# PHYSICS

# BOOKS - BINA LIBRARY PHYSICS (ASSAMESE ENGLISH)

# MEASUREMENT

**Exercise**

**1.** what do you mean by fundemental quantities ?

**2.** what is unit ?

**3.** what is a coherent system of units ?

**4.** state the unit of impulse in SI.

**5.** what is dimensional formula ?

**6.** state the dimensions of work .

**7.** what physical quatity has dimentional formula $ML^2T^{-2}$

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**8.** what is dimensions of torque ?

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**9.** what is unit ?

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**10.** state the advantages of SI units over other systems of units .

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**11.** what is a coherent system of units ?

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**12.** what is various sources of occurrence of errors while taking measuremets .?

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**13.** how is systemetic error eliminated ?

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**14.** what is random error ?

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**15.** how is systemetic error eliminated ?

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**16.** what is meant by significant figures ?how they counted ?

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**17.** state the rules of finding the significant figures in the sum and the product of two numbers .

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**18.** what is difference between 5.0to 5.00?

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**19.** show that planck 's constant and angukar momemtum have identical dimentions .

**20.** what are dimensions and dimensional equations ?what is the dimension of angle ?

**21.** what is dimensional formula ?

**22.** what are the uses of dimensional formula?

**23.** write the limitations of dimesional analysis

.

**24.** what is various sources of occurrence of errors while taking measuremets .?

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**25.** what do you mean by absolute error?how do error combine in multiplication or divisions ?

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**26.** what does it mean by precision of measurement and accuracy of measurement ?

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**27.** Obtain the dimensional equation of the following quantitites :

a)velocity b)momemtum c) pressure d) energy

e)acceleration f)force g)impulse h)stress

i) density j)work k) frequency l)power m) torque

**28.** How will you estimate the number of air molecules in your room ?

**29.** which of the following devices is more precise ?

a) a vernier callipers with 10 divisons on the sliding scale b) a screw guage of pitch 1 mm and 100 divisos on the circular scale .

**30.** which of the following measurements is more accurate - 3.0 m and 3.00 m ?

**31.** can a quantity have unit , but no dimension ?

**32.** can a quantity have dimension , but no unit
?

**33.** Name a pair of physical qauantities having
same dimensions .

**34.** The length , breadth , and thickness of a sheet are respectively 4.234 m , 1.005 m, and 2.01 cm find the area and the volume of the sheet to correct number of significant figure

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**35.** The diameter of a circle is 2.486 m . Calculate its area with due regard to significant figures

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**36.** The radius of sphere is measured with an error of 2% what will be the error in its volume ?

**37.** The radius of a sphere is measured to be $(2.1\pm0.5)$cm . Calculate its surface area with error limit .

**38.** A physical quantity X is given by the relation $X = \dfrac{a^2 b^3}{c\sqrt{d}}$ if the percentage error in a b, c and d are 2%,1%,3% and 4% respectively what is the percentage error in x

**39.** The dimension of pressure is

A. $MLT^{-2}$

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

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

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

**Answer: D**

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**40.** The dimensional formula for universal gravitational constant is

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

B. $MLT^{-2}$

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

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

**Answer: D**

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**41.** The dimension of impulse is

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

B. $MLT^{-1}$

C. $MLT^{-2}$

D. $ML^{-1}T^{-3}$

**Answer: B**

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**42.** What is the dimensional formula of light year ?

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**43.** The dimensions of torque are

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

B. $MLT^{-2}$

C. $MLT^{-1}$

D. $ML^0T^{-2}$

**Answer: A**

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**44.** The dimension of co - efficient of viscocity is

A. $ML^{-3}$

B. $MLT^{-2}$

C. $MT^{-1}$

D. $ML^{-1}T^{-1}$

**Answer: D**

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**45.** The ratio of dimensions of angular and linear momemtum is

A. $M^0 L^1 T^0$

B. $MLT^{-1}$

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

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

**Answer: A**

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**46.** If L and R reperesnt respectively the inductance and resisitance the dimensions of L/R are

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

B. $M^0 L^0 T$

C. $M^2 L^0 T$

D. $MLT^{-2}$

**Answer: B**

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**47.** Identify the pair whose dimensions are equal

A. torque and work

B. force and work

C. stress and energy

D. force and stress

**Answer: A**

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**48.** The dimensions of quantities in one or more pairs are same . Identify them

A. torque and force

B. angular momentum and work

C. energy and young's modulus

D. light year and wavelength

**Answer: D**

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**49.** which of the following pairs do not have same dimensions

A. frequency and angular velocity

B. pressure gradient and potential gradient

C. angular frequency and velocity gradient

D. force constant and surface tension

Answer: B

**50.** Which of the following is a dimensional constant

A. refractive index

B. dielectric constant

C. relative density

D. gravitational constant

**Answer: D**

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**51.** Identify the pair which has different dimensions

   A. planck's constatnt and angular momemtum

   B. impulse and linear momemtum

   C. angular momemtum and frequency

   D. angular velocity and frequency

**Answer: C**

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**52.** From the flowing pair , choose the pair that does not have identical dimensions

    A. angular momemtum and planck's constant

    B. tension and surface tension

    C. work and torque

    D. impulse and momemtum

**Answer: B**

**53.** Which physical quantities have same dimensions ?

A. moment ofcouple and work

B. force and power

C. work and power

D. latent heat and specific heat

Answer: A

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**54.** A force F is f=given by $F = at + bt^2$ where t is the time , the dimensions of a and b are

A. $MLT^{-3}$ and $MLT^{-4}$

B. $MLT^{-4}$ and $MLT(-3)$

C. $MLT^{-1}$ and $MLT(-3)$

D. $MLT^{-2}$ and $MLT^0$

**Answer: A**

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**55.** A quantity X is given by $\varepsilon 0 L \dfrac{\triangle v}{v}$ , where is

$\varepsilon 0$ permitivity of free space , L is length , $\triangle V$

is p.d. and $\triangle V$ is time interval . The

dimensional formula of X is the same as that

of

    A. resistance

    B. charge

    C. voltage

    D. current

**Answer: D**

**56.** When a copper sphere is heated , maximum percentage change will be observed in

A. radius

B. area

C. volume

D. none of these

**Answer: C**

57. The measured mass and volume of a body are 22.42 g and 4.7 cm ^3 the possible errors in measuements of mass and volume are respectively 0.01 g and 0.1 cm ^3

The maximum error in density is about

A. 0.002

B. 2

C. 0.05

D. 0.1

**Answer: B**

**58.** The density of a material of a cube is calculated by measuring its mass and side . The error in measurement of mass and side are respectively 4% and 3%. Then the maximum percentage of error in measurement of density is

A. 0.12

B. 13

C. 0.07

D. 0.09

Answer: B

**59.** While measuring acceleration due to gravity by a simple pendulam a student makes a positive error of 1% in length and a negetive

error of 3% in the value of timeperiod . The actual percentage of error in the measurement is

A. 0.02

B. 4

C. 7

D. 0.1

Answer: C

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**60.** The value of resistance is 10.84 ohm and current is 3.23 A . The potential difference is 35.02935 V its value in significant number will be

A. 35 V

B. 35.0 V

C. 35.03 V

D. 35.0290V

Answer: B

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**61.** An experimenter mesures quantitites a, b, c

and X is calculated from X = $\dfrac{ab^2}{c^3}$

if the percentage of error in a,b,c are $\pm 1\%$,

$\pm 3\%$ and $\pm 2\%$ respectively the p.c. of error

in X is

    A. $\pm 13\%$

    B. $\pm 7\%$

    C. $\pm 4\%$

    D. $\pm 1\%$

**Answer: A**

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**62.** One nanometer is equivalent to

    A. $10^9 mm$

    B. $10^{-6} cm$

    C. $10^{-7} cm$

    D. $10^{-9} cm$

**Answer: C**

**63.** one micron is equivalent to

A. $10^{-9}m$

B. $10^{-12}m$

C. $10^{-6}m$

D. $10^{-15}m$

**Answer: C**

**64.** one barn is equal to

    A. $10^{-20}$ m^2

    B. $10^{-28}$ m^2

    C. $10^{-30}$ m^2

    D. $10^{-14}$ m^2

**Answer: B**

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**65.** which distance is represented by a fermi ?

A. $10^{-8} cm$

B. $10^{-13} cm$

C. $10^{-4} cm$

D. $10^{-12} cm$

**Answer: B**

**66.** Chronometer is used to measure

A. time

B. mass

C. density

D. distance

**Answer: A**

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**67.** Light year is a unit of

A. distance

B. velocity

C. time

D. momemtum

**Answer: A**

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**68.** Which of the following is not a unit of time

A. solar year

B. tropical year

C. leap year

D. light year

**Answer: D**

**69.** Length cannot be measured by

A. fermi

B. micron

C. debye

D. light year

Answer: C

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**70.** S.I. unit of magnetic dipole is

A. $Am^{-1}$

B. $Am^2$

C. $mA(-1)$

D. $mA(-2)$

Answer: B

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**71.** Which of the following quantities has S.I. unit $Kgm^2 A(-2)S(-3)$

A. resistance

B. inductance

C. capacitance

D. magnetic flux

**Answer: A**

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**72.** which of the following is a fundemental quantity

A. force

B. time

C. volume

D. velocity

**Answer: B**

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**73.** which of the following is a unitless quantity

A. velocity gradient

B. pressure gradient

C. displacement gradient

D. force gradient

**Answer: C**

**74.** The dimensional formula of angular momemtum is

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

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

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

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

**Answer: D**

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**75.** The dimensions of Young's modulus of elasticity is

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

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

C. $MLT^{-1}$

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

**Answer: D**

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**76.** The volume and surface area of a cube is numerically equal . The volume of such a cube is

A. 1000 unit

B. 216 unit

C. 512 unit

D. 729 unit

**Answer: B**

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**77.** The dimension of pressure is

    A. $MLT^{-2}$

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

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

    D. $ML^{-1}T^{-1}$

**Answer: C**

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**78.** The dimensions of torque are

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

B. $MLT^{-2}$

C. $MLT^{-1}$

D. $ML^0T^{-2}$

**Answer: A**

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**79.** Dimension of angular velocity is

A. $M^0L^{-1}T^{-2}$

B. $M^0 LT^{-1}$

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

D. $ML^{-1}T^{-1}$

**Answer: C**

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80. The dimensions of which of the quantities

of the following pairs are not the same ?

A. light year and wavelength

B. torque and work

C. energy and work

D. angular momemtum and work

**Answer: D**

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**81.** Which of the following quantity is dimensionless ?

A. angle

B. strain

C. specific gravity

D. all of these

**Answer: D**

**82.** The significant figure in 0.050 is

A. 1

B. 2

C. 3

D. 4

**Answer: B**

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**83.** The percentage errors in measurement of mass and velocity are 2 % and 3% resoectively . How much will be the maximum wrror in estimate of kinetic energy , obtained by measuring mass and velocity ?

A. 1

B. 5

C. 8

D. 11

**Answer: C**

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**84.** A simple pendulam completes 20

oscillations in 25 S . The time is measured with

a stop watch of least count 0.1 S . The error in the measurement is

A. 0.4

B. 0.8

C. 0.012

D. 0.16

**Answer: A**

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**85.** If f = x^2 then the reative error in f is

A. $\left[\dfrac{2 \triangle x}{x}\right]$

B. $\dfrac{\triangle x}{x}$

C. $\dfrac{\triangle x}{x}$

D. $\triangle x^2$

**Answer: A**