]$ and $[M\ L\ T^{0}]$

PPM038

39. If $S = \frac{1}{3}ft^3$, 'f' has the dimensions of - (S = distance, t = time)
(1) $[M^0L^{-1}T^3]$ (2) $[M^1L^1T^{-3}]$
(3) $[M^0L^1T^{-3}]$ (4) $[M^0L^{-1}T^{-3}]$

PPM039

40. The time dependence of a physical quantity P is given by $P = P_0 \exp(-\alpha t^2)$, where α is a constant and t is time. The constant α
(1) is dimensionless
(2) has dimensions $[T^{-2}]$
(3) has dimensions of P
(4) has dimensions $[T^2]$

PPM040

41. Given the force $F = Pt^{-1} + Qt$. Here t is time. The unit of P is same as that of :-
(1) displacement (2) velocity
(3) acceleration (4) momentum

PPM041

42. The force F, on a sphere of radius 'a' moving in a medium with velocity v is given by $F = 6\pi\eta av$. The dimensions of η are :-
(1) $[ML^{-1}T^{-1}]$ (2) $[MT^{-1}]$
(3) $[MLT^{-2}]$ (4) $[ML^{-3}]$

PPM042

43. The force is given in terms of time (t) and displacement (x) by the equation :

$$F = A\cos Bx + C\sin Dt$$

Then, the dimensions of $\frac{D}{B}$ are :-
(1) $M^oL^oT^o$ (2) $M^oL^oT^{-1}$
(3) $M^oL^{-1}T^o$ (4) M^oLT^{-1}

PPM043

44. For a body moving along x-axis, the distance travelled by body from a reference point is given as function of time t as $x = at^2 + b$, where a and b are constants, then the dimension of $\sqrt{ab}$ is same as :-
(1) speed (2) distance travelled
(3) acceleration (4) none of these

PPM044

45. In the relation $y = r\sin(\omega t - kx)$ the dimensions of $\frac{\omega}{k}$ are :-
(1) $[M^0L^1T^0]$ (2) $[M^0L^1T^{-1}]$
(3) $[M^0L^0T^3]$ (4) $[M^0L^1T^0]$

PPM045

46. A wave is represented by
$y = a\sin(At - Bx + C)$
where A, B, C are constants. The dimensions of A, B, C are
(1) T^{-1}, L, $M^0L^0T^0$ (2) T^{-1}, L^{-1}, $M^0L^0T^0$
(3) T, L, M (4) T^{-1}, L^{-1}, M^{-1}

PPM046

47. For $10^{(at+3)}$, the dimensions of a is :-
(1) $M^0L^0T^0$ (2) $M^0L^0T^1$
(3) $M^0L^0T^{-1}$ (4) None of these

PPM047

48. The equation $\frac{dv}{dt} = AT - Bv$ is describing the rate of change of velocity of a body falling from rest in a resisting medium. The dimensions of A and B are :-
(1) LT^{-3}, T (2) LT^{-3}, T^{-1}
(3) LT, T (4) LT, T^{-1}
PPM048

49. If y represents distance and x-represents time, dimensions of $\frac{d^2y}{dx^2}$ are :-
(1) LT^{-1} (2) L^2T^2 (3) L^2T^{-1} (4) LT^{-2}
PPM049

50. If energy (E), velocity (v) and force (F), be taken as fundamental quantities, then what are the dimensions of mass :-
(1) EV^2 (2) EV^{-2} (3) FV^{-1} (4) FV^{-2}
PPM050

51. A system has basic dimensions as density [D], velocity [V] and area [A]. The dimensional representation of force in this system is :-
(1) AV^2D (2) A^2VD (3) AVD^2 (4) A^0VD
PPM051

ERRORS

52. The significant digits in 200.40 are :-
(1) 4 (2) 5 (3) 2 (4) 3
PPM052

53. Number of significant digits in 0.01230 is :-
(1) 3 (2) 4 (3) 5 (4) 6
PPM053

54. Which of the following has the highest number of significant figures ?
(1) 0.007 m^2 (2) 2.64×10^{24} kg
(3) 0.0006032 m^2 (4) 6.3200 J
PPM054

55. Given P = 0.0030 m, Q = 2.40 m and R = 3000m, the number of significant figures in P, Q and R are respectively :-
(1) 1, 2, 1 (2) 2, 3, 4
(3) 4, 2, 1 (4) 4, 2, 4
PPM055

56. After rounding off the number 4621 to 2 significant digits the value becomes :-
(1) 4600 (2) 4500
(3) 4700 (4) 4720
PPM056

57. If L = 2.331 cm and B = 2.1 cm, then L + B = (According to significant figures)
(1) 4.431 cm (2) 4.43 cm
(3) 4.4 cm (4) 4 cm
PPM057

58. Subtract 0.2 J from 5.27 J and express the result with correct number of significant figures :-
(1) 5.1 J (2) 5.06 J (3) 5.0 J (4) 5 J
PPM058

59. In arithmetic 17.8 × 3.1143 = 55.4354. But as a result of experimental measurements the best way to express the product is :-
(1) 55.3454 (2) 55.4
(3) 55.44 (4) 55.435
PPM059

60. The order of magnitude of the number 1013 is:-
(1) 1 (2) 2 (3) 3 (4) 4
PPM060

61. The length of a rod is (11.05 ± 0.05) cm. What is the sum of lengths of two such rods :-
(1) (22.1 ± 0.05) cm (2) (22.10 ± 0.05) cm
(3) (22.1 ± 0.15) cm (4) (22.10 ± 0.10) cm
PPM061

62. The external and internal radius of a hollow cylinder are measured to be (5.23 ± 0.015) cm and (4.89 ± 0.005) cm. The thickness of the wall of the cylinder is :-
(1) (0.34 ± 0.02) cm (2) (0.17 ± 0.02) cm
(3) (0.17 ± 0.01) cm (4) (0.34 ± 0.01) cm
PPM062

63. The resistance is $R = \frac{V}{I}$ where V = (100 ± 5) volt and I = (10 ± 0.2) ampere. What is the total error in R ?
(1) 5 % (2) 7 %
(3) 5.2 % (4) $\left(\frac{5}{2}\right)$%
PPM063

64. When a copper sphere is heated, maximum percentage change will be observed in–
(1) radius (2) area
(3) volume (4) none of these
PPM064

65. If error in measuring diameter of a circle is 2%, the error in circumference of the circle would be :-
(1) 2% (2) 8% (3) 4% (4) 1%
PPM065

66. The error is the measurement of volume of sphere is 1.5%. The error in the measurement of its diameter is :-
(1) 1% (2) 2% (3) 0.5% (4) 1.5%
PPM066

67. There is an error of 2% in the measurement of side of a cube. The percentage error in the calculation of its volume will be :-
(1) 1% (2) 2% (3) 3 (4) 6%
PPM067

68. A thin copper wire of length ℓ metre increases in length by 2% when heated through 10°C. What is the percentage increase in area when a square copper sheet of length ℓ metre is heated through 10°C ?
(1) 4% (2) 8%
(3) 16% (4) None of these
PPM068

69. If $f = x^2$, then the relative error in f is :-
(1) $\frac{2\Delta x}{x}$ (2) $\frac{(\Delta x)^2}{x}$
(3) $\frac{\Delta x}{x}$ (4) $(\Delta x)^2$
PPM069

70. The percentage error in the measurement of mass and speed are 2% and 3% respectively. How much will be the maximum error in the estimate of kinetic energy obtained by measuring mass and speed :-
(1) 11% (2) 8% (3) 5% (4) 4%
PPM070

71. The heat generated in a circuit is dependent upon the resistance, current and time for which the current is flown. If the error in measuring the above are as 1%, 2% and 1% the maximum error in measuring heat will be
(1) 2% (2) 3%
(3) 6% (4) 1%
PPM071

72. Percentage error in measuring the radius (R) and mass (M) of a solid sphere are 2% & 1% respectively. Then error in measurement of moment of inertia about to its diameter $\left(\text{i.e. } I = \frac{2}{5}MR^2\right)$ is :-
(1) 3 % (2) 6 % (3) 5 % (4) 4 %
PPM072

73. The resistance R of a wire is given by the relation $R = \frac{\rho\ell}{\pi r^2}$. Percentage error in the measurement of ρ, ℓ and r is 1%, 3 % and 2% respectively. Then the percentage error in the measurement of R is
(1) 6% (2) 9% (3) 8% (4) 10%
PPM073

74. The pressure on a square plate is measured by measuring the force on the plate and the length of the sides of the plate. If the maximum error in the measurement of force and length are respectively 4% and 2%, the maximum error in the measurement of pressure is –
(1) 1% (2) 2% (3) 6% (4) 8%
PPM074

75. What is the fractional error in g calculated from $T = 2\pi\sqrt{\ell/g}$? Given that fractional errors in T and ℓ are ±x and ±y respectively.
(1) x + y (2) x – y
(3) 2x + y (4) 2x – y
PPM075

76. While measuring acceleration due to gravity by a simple pendulum a student makes a positive error of 1% in the length of the pendulum and a negative error of 3% in the value of the time period. His percentage error in the measurement of the value of g will be (Use time period of a simple pendulum, $T = 2\pi\sqrt{\frac{\ell}{g}}$) -
(1) 2 % (2) 4 %
(3) 7 % (4) 10 %
PPM076

77. An experiment measures quantities a, b and c, and X is calculated from $X = ab^2/c^3$. If the percentage error in a, b and c are ±1%, ±3% and ±2% respectively, the percentage error in X will be –
(1) ±13% (2) ±7%
(3) ±4% (4) ±1%
PPM077

78. A physical quantity X is given by $X = \frac{2k^3\ell^2}{m\sqrt{n}}$
The percentage error in the measurements of k,ℓ, m and n are 1%, 1%, 3% and 4% respectively. The value of X is uncertain by
(1) 8 % (2) 10 % (3) 12 % (4) None
PPM078

79. A quantity is represented by $X = M^a L^b T^c$. The percentage error in measurement of M, L and T are α%, β % and γ % respectively. The percentage error in X would be
(1) (α a + βb + γc) %
(2) (αa – βb + γc) %
(3) (α a – βb– γc) %
(4) None of these
PPM079

80. the dimensional formula of a physical quantity x is $[M^{-1}L^3T^{-2}]$. The error in measuring the quantities M, L, and T are 2%, 3% and 4%. The maximum percentage of error that occurs in measuring the quantity x is :-
(1) 9 (2) 10 (3) 14 (4) 19
PPM080

81. The pressure P and volume V of a gas are related as $PV^{3/2} = K$, where K is a constant. The percentage change in the pressure for a decrease of 0.5% in the volume is :-
(1) –0.75% (2) 0.75%
(3) 1.50% (4) –1.50%
PPM081

MEASUREMENT

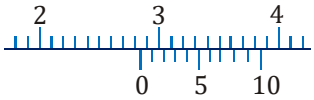
82. Zero error of an instrument introduces
(1) Systematic errors (2) Random errors
(3) Both (4) None of these
PPM082

83. A pendulum clock, designed to give correct time in planes, gives incorrect time at hill station. Type of error in measurement of time can be :-
(1) Systematic error (2) Random error
(3) Gross error (4) None of these
PPM083

84. A vernier callipers has 40 divisions on the vernier scale which coincide with 38 divisions on the main scale. The least count of the instrument is 0.1 mm. The main scale divisions are of
(1) 0.5 mm (2) 1 mm
(3) 2 mm (4) 1/4 mm
PPM084

85. One centimetre on the main scale of vernier callipers is divided into ten equal parts. If 20 divisions of vernier scale coincide with 16 small divisions of the main scale, the least count of the callipers is
(1) 0.01 cm (2) 0.02 cm
(3) 0.05 cm (4) 0.005 cm
PPM085

86. In main scale of a vernier callipers 1 cm divided into 10 equal divisions. The vernier scale has 10 equal divisions that correspond to 9 main scale divisions. The measured value by this calliper is :-



(1) 2.82 cm (2) 2.83 cm
(3) 2.87 cm (4) 2.89 cm
PPM086

87. A student measured the thickness of a metal sheet using a screw gauge with least count 0.001 cm and listed the measurements. The correct measurement is –
(1) 4.2 cm (2) 4.22 cm
(3) 4.220 cm (4) 4.2200 cm
PPM087

88. One full rotation of the cap of a screw gauge is equivalent to 5 mm. The cap has 100 division. Find the least count.
(1) 0.5 m (2) 0.05 mm
(3) 0.005 m (4) 5×10^{-4} m
PPM088

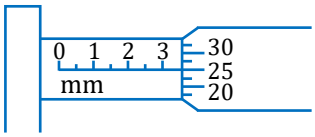
89. Distance moved by a screw in 5 rotation is 5 mm and total number of circular divisions is 100. The least count of the screw gauge is :-

(1) 1 mm (2) 0.001 cm

(3) 0.0001 cm (4) 0.001 mm

PPM089

90. The number of circular division on screwgauge is 100. It moves 1 mm on main scale for one complete revolution. Find reading of micrometer.

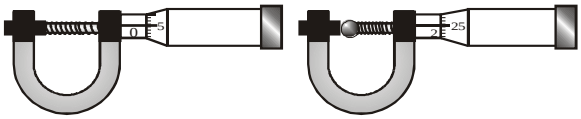


(1) 3.25 mm (2) 3.24 mm

(3) 3.30 mm (4) 3.41 mm

PPM090

91. The number of circular division on the shown screw gauge is 100. It moves 1 mm on main scale for one complete rotation and main scale has 1 mm marks. The diameter of the ball is :-



(1) 2.25 mm

(2) 2.20 mm

(3) 1.20 mm

(4) 1.25 mm

PPM091

EXERCISE-I (Conceptual Questions) ANSWER KEY

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Answer	1	4	1	4	3	3	2	1	3	3	4	1	2	3	3
Question	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Answer	4	2	4	2	1	2	3	3	3	3	3	3	4	4	4
Question	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
Answer	3	1	4	1	3	3	4	1	3	2	4	1	4	1	2
Question	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Answer	2	3	2	4	2	1	2	2	4	2	1	3	1	2	3
Question	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
Answer	4	1	2	3	1	3	4	1	1	2	3	3	3	4	3
Question	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
Answer	3	1	2	1	4	2	1	1	3	2	3	3	2	2	1
Question	91														
Answer	2														

Exercise - II (Previous Year Questions) AIPMT/NEET

AIPMT 2014

1. If force (F), velocity (V) and time (T) are taken as fundamental units, then the dimensions of mass are:

(1) $[F\ V\ T^{-1}]$ (2) $[F\ V\ T^{-2}]$

(3) $[F\ V^{-1}\ T^{-1}]$ (4) $[F\ V^{-1}\ T]$

PPM103

AIPMT 2015

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

(1) $[EV^{-1}T^{-2}]$ (2) $[EV^{-2}T^{-2}]$

(3) $[E^{-2}V^{-1}T^{-3}]$ (4) $[EV^{-2}T^{-1}]$

PPM104

Re-AIPMT 2015

3. If dimension of critical velocity v_c, of liquid flowing through a tube is expressed as $(\eta^x \rho^y r^z)$, where η, ρ and r 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 :

(1) 1, 1, 1 (2) 1, –1, –1

(3) –1, –1, 1 (4) –1, –1, –1

PPM105

NEET-II 2016

4. 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?

(1) $\sqrt{\frac{hc}{G}}$ (2) $\sqrt{\frac{Gc}{h^{3/2}}}$ (3) $\frac{\sqrt{hG}}{c^{3/2}}$ (4) $\frac{\sqrt{hG}}{c^{5/2}}$

PPM106

NEET(UG) 2017

5. A physical quantity of the dimensions of length that can be formed out of c, G and $\frac{e^2}{4\pi\varepsilon_0}$ is [c is velocity of light, G is universal constant of gravitation and e is charge] :-

(1) $c^2\left[G\frac{e^2}{4\pi\varepsilon_0}\right]^{1/2}$ (2) $\frac{1}{c^2}\left[\frac{e^2}{G\,4\pi\varepsilon_0}\right]^{1/2}$

(3) $\frac{1}{c}G\frac{e^2}{4\pi\varepsilon_0}$ (4) $\frac{1}{c^2}\left[G\frac{e^2}{4\pi\varepsilon_0}\right]^{1/2}$

PPM107

NEET(UG) 2018

6. A student measured the diameter of a small steel ball using a screw gauge of least count 0.001 cm. The main scale reading is 5 mm and zero of circular scale division coincides with 25 divisions above the reference level. If screw gauge has a zero error of – 0.004 cm, the correct diameter of the ball is :-

(1) 0.521 cm (2) 0.525 cm

(3) 0.053 cm (4) 0.529 cm

PPM108

NEET(UG) 2019

7. In an experiment, the percentage of error occurred in the measurement of physical quantities A, B, C and D are 1%, 2%, 3% and 4% respectively. Then the maximum percentage of error in the measurement X, where $X=\frac{A^2B^{1/2}}{C^{1/3}D^3}$, will be :

(1) $\left(\frac{3}{13}\right)\%$ (2) 16% (3) –10% (4) 10%

PPM109

8. The unit of thermal conductivity is :

(1) J m K^{-1} (2) J m^{-1} K^{-1}

(3) W m K^{-1} (4) W m^{-1} K^{-1}

PPM110

NEET(UG) 2019 (Odisha)

9. The main scale of a vernier calliper has n divisions/cm. n divisions of the vernier scale coincide with (n – 1) divisions of main scale. The least count of the vernier calliper is,

(1) $\frac{1}{(n+1)(n-1)}$ cm (2) $\frac{1}{n}$ cm

(3) $\frac{1}{n^2}$ cm (4) $\frac{1}{n(n+1)}$ cm

PPM111

NEET(UG) 2020

10. Taking into account of the significant figures, what is the value of 9.99 m – 0.0099 m ?

(1) 9.9 m (2) 9.9801 m

(3) 9.98 m (4) 9.980 m

PPM112

11. Dimensions of stress are :

(1) $[M\ L^{-1}\ T^{-2}]$ (2) $[M\ L\ T^{-2}]$

(3) $[M\ L^2\ T^{-2}]$ (4) $[M\ L^0\ T^{-2}]$

PPM113

12. A screw gauge has least count of 0.01 mm and there are 50 divisions in its circular scale. The pitch of the screw gauge is :
(1) 1.0 mm (2) 0.01 mm
(3) 0.25 mm (4) 0.5 mm

PPM114

NEET(UG) 2020 (COVID-19)

13. The angle of 1' (minute of arc) in radian is nearly equal to
(1) 2.91×10^{-4} rad (2) 4.85×10^{-4} rad
(3) 4.80×10^{-6} rad (4) 1.75×10^{-2} rad

PPM115

14. Time intervals measured by a clock give the following readings :
1.25 s, 1.24 s, 1.27 s, 1.21 s and 1.28 s.
What is the percentage relative error of the observations ?
(1) 2 % (2) 4 %
(3) 16 % (4) 1.6 %

PPM116

NEET(UG) 2021

15. If force [F], acceleration [A] and time [T] are chosen as the fundamental physical quantities. Find the dimensions of energy.
(1) [F] [A] [T] (2) [F] [A] $[T^2]$
(3) [F] [A] $[T^{-1}]$ (4) [F] $[A^{-1}]$ [T]

PPM117

16. A screw gauge gives the following readings when used to measure the diameter of a wire
Main scale reading : 0 mm
Circular scale reading : 52 divisions
Given that 1 mm on main scale corresponds to 100 divisions on the circular scale. The diameter of the wire from the above data is :
(1) 0.52 cm (2) 0.026 cm
(3) 0.26 cm (4) 0.052 cm

PPM118

17. If E and G respectively denote energy and gravitational constant, then $\frac{E}{G}$ has the dimensions of :
(1) $[M^2]$ $[L^{-1}]$ $[T^0]$ (2) [M] $[L^{-1}]$ $[T^{-1}]$
(3) [M] $[L^0]$ $[T^0]$ (4) $[M^2]$ $[L^{-2}]$ $[T^{-1}]$

PPM119

NEET(UG) 2022

18. Plane angle and solid angle have :
(1) Dimensions but no units
(2) No units and no dimensions
(3) Both units and dimensions
(4) Units but no dimensions

PPM120

19. The dimensions $[MLT^{-2} A^{-2}]$ belong to the :
(1) self inductance
(2) magnetic permeability
(3) electric permittivity
(4) magnetic flux

PPM121

RE-NEET(UG) 2022

20. The physical quantity that has the same dimensional formula as pressure is :
(1) Force
(2) Momentum
(3) Young's modulus of elasticity
(4) Coefficient of viscosity

PPM122

21. The ratio of coulomb's electrostatic force to the gravitational force between an electron and a proton separated by some distance is 2.4×10^{39}. The ratio of the proportionality constant, $K = \frac{1}{4\pi\varepsilon_0}$ to the Gravitational constant G is nearly (Given that the charge of the proton and electron each $=1.6 \times 10^{-19}$ C, the mass of the electron = 9.11×10^{-31} kg, the mass of the proton = 1.67×10^{-27} kg):
(1) 10^{20} (2) 10^{30} (3) 10^{40} (4) 10

PPM123

NEET(UG) 2023

22. The errors in the measurement which arise due to unpredictable fluctuations in temperature and voltage supply are :
(1) Personal errors
(2) Least count errors
(3) Random errors
(4) Instrumental errors

PPM142

23. A metal wire has mass (0.4 ± 0.002) g, radius (0.3 ± 0.001) mm and length (5 ± 0.02) cm. The maximum possible percentage error in the measurement of density will nearly be :
(1) 1.3% (2) 1.6% (3) 1.4% (4) 1.2%

PPM143

RE-NEET(UG) 2023

24. The diameter of a spherical bob, when measured with vernier callipers yielded the following values : 3.33 cm, 3.32 cm, 3.34 cm, 3.33 cm and 3.32 cm. The mean diameter to appropriate significant figures is :
(1) 3.328 cm (2) 3.3 cm
(3) 3.33 cm (4) 3.32 cm

PPM144

25. The mechanical quantity, which has dimensions of reciprocal of mass (M^{-1}) is :
(1) angular momentum
(2) coefficient of thermal conductivity
(3) torque
(4) gravitational constant

PPM145

NEET(UG) 2024

26. In a vernier calipers, (N+1) divisions of vernier scale coincide with N divisions of main scale. If 1 MSD represents 0.1 mm, the vernier constant (in cm) is :
(1) $\frac{1}{10N}$ (2) $\frac{1}{100(N+1)}$
(3) 100N (4) 10(N+1)

PPM146

27. The quantities which have the same dimensions as those of solid angle are :
(1) strain and angle
(2) stress and angle
(3) strain and arc
(4) angular speed and stress

PPM147

28. A force defined by $F = \alpha t^2 + \beta t$ acts on a particle at a given time t. The factor which is dimensionless, if α and β are constants, is :
(1) $\frac{\beta t}{\alpha}$ (2) $\frac{\alpha t}{\beta}$
(3) $\alpha\beta t$ (4) $\frac{\alpha\beta}{t}$

PPM148

RE-NEET(UG) 2024

29. In an electrical circuit, the voltage is measured as $V = (200\pm4)$ volt and the current is measured as $I = (20\pm0.2)$A. The value of the resistance is :
(1) $(10\pm4.2)\Omega$ (2) $(10\pm0.3)\Omega$
(3) $(10\pm0.1)\Omega$ (4) $(10\pm0.8)\Omega$

PPM149

30. The pitch of an error free screw gauge is 1 mm and there are 100 divisions on the circular scale. While measuring the diameter of a thick wire, the pitch scale reads 1 mm and 63rd division on the circular scale coincides with the reference line. The diameter of the wire is :
(1) 1.63 cm (2) 0.163 cm
(3) 0.163 m (4) 1.63 m

PPM150

31. The potential energy of a particle moving along x-direction varies as $V = \frac{Ax^2}{\sqrt{x}+B}$. The dimensions of $\frac{A^2}{B}$ are :
(1) $[M^{3/2} L^{1/2} T^{-3}]$
(2) $[M^{1/2} L T^{-3}]$
(3) $[M^2 L^{1/2} T^{-4}]$
(4) $[M L^2 T^{-4}]$

PPM151

EXERCISE-II (Previous Year Questions) ANSWER KEY

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Answer	4	2	2	3	4	4	2	4	3	3	1	4	1	4	2
Question	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Answer	4	1	4	2	3	1	3	2	3	4	2	1	2	2	2
Question	31														
Answer	3														

Exercise - III (Analytical Questions) Master Your Understanding

1. Given below are two statements: one is labelled as **Assertion (A)** and the other is labelled as **Reason (R)**.
Assertion (A) : Absolute error in a physical quantity may be +ve, –ve or zero.
Reason (R) : Absolute error is the difference of measured value and true value of a physical quantity.
In the light of the above statements, choose the most appropriate answer from the options given below:
(1) Both **(A)** and **(R)** are true and **(R)** is the correct explanation of **(A)**.
(2) Both **(A)** and **(R)** are true and **(R)** is NOT the correct explanation of **(A)**.
(3) **(A)** is true but **(R)** is false.
(4) **(A)** is false but **(R)** is true.

PPM124

2. Given below are two statements: one is labelled as **Assertion (A)** and the other is labelled as **Reason (R)**.
Assertion (A) : Maximum possible error in a reading is taken as least count of the measuring instrument.
Reason (R) : Error in a measurement can not be greater than least count of the measuring instrument.
In the light of the above statements, choose the most appropriate answer from the options given below:
(1) Both **(A)** and **(R)** are true and **(R)** is the correct explanation of **(A)**.
(2) Both **(A)** and **(R)** are true and **(R)** is NOT the correct explanation of **(A)**.
(3) **(A)** is true but **(R)** is false.
(4) **(A)** is false but **(R)** is true.

PPM125

3. Given below are two statements: one is labelled as **Assertion (A)** and the other is labelled as **Reason (R)**.
Assertion (A) : Higher is the accuracy of measurement, if instrument has smaller least count.
Reason (R) : Smaller the percentage error, higher is the accuracy of measurement.
In the light of the above statements, choose the most appropriate answer from the options given below:
(1) Both **(A)** and **(R)** are true and **(R)** is the correct explanation of **(A)**.
(2) Both **(A)** and **(R)** are true and **(R)** is NOT the correct explanation of **(A)**.
(3) **(A)** is true but **(R)** is false.
(4) **(A)** is false but **(R)** is true.

PPM126

4. Given below are two statements :
Statement I : Absolute error is unitless and dimensionless.
Statement II : All types of errors are unitless and dimensionless.
In the light of the above statements, choose the most appropriate answer from the options given below :
(1) Both statement I and statement II are correct.
(2) Statement I is correct and statement II is incorrect.
(3) Statement I is incorrect and statement II is correct.
(4) Both statements I and statements II are incorrect.

PPM128

5. Given below are two statements :
Statement I : Least count of a screw gauge is directly proportional to the number of divisions on circular scale.
Statement II : A screw gauge having a smaller value of pitch has greater accuracy.
In the light of the above statements, choose the most appropriate answer from the options given below :
(1) Both statement I and statement II are correct.
(2) Statement I is correct and statement II is incorrect.
(3) Statement I is incorrect and statement II is correct.
(4) Both statements I and statements II are incorrect.

PPM131

6. Match the quantities having same dimensions in column-1 and column-2 :

	Column-1		Column-2
A	Stress	p	Pressure
B	Strain	q	Energy density
C	Modulus of elasticity	r	Angle
D	Torque	s	Energy

(1) A → r ; B → p ; C → s ; D → q
(2) A → q ; B → r ; C → p ; D → s
(3) A → p ; B → s ; C → r ; D → q
(4) A → q ; B → s ; C → r ; D → q

PPM132

7. Match the column :

	Column-1		Column-2
A	Electrical resistance	p	$M^{-1}L^{-2}T^{4}A^{2}$
B	Capacitance	q	$ML^{2}T^{-2}A^{-2}$
C	Magnetic field	r	$ML^{2}T^{-3}A^{-2}$
D	Inductance	s	$MT^{-2}A^{-1}$

(1) A → r ; B → p ; C → s ; D → q
(2) A → s ; B → p ; C → r ; D → q
(3) A → p ; B → s ; C → r ; D → q
(4) A → q ; B → s ; C → r ; D → q

PPM133

8. Match the column :

	Column-1		Column-2
A	Boltzmann constant	p	$ML^{2}T^{-1}$
B	Coefficient of viscosity	q	$ML^{-1}T^{-1}$
C	Planck constant	r	$MLT^{-3}K^{-1}$
D	Thermal conductivity	s	$ML^{2}T^{-2}K^{-1}$

(1) A → r ; B → s ; C → p ; D → q
(2) A → p ; B → s ; C → r ; D → q
(3) A → p ; B → r ; C → s ; D → q
(4) A → s ; B → q ; C → p ; D → r

PPM135

9. Which two of the following five physical quantities have the same dimensions?
(a) Energy density (b) Refractive index
(c) Dielectric constant (d) Young's modulus
(e) Magnetic field
(1) (a) and (e) (2) (b) and (d)
(3) (c) and (e) (4) (a) and (d)

PPM136

10. Photon is quantum of radiation with energy E = hν where ν is frequency and h is Planck's constant. The dimensions of h are the same as that of
(a) Linear impulse
(b) Angular impulse
(c) Linear momentum
(d) Angular momentum
(1) (a) and (c) (2) (b) and (d)
(3) (b) and (c) (4) (a) and (d)

PPM138

11. Which of the following ratios express pressure?
(a) Force / area (b) Energy / volume
(c) Energy / area (d) Force / volume
(1) (a) and (c) (2) (b) and (d)
(3) (b) and (c) (4) (a) and (b)

PPM139

12. **Statement–1 :** The displacement cannot be added with distance travelled.
Statement–2 : Addition of scalar and vector of same dimensions is not a meaningful algebraic operation.
(1) Statement–1 is True, Statement–2 is True; Statement–2 is a correct explanation for Statement–1.
(2) Statement–1 is True, Statement–2 is True; Statement–2 is not a correct explanation for Statement–1.
(3) Statement–1 is True, Statement–2 is False.
(4) Statement–1 is False, Statement–2 is True.

PPM140

13. Match the column – I with column – II.

	Column-I (Number)		Column-II (Number of significant digits)
(A)	1001	(P)	5
(B)	0100.1	(Q)	4
(C)	100.100	(R)	6
(D)	0.001001	(S)	3

Options :-
(1) A → Q, B → Q, C → R, D → Q
(2) A → Q, B → P, C → R, D → R
(3) A → Q, B → S, C → S, D → Q
(4) A → Q, B → Q, C → P, D → Q

PPM141

EXERCISE-III (Analytical Questions) ANSWER KEY

Question	1	2	3	4	5	6	7	8	9	10	11	12	13
Answer	1	3	1	4	3	2	1	4	4	2	4	1	1

Important Notes