PHYSICS

BOOKS - MTG GUIDE PHYSICS (HINGLISH)

PHYSICAL WORLD AND MEASUREMENT

Illustrations

1. Find the fundamental quantities in term of which density can be expressed.

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2. The acceleration due to gravity is $9.8ms^{-2}$. Give its value in ft s^{-2}

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3. If a composite physical quantity in terms of moment of inertia I, force F, velocity v, work W and length L is defined as,

$Q = \left(IFv^2 / WL^3\right)$,

find the dimensions of Q and identify it.

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4. The period of oscillation of a simple pendulum in the experiment is recorded as $2.63s, 2.56s, 2.42s, 2.71s,$ and $2.80s.$ Find the average absolute error.

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5. If two lengths a and b are given as:

$a = 25.4cm \pm 0.1$ cm and b= $16.5cm \pm 0.4$ cm.

Then find a +b.

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6. A body travels uniformly a distance (13.8 ± 0.2) m in a time (4.0 ± 0.3) s. Calculate its velocity with error limits. What is the percentage error in velocity ?

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7. A thin copper wire of length L increases in length by 2% when heated from T_1 to T_2. If a copper cube having side 10L is heated from T_1 to T_2, what will be the percentage change in ,

area of one face of the cube and

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8. A thin copper wire of length L increases in length by 2% when heated from T_1 to T_2. If a copper cube having side 10L is heated from T_1 to T_2, what will be the percentage change in ,

volume of the cube

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9. The smallest division on main scale of a vernier callipers is 1 mm and 10 vernier divisions coincide with 9 scale divisions. While measuring the length

of a line, the zero mark of the vernier scale lies between 10.2 cm and 10.3 cm and the third division of vernier scale coincide with a main scale division.

(a) Determine the least count of the callipers

(b) Find the length of the line

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10. The pitch of a screw gauge is 1 mm and there are 100 divisions on the circular scale. In measuring the diameter of a sphere there are six divisions on the linear scale and forty divisions on

circular scale coincides with the reference line. Find the diameter of the sphere.

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11. A thin wire has a length of 21.7 cm and radius 0.46 mm. Calculate the volume of the wire to correct significant figures.

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1. Which of the following pairs is not correct ?

A. Temperature - Thermometer

B. Atmospheric pressure - Barometer

C. Relative density - Hygrometer

D. Unit of charge - Coulomb

Answer: C

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2. Raman got Nobel prize in Physics for

A. scattering of light

B. Atmospheric pressure - Barometer

C. reflection of light

D. refraction of light

Answer: A

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Neet Cafe Topicwise Practice Questions System Of Units

1. N m^2 / kg^2 is a unit of

A. surface tension

B. permittivity

C. gravitational constant

D. torque

Answer: C

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2. Which one of the following is not a derived unit?

A. Frequency

B. Planck's constant

C. Gravitational constant

D. Electric current

Answer: D

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3. Which of the following quantities has the units $Kgm^2s^{-3}A^{-2}$?

A. Resistance

B. Inductance

C. Capacitance

D. Magnetic flux

Answer: A

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4. Which one of the following is not measured in the units of energy

A. $\text{Couple} \times \text{Angle turned through}$

B. $\text{Moment of inertia} \times (\text{Angular velocity})^2$

C. $\text{Force} \times \text{Distance}$

D. $\text{Impulse} \times \text{Time}$

Answer: D

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5. Which one of the following quantities has not been expressed in proper units?

A. Stefan's constant - $Wm^{-2}K^{-4}$

B. Latent heat - Jkg^{-1}

C. Coefficient of elasticity - Nm^{-2}

D. Universal gas constant - JK

Answer: D

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6. The SI unit of entropy is

A. joule/kelvin

B. newton meter

C. calorie/second

D. joule/calorie

Answer: A

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7. Which one of the following quantities has not been expressed in proper units?

A. $\frac{\text{stress}}{\text{Strain}} = \text{newton}/m^2$

B. Surface tension = newton/m

C. Energy = kg m/s

D. Pressure = newton/m^2

Answer: C

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8. The SI unit of electron mobility is :

A. $m^2V^{-1}s^{-1}$

B. $mV^{-1}s$

C. mVs^{-1}

D. $m^2V^{-2}s^{-2}$

Answer: A

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9. 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

Answer: A

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10. The joule $\times$ second is the unit of

A. energy

B. linear momentum

C. angular momentum

D. power

Answer: C

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11. Which one of the following units is not that of mutual inductance?

A. henry

B. weber

C. ohm second

D. volt second $(\text{ampere})^{-1}$

Answer: B

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12. The SI unit of velocity is

A. joule

B. erg

C. newton

D. watt

Answer: D

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13. The SI unit of velocity is

A. m/s

B. $m\sec^2$

C. mhr^{-2}

D. m/hr

Answer: A

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14. One of the combination from the fundamental physical constants is hc/G. The unit of this expression is

A. kg^2

B. m^3

C. s^{-1}

D. none of these

Answer: A

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15. Which one has not the same unit as other?

A. watt sec

B. kilowatt hr

C. eV

D. J sec

Answer: D

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16. Which one has not the same unit as other?

A. p- ii, q- ii, r- iv, s-i

B. p-iv, q- iii, r- ii, s - i

C. p- iii, q-iv, r-i, s- ii

D. p- iv, q- i, r- ii, s-ii

Answer: B

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Neet Cafe Topicwise Practice Questions Length Mass And Time Measurements

1. Which one of the following is not a unit of time?

A. Lunar month

B. Leap year

C. Parsec

D. Solar day

Answer: C

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2. Match list I with list II and select the correct answer by using the codes given below the lists.

List I (Item)		List II (Units of length)	
A.	Distance between earth and stars	1.	micron
B.	Interatomic distance in a solid	2.	angstrom
C.	Size of nucleus	3.	light year
D.	Wavelength of infrared laser	4.	fermi
		5.	kilometre

Codes:

	A	B	C	D
(a)	5	4	2	1
(b)	3	2	4	1
(c)	5	2	4	3
(d)	3	4	1	2

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3. Length cannot be measured by

A. fermi

B. micron

C. debye

D. light year

Answer: C

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4. Which of the following is not the unit of length?

A. Micron

B. Light year

C. Angstrom

D. Radian

Answer: D

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5. One nanometre is equal to

A. 10^{-8} cm

B. 10^{9} mm

C. 10^{-9} m

D. 10^{-6} cm

Answer: C

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6. How many wavelengths of Kr_{86} are there in one metre?

A. 2348123.73

B. 652189.63

C. 1553164.13

D. 1650763.73

Answer: D

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7. Light year is the unit of

A. velocity

B. time

C. intensity of light

D. distance

Answer: D

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8. Parsec is the unit of

A. time

B. distance

C. frequency

D. angular acceleration

Answer: B

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9. Chronometer is used to measure

A. time

B. mass

C. density

D. distance

Answer: A

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10. How many seconds are there in a light fermi?

A. 10^{-15}

B. 3.0×10^{8}

C. 3.33×10^{-24}

D. 3.3×10^{-7}

Answer: C

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Neet Cafe Topicwise Practice Questions Accuracy Precision Of Instruments And Errors In Measurement

1. The radius of a ball is (5.4 ± 0.2) cm. The percentage error in the volume of the ball is

A. $11\ \%$

B. 4%

C. 7%

D. 9%

Answer: A

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2. A student measured the diameter of a wire using a screw gauge with least count 0.001 cm and listed the measurements. The correct measurement is

A. 5.3 cm

B. 5.32 cm

C. 5.320 cm

D. 5.3200 cm

Answer: C

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3. A wire has a mass (0.3 ± 0.003) g, radius $(0.5 + -0.005)$ mm and length (6 ± 0.06) cm. The maximum percentage error in the measurement of its density is

A. 1%

B. 2%

C. 3%

D. 4%

Answer: D

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4. A physical quantity P is related to four observables a, b, c and d as follows: $P = \frac{a^3b^2}{\sqrt{c}d}$

The percentage errors of measurement in a, b, c

and d are 1%, 3%, 4% and 2%, respectively. What is the percentage error in the quantity P?

A. $12\ \%$

B. $13\ \%$

C. $15\ \%$

D. $16\ \%$

Answer: B

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5. Which of the following measurements is most precise?

A. 5.00 km

B. 5.00 cm

C. 5.00 m

D. 5.00 mm

Answer: D

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6. Choose the incorrect statement out of the following.

A. Every measurement by any measuring instrument has some error.

B. Every calculated physical quantity that is based on measured values has some error.

C. A measurement can have more accuracy but less precision and vice versa.

D. The percentage error is different from relative error.

Answer: D

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7. When a current of (2.5 ± 0.5) ampere flows through a wire, it develops a potential difference of (20 ± 1) volt, the resistance of the wire is

A. (8 ± 2) ohm

B. (8 ± 1.5) ohm

C. (8 ± 0.5) ohm

D. (8 ± 3) ohm

Answer: A

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8. The period of oscillation of a simple pendulum is $T = 2\pi\sqrt{L/g}$. Measured value of L is $20.0cm$ known to $1mm$ accuracy and time for 100 oscillations of the pendulum is found to be 90 s using a wrist watch of 1 s resolution. What is the accuracy in the determination of g?

A. 2%

B. 3%

C. 4%

D. 5%

Answer: D

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9. A physical quantity $P = \frac{\sqrt{abc^2}}{d^3 e^{1/3}}$ is determined by measuring a,b,c,d and e separately with the percentage error of 2%, 3% , 2%, 1% and 6% respectively. Minimum amount of error is contributed by the measurement of :

A. b

B. a

C. d

D. c

Answer: B

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10. 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 L/T^2 is

A. 5%

B. 7%

C. 8%

D. 1%

Answer: B

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11. In an experiment to measure the height of a bridge by dropping stone into water underneath, if the error in measurement of time of 0.1 s at the end of 2s, then the error in estimation of height of bridge will be

A. 0.49 m

B. 0.98 m

C. 1.96 m

D. 2.12 m

Answer: C

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12. 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. 0.02

B. 0.03

C. 0.06

D. 0.09

Answer: A

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

A. $5\ \%$

B. $10\ \%$

C. $15\ \%$

D. $20\ \%$

Answer: A

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14. If 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. $3.5\ \%$

Answer: C

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15. 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. $20\ \%$

Answer: D

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16. The heat dissipated in a resistor can be obtained by the measurement of resistance, 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%

Answer: B

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17. The mass of a body is 20.0 g and its volume is $10.0cm^3$. If possible maximum errors in the measurement of mass of body and volume of body are 0.001 g and $0.01cm^3$ respectively, then the maximum error in the value of density is

A. $0.001 gcm^{-3}$

B. $0.010 gcm^{-3}$

C. $0.10 gcm^{-3}$

D. none of these

Answer: D

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18. In a vernier callipers, N divisions of vernier scale coincide with (N-1) divisions of main scale (in which 1 division represents 1 mm). The least count of the instrument in cm should be

A. N

B. N-1

C. $\frac{1}{N-1}$

D. $\frac{1}{10N}$

Answer: D

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19. How are the pitch and least count of a spherometer related ?

A. $\text{Pitch} = \frac{L.C.}{100}$

B. $L.C. = \frac{\text{Pitch}}{100}$

C. $\text{Pitch} = (L.C. \times 200)$

D.

$$L.C. = \frac{\text{Pitch}}{\text{number of divisions on circular scale}}$$

Answer: D

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20. The mass and volume of a body are found to be $5.00 \pm 0.05kg$ and $1.00 \pm 0.05m^3$ respectively. Then, the maximum possible percentage error in its density is

A. 6%

B. 3%

C. 10%

D. 5%

Answer: A

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21. When circular scale of a srew gauge carrying 100 divisions is given four complete rotations, the head of the screw moves through $2mm$. The pitch and least count of screw gauge are respectively.

A. 0.005 cm

B. 0.0005 cm

C. 0.001 cm

D. 0.0001 cm

Answer: B

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22. If the error in measuring the radius of the sphere is 2% and that in measuring its mass is 3%, Then the error in measuring density of materials the sphere is:

A. 5%

B. 7%

C. 9%

D. 11%

Answer: C

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23. A force F is applied on a square plate of side L. If the percentage error in the determination of L is 2% and that in F is 4%. What is the permissible error in pressure?

A. 2%

B. 4%

C. 6%

D. 8%

Answer: D

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Neet Cafe Topicwise Practice Questions Significant Figures

1. 1.00×2.88 is equal to

A. 2.88

B. '2.880`

C. 2.9

D. none of these

Answer: A

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2. In Figure 5, a triangle PQR is drawn to circumscribe a circle of radius 6 cm such that the segments QT and TR into which QR is divided by the point of contact T, are of lengths 12 cm and 9

cm respectively. If the area of $\Delta PQR = 189cm^2$, then find the lengths of sides PQ and PR.

A. $4.43m^2$

B. $4.432m^2$

C. $4.4324m^2$

D. $4.432428m^2$

Answer: B

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3. The probability of selecting a rotten apple randomly from a heap of 900 apples is 0·18. What is the number of rotten apples in the heap ?

A. 2

B. 3

C. 4

D. 5

Answer: C

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4. The number of significant figures in the numbers 4.8000×10^4 and 48000.50 are respectively

A. 5 and 6

B. 5 and 7

C. 2 and 7

D. 2 and 6

Answer: B

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5. Which of the following has the highest number of significant figures ?

A. 0.007 m^2

B. 2.64×10^{24} kg

C. $0.0006032 m^2$

D. 6.3200 J

Answer: D

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6. The length and breadth of a metal sheet are 3.124m and 3.002m respectively. The area of this sheet upto correct significant figure is

A. $9.376m^2$

B. $9.378m^2$

C. $9.379m^2$

D. $9.388m^2$

Answer: B

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7. The significant figures in 300.500 are

A. 6

B. 5

C. 4

D. 2

Answer: A

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8. What is the number of significant figures in 0.0310×10^3?

A. 2

B. 3

C. 4

D. 5

Answer: B

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9. The number of significant figures in 11.118×10^{-6} V is

A. 3

B. 6

C. 5

D. 4

Answer: C

10. The mass of a block is 87.2 g and its volume is $25cm^3$. Its density upto correct significant figures is

A. $3.488gcm^{-3}$

B. $3.5gcm^{-3}$

C. $3.48gcm^{-3}$

D. $3.4gcm^{-3}$

Answer: B

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11. The radius of a circle is 1.22 m. Area enclosed by it upto correct significant figures is

A. $4.6778m^2$

B. $4.677m^2$

C. $4.67782m^2$

D. $4.68m^2$

Answer: D

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12. The number of significant figures in $(3.20 + 4.80) \times 10^5$

A. 5

B. 4

C. 3

D. 2

Answer: C

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13. The area enclosed by a circle of diameter 1.06 m to correct number of significant figures is

A. $0.88m^2$

B. $0.088m^2$

C. $0.882m^2$

D. $0.530m^2$

Answer: C

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14. From the point of the view of significant figures which of the following statements are correct ?

(i) $10.2cm + 8cm = 18.\ 2cm$

(ii) $2.53m - 1.2m = 1.33m$

(iii) $4.2m \times 1.4m = 5.88m^2$

(iv) $3.6m / 1.75\,\text{sec} = 2.1m / s$

A. (i) and (iv) only

B. (ii) and (iii) only

C. (iv) only

D. (ii) and (iv) only

Answer: A

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15. Which of the following has the least number of significant figures?

A. 1.64×10^{20} kg

B. $0.006m^2$

C. 7.2180 J

D. 5.045 J

Answer: B

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16. The result after adding 3.8×10^{-6} and 4.2×10^{-5} with due regards to significant figures is

A. 4.58×10^{-5}

B. 4.6×10^{-5}

C. 4.5×10^{-5}

D. 4.7×10^{-5}

Answer: B

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17. Three measurements are made as 18.425 cm, 7.21 cm and 5.0 cm. The sum of measurements upto correct number of significant figure is

A. 30.635 cm

B. 30.64 cm

C. 30.63 cm

D. 30.6 cm

Answer: D

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18. If a current of 2.33 A is passed through a resistance of 10.485Ω, the potential is 24.43005, its value in proper significant figures would be

A. 24.43 V

B. 24.4 V

C. 24.430 V

D. 24.43005 V

Answer: B

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Neet Cafe Topicwise Practice Questions Dimensions And Dimensional Formulae

1. If C be the capacitance and V be the electric potential, then the dimensional formula of CV^2 is

A. $\left[M^1L^2T^{-2}A^0\right]$

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

C. $\left[M^0L^1T^{-2}A^0\right]$

D. $\left[M^1L^{-3}T^1A^{-1}\right]$

Answer: A

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2. The fundamental unit which has same power in the dimensional formula of surface tension and coefficient of viscosity is

A. mass

B. length

C. time

D. none of these

Answer: A

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3. If E= energy, G= gravitational constant, I= impulse and M = mass, the dimension of $\frac{GIM^2}{E^2}$ is same as that of

A. time

B. mass

C. length

D. force

Answer: A

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4. Out of the following pairs which one does not have identical dimensions ?

A. Moment of inertia and moment of a force

B. Work and torque

C. Angular momentum and Planck's constant

D. Impulse and momentum

Answer: A

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5. Match List I with List II and select the correct answer

List I		List II	
A.	spring constant	1.	$[M^1L^2T^{-2}]$
B.	pascal	2.	$[M^0L^0T^{-1}]$
C.	hertz	3.	$[M^1L^0T^{-2}]$
D.	joule	4.	$[M^1L^{-1}T^{-2}]$

	A	B	C	D
(a)	3	4	2	1
(b)	4	3	1	2
(c)	4	3	2	1
(d)	3	4	1	2

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6. Dimensions of resistance are same as (where his Planck's constant and e is charge)

A. $\frac{h}{e}$

B. $\frac{h^2}{e}$

C. $\frac{h}{e^2}$

D. $\frac{h^2}{e^2}$

Answer: C

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7. The dimensions of heat capacity are

A. $\left[ML^{-2}T^{-2}K^{-1}\right]$

B. $\left[ML^{2}T^{-2}K^{-1}\right]$

C. $\left[M^{-1}L^{2}T^{-2}K^{-1}\right]$

D. $\left[MLT^{-2}K\right]$

Answer: B

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8. Which of the following pairs does not have similar dimensions?

A. Stress and pressure

B. Tension and surface tension

C. Angle and strain

D. Planck's constant and angular momentum

Answer: B

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9. The dimensions of $\text{resistance} \times \text{capacitance}$ are same as that of

A. current

B. energy

C. frequency

D. time

Answer: D

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10. The dimensions of $\frac{\text{magnetic moment}}{\text{angular momentum}}$ are

A. $\left[M^{-1}L^{0}TA\right]$

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

C. $\left[M^{3}LT^{-2}A^{-1}\right]$

D. $\left[ML^{-1}T^{2}A^{-1}\right]$

Answer: A

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11. In the formula, $X = 3YZ^2$, X has dimensions of capacitance and Z has dimensions of magnetic induction. The dimensions of Y are

A. $\left[M^{-3}L^{-2}T^{-2}A^4\right]$

B. $\left[ML^{-2}T^2A^2\right]$

C. $\left[M^{-3}L^{-2}A^4T^4\right]$

D. $\left[M^{-3}L^{-2}T^8A^4\right]$

Answer: D

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12. A quantity X is given by $\frac{me^4}{8\varepsilon_0^2 ch^3}$ where m is the mass of electron, e is the charge of electron, ε_0 is the permittivity of free space, c is the velocity of light and h is the Planck's constant. The dimensional formula for X is the same as that of

A. length

B. frequency

C. velocity

D. wave number

Answer: D

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13. The dimensions of the quantity namely $\frac{\mu_0 ce^2}{2h}$ where μ_0 permeability of free space, c - velocity of light, e - electronic charge and $h = \frac{h}{2\pi}$ being Planck's constant

A. $\left[M^0 LT\right]$

B. $\left[M^0 L^0 T\right]$

C. $\left[M^0 L^0 T^0\right]$

D. $\left[M^{-2} L^{-1} T^{-3}\right]$

Answer: C

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14. Which one of the following is dimensionally incorrect?

A. Capacitance $C = \left[M^{-1}L^{-2}T^{4}A^{2}\right]$

B. Magnetic field induction B = $\left[ML^{0}T^{-2}A^{-1}\right]$

C. Coefficient of self-induction $L = \left[ML^{2}T^{-2}A^{-1}\right]$

D. Specific resistance $\rho = \left[ML^{3}T^{-3}A^{-2}\right]$

Answer: C

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15. Which of the following units denotes the dimensions ML^2/Q^2, where Q denotes the electric charge ?

A. weber (Wb)

B. Wb/m^2

C. henry(H)

D. H/m^2

Answer: C

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16. The Hubble constant has the dimension of

A. time

B. $(time)^{-1}$

C. length

D. mass

Answer: B

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17. If E, m, l and G denote energy, mass, angular momentum and gravitational constant respectively, the quantity $\left(El^2/m^5G^2\right)$ has the dimensions of

A. angle

B. length

C. mass

D. time

Answer: A

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18. The dimensions of σb^4 are (where σ = Stefan's constant and b = Wein's constant)

A. $\left[M^0 L^0 T^0\right]$

B. $\left[ML^4 T^{-3}\right]$

C. $\left[ML^{-2} T\right]$

D. $\left[ML^6 T^{-3}\right]$

Answer: B

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19. $\frac{A^2}{\text{mass}}$ has the dimensions of kinetic energy. Then A has the dimensions of

A. pressure

B. torque

C. moment of inertia

D. impulse

Answer: D

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20. The dimensions of $\frac{l}{KA}$ are (l is the length of rod, K is the thermal conductivity of rod and A is the area of cross-section of rod)

A. $\left[ML^2T^{-3}K^{-1}\right]$

B. $\left[M^{-1}L^{-2}T^3K\right]$

C. $\left[ML^2T^{-3}K^{-2}\right]$

D. $\left[MLT^{-3}K^{-1}\right]$

Answer: B

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21. 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. $\left[M^{-1}L^{-3}T^{2}A\right]$

B. $\left[M^{0}L^{0}T^{0}A^{0}\right]$

C. $\left[ML^{3}T^{-4}A^{-2}\right]$

D. $\left[M^{-1}L^{-3}T^{4}A^{2}\right]$

Answer: B

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22. The dimensional formula for the magnetic field is

A. $\left[MT^{-2}A^{-1}\right]$

B. $\left[ML^{2}T^{-1}A^{-2}\right]$

C. $\left[MT^{-2}A^{-2}\right]$

D. $\left[MT^{-1}A^{-2}\right]$

Answer: A

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23. The quantities RC and (L/R) (where R, L and C stand for resistance, inductance and capacitance respectively) have the dimension of

A. force

B. linear momentum

C. linear velocity

D. time

Answer: D

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24. The dimensions of $\mu_0 I / MB$ where μ_0 is the permeability of free space, I is the moment of inertia, M is the magnetic moment and B is the magnetic induction respectively, are those of

A. time

B. $(\text{time})^2$

C. $(\text{time})^3$

D. $(\text{time})^{\frac{1}{2}}$

Answer: B

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25. Dimensions of $\frac{L}{RCV}$ are

A. $\left[A^{-1}\right]$

B. $\left[A^{-2}\right]$

C. $[A]$

D. $\left[A^{2}\right]$

Answer: A

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26. Which of the following pairs have same dimensional formula for both the quantities ?

(i) kinetic energy and torque

(ii) resistance and inductance

(iii) Young's Modulus and Pressure

A. (1) only

B. (2) only

C. (1) and (3) only

D. All of three

Answer: C

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27. The correct order in which the dimensions of time decreases in the following physical quantities is

1. Stefan's constant

2. Coefficient of volume expansion

3. Work done 4. Velocity gradient

A. 2,4,3,1

B. 1, 2, 3, 4

C. 4,3,2,1

D. 1, 2, 4, 3

Answer: A

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28. μ_0 and ε_0 denote the permeability and permittivity of free space, the dimensions of $\mu_0\varepsilon_0$ are

A. $\left[LT^{-1}\right]$

B. $\left[L^{-2}T^{-2}\right]$

C. $\left[M^{-1}L^{-3}T^{-2}\right]$

D. $M^{-1}L^{-3}A^{2}\right]$

Answer: B

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29. 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

Answer: D

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30. The frequency v of vibrations of uniform string of length l and stretched with a force F is given by

$$v = \frac{p}{2l}\sqrt{\frac{F}{m}}$$

where p is the number of segments of the vibrating string and m is constant of the string. What is the dimensions of m?

A. $\left[ML^{-1}T^{-1}\right]$

B. $\left[ML^{-3}T^{0}\right]$

C. $\left[ML^{-2}T^{0}\right]$

D. $\left[ML^{-1}T^{0}\right]$

Answer: D

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31. Which of the following is a dimensionless quantity?

A. Specific heat

B. Strain

C. Quantity of heat

D. Stress

Answer: B

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32. $ML^{-1}T^{-2}$ represents

A. torque

B. work

C. energy

D. coefficient of viscosity

Answer: D

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33. Of the following quantities which one has the dimensions different from the remaining three?

(i) Energy density

(ii) Force per unit area

(iii) Product of charge per unit volume and voltage

(iv) Angular momentum per unit mass

A. (i)

B. (ii)

C. (iii)

D. (iv)

Answer: D

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34. Given $X = \left(Gh/c^3\right)^{1/2}$, where G, h and c are gravitational constant, Planck's constant and the velocity of light respectively. Dimensions of X are the same as those of

A. mass

B. time

C. length

D. acceleration

Answer: C

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35. In case of an electromagnetic wave, the radiation pressure has the dimensions of

A. intensity

B. energy density

C. energy flux

D. energy per unit area

Answer: B

View Text Solution

36. The dimensions of coefficient of viscosity are

A. $\left[ML^{-1}T^{-1}\right]$

B. $\left[MLT^{-2}\right]$

C. $\left[ML^{0}T^{-2}\right]$

D. $\left[MLT^{-1}\right]$

Answer: A

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37. What are the dimensions of impedance ?

A. $\left[ML^2T^{-3}I^{-2}\right]$

B. $\left[M^{-1}L^{-2}T^3I^2\right]$

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

D. $\left[M^{-1}L^{-3}T^3I^2\right]$

Answer: A

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38. If C is capacitance, Vis potential, ρ is specific resistance and ε_0 is permittivity of free space, then the dimensions of $\frac{CV}{\rho\varepsilon_0}$ are same as that of

A. charge

B. current

C. time

D. frequency

Answer: B

View Text Solution

39. What is the dimensional formula of thermal conductivity?

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

B. $[MLT^{-3}K^{-1}]$

C. $[M^2LT^{-3}K^{-2}]$

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

Answer: B

View Text Solution

40. A quantity X is given by $\varepsilon_0 L \frac{\Delta V}{\Delta t}$ where ε_0 is the permittivity of free space, L is a length, ΔV is a potential difference and Δt is a time interval. The dimensional formula for X is the same as that of

A. resistance

B. charge

C. voltage

D. current

Answer: D

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41. Solar constant may be defined as the amount of solar energy received per cm^2 per minute. The dimensions of solar constant is

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

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

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

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

Answer: D

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42. The dimensions of permittivity ε_0 are

A. $\left[M^{-1}L^{-3}A^2T^4\right]$

B. $\left[M^{-1}L^3A^{-1}T^{-4}\right]$

C. $\left[M^2LT^{-3}T^{-2}\right]$

D. $\left[ML^2T^{-2}A\right]$

Answer: A

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43. Surface tension has the same dimensions as that of

A. coefficient of viscosity

B. momentum

C. spring constant

D. frequency

Answer: C

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Neet Cafe Topicwise Practice Questions Dimensional Analysis And Its Applications

1. Distance Z travelled by a particle is defined by $Z = \alpha + \beta t + \gamma t^2$. Dimensions of γ are

A. $\left[LT^{-1}\right.$

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

C. $\left[LT^{-2}\right]$

D. $\left[LT^{2}\right]$

Answer: C

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2. Suppose refractive index μ is given as $\mu = A + \frac{B}{\gamma^2}$ where A and B are constants and γ is wavelength, then dimensions of B are same as that of

A. wavelength

B. volume

C. pressure

D. area

Answer: D

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3. 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. $-\frac{1}{2}, \frac{1}{2}$ 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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4. If velocity (v), acceleration (a) and force (F) are taken as fundamental quantities, the dimensions of Young's modulus (Y) would be

A. $[Fa^2v^{-2}]$

B. $[Fa^2v^{-3}]$

C. $[Fa^2v^{-4}]$

D. $[Fa^2v^{-5}]$

Answer: C

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5. Consider the following equation of Bernoulli theorem

$P + \frac{1}{2}\rho v^2 + \rho g h = K$ (constant)

Which of the following quantity has same dimensions as that of $\frac{K}{P}$?

A. Thrust

B. Pressure

C. Angle

D. Viscosity

Answer: C

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6. If $A = B + \frac{C}{D+E}$ the dimensions of B and Care $\left[M^0LT^{-1}\right]$ and $\left[M^0LT^0\right]$, respectively. Find the dimensions of A, D and E.

A. $[A] = \left[M^0L^0T^{-1}\right], [D] = [T], [E] = [LT]$

B. $[A] = \left[MLT^0\right], [D] = \left[T^2\right], [E] = \left[T^2\right]$

C.

$[A] = \left[M^0LT^{-1}\right], [D] = [MT], [E] = [MT]$

D. $[A] = \left[M^0LT^{-1}\right], [D] = [T], [E] = [T]$

Answer: D

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7. The potential energy U of a particle varies with distance x from a fixed origin as $U = \frac{A\sqrt{x}}{x^2 + B}$ where A and B are dimensional constants. The dimensional formula for AB is

A. $\left[M^1 L^{7/2} T^{-2}\right]$

B. $\left[M^1 L^{11/2} T^{-2}\right]$

C. $\left[M^1 L^{5/2} T^{-2}\right]$

D. $M^1L^{9/2}T^{-2}]$

Answer: B

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8. Consider an expression $F = Ax\sin^{-1}{}'(Bt)$ where F represents force, x represents distance and t represents time. Dimensionally the quantity AB represents

A. energy

B. surface tension

C. intensity of light

D. pressure

Answer: C

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9. In the equation $\left(P+\frac{a}{V^2}\right)(V-b)=$ constant, the unit of a is

A. $\text{dyne} \times cm^5$

B. $\text{dyne} \times cm^4$

C. $\text{dyne} \times cm^3$

D. $\text{dyne} \times cm^2$

Answer: B

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10. If energy (E), momentum (p) and force (F) are chosen as fundamental units. The dimensions of mass in new system is

A. $\left[E^{-1}p^3\right]$

B. $\left[E^{-1}p^2\right]$

C. $\left[E^{-2}p^2\right]$

D. $\left[E^{-1}p\right]$

Answer: B

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11. The value of universal gravitational constant $G = 6.67 \times 10^{-11} Nm^2 kg^{-2}$. The value of G in units of $g^{-1}cm(\hat{}\ (3)s^{-2}$ is

A. 6.67×10^{-8}

B. 6.67×10^{-7}

C. 6.67×10^{-9}

D. 6.67×10^{10}

Answer: A

View Text Solution

12. In the relation $P = \frac{\alpha}{\beta} e^{-\frac{\alpha z}{k\theta}}$ is pressure, z is distance, k is Boltzmann constant and θ is the temperature. The dimensional formula of β will be

A. $\left[M^0 L^2 T^0\right]$

B. $\left[ML^2 T\right]$

C. $\left[ML^0 T^{-1}\right]$

D. $\left[M^0L^2T^{-1}\right]$

Answer: A

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13. Given that: $y = A\sin\left[\frac{2\pi}{\lambda}(vt - x)\right]$

where y and x are measured in metres. Which of the following statements is true?

A. The unit of λ is same as that of x and A

B. The unit of λ is same as that of x but not of

A.

C. The unit of v is same as that of $2\pi / \lambda$

D. The unit of $(vt - x)$ is same as that of $2\pi / \lambda$

Answer: A

View Text Solution

14. The density of mercury is $13600 kgm^{-3}$. Its value in CGS system will be

A. $13.6 gcm^{-3}$

B. $1360 gcm^{-3}$

C. $136 gcm^{-3}$

D. $1.36gcm^{-3}$

Answer: A

View Text Solution

15. The velocity v of waves produced in water depends on their wavelength λ, the density of water d, and acceleration due to gravity g. These quantities are related as (where k is a dimensionless constant)

A. $v^2 = k\lambda^{-1}g^{-1}d^{-1}$

B. $v^2 = k\lambda g$

C. $v^2 k\lambda dg$

D. $v^2 \lambda^{3g^{-1}d^{-1}}$

Answer: B

View Text Solution

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

A. $\left[MLT^{-3}\right]$ and $\left[MLT^{-4}\right]$

B. $\left[MLT^{-4}\right]$ and $\left[MLT^{-3}\right]$

C. $\left[MLT^{-1}\right]$ and $\left[MLT^{-2}\right]$

D. $\left[MLT^{-2}\right]$ and $\left[MLT^{0}\right]$

Answer: A

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17. In the following equation, x, t and F represent respectively, displacement, time and force:

$$F = a + bt + \frac{1}{c + d.\ x} + A\sin(\omega t + \phi)$$

The dimensional formula for A. d is

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

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

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

D. $\left[TL^{-1}\right]$

Answer: B

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18. If the time period (t) of vibration of a liquid drop depends on density (ρ) of the liquid, radius (r) of the drop and surface tension (S), then the expression of t is

where k is a dimensionless constant.

A. $t = k\sqrt{\frac{\rho r^3}{S}}$

B. surface tension

C. $t = k\sqrt{\frac{\rho r^3}{S^{1/2}}}$

D. $t = k\sqrt{\frac{\rho r}{S}}$

Answer: A

View Text Solution

19. $S = A\left(1 - e^{-Bxt}\right)$ where S is speed, t is time and x is displacement. Then unit of B is

A. $m^{-1}s^{-1}$

B. $m^{-2}s$

C. s^{-2}

D. s^{-1}

Answer: A

View Text Solution

20. The dimensions of $\frac{a}{b}$ in the equation $P = \frac{a^2 - t^2}{bx}$ where P is pressure, x is distance and t is time are

A. $\left[M^2LT^{-3}\right]$

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

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

D. $\left[M^0LT^{-3}\right]$

Answer: B

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21. A book with many printing errors contains four different formulae for the displacement y of a particle undergoing a certain periodic motion.

1. $y = a\sin\frac{2\pi t}{T}$

2. $y = a\sin vt$

3. $y = \frac{a}{T}\sin\frac{t}{a}$

4. $y = (a\sqrt{2})\left(\sin\left(\frac{2\pi t}{T}\right) + \cos\left(\frac{2\pi t}{T}\right)\right)$

where a is the maximum displacement of the particle, v is the speed of the particle, T is the time period of motion. Then dimensionally

A. 1 and 2 are wrong

B. 2 and 3 are wrong

C. 3 and 4 are wrong

D. 1 and 4 are wrong

Answer: B

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22. When one metre, one kg and one minute are taken as fundamental units, the magnitude of a force is 36 units. What is the value of this force on CGS system?

A. 10^3 dyne

B. 10^5 dyne

C. 10^6 dyne

D. 10^7 dyne

Answer: A

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23. The position x of a particle at time t is given by $x = \frac{V_0}{a}\left(1 - e^{-at}\right)$, where V_0 is constant and $a > 0$. The dimensions of V_0 and a are

A. $\left[M^0 LT^{-1}\right]$ and $\left[M^0 L^0 T^{-1}\right]$

B. $\left[M^0 LT^0\right]$ and $\left[M^0 LT^{-1}\right]$

C. $\left[M^0 LT^{-1}\right]$ and $\left[MLT^{-2}\right]$

D. $\left[M^0 LT^{-1}\right]$ and $\left[M^0 LT\right]$

Answer: A

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24. In the equation $\left(P+\frac{a}{V^2}\right)(V-b)=RT$,, the SI unit of a is

A. Nm^2

B. Nm^4

C. Nm^{-3}

D. Nm^{-2}

Answer: B

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25. In a particular system, the unit of length, mass and time are chosen to be 10 cm, 10 g and 0.1 s respectively. The unit of force in this system will be equivalent to

A. 0.1 N

B. 1N

C. 10N

D. 100N

Answer: A

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26. If speed of light (c), acceleration due to gravity (g) and pressure (P) are taken as fundamental units, the dimensions of gravitational constant (G) are

A. $\left[c^0 g P^{-3}\right]$

B. $\left[c^2 g^3 P^{-2}\right]$

C. $c^0 g^2 P^{-1}]$

D. $c^2 g^2 P^{-2}]$

Answer: C

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27. The displacement of a particle moving along x-axis with respect to time t is $x = at + bt^2 - ct^3$ The dimensions of care

A. $[T^{-3}]$

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

C. $[LT^{-3}]$

D. $[LT^3]$

Answer: C

View Text Solution

28. Force F is given in terms of time t and distance x by $F = A\sin Ct + B\cos Dx$. Then dimensions of $\frac{A}{B}$ and $\frac{C}{D}$ are

A. $\left[M^0L^0T^0\right], \left[M^0L^0T^{-1}\right]$

B. $\left[MLT^{-2}\right], \left[M^0L^{-1}T^0\right]$

C. $\left[M^0L^0T^0\right], \left[M^0LT^{-1}\right]$

D. $\left[M^0LT^{-1}\right], \left[M^0L^0T^0\right]$

Answer: C

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29. The unit $1Nm^{-}$ is equivalent to

A. $1ergcm^{-1}$

B. $1ergcm^{-2}$

C. $1Jm^{-1}$

D. $1Jm^{-2}$

Answer: D

View Text Solution

30. If the dimensions of a physical quantity are given by $M^aL^bT^c$, 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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31. The moment of inertia of a body rotating about a given axis is $12.0 kgm^2$ in the SI system. What is the value of the moment of inertia in a system of units in which the unit of length is 5 cm and the unit of mass is 10 g?

A. 2.4×10^3

B. 6.0×10^3

C. 5.4×10^5

D. 4.8×10^5

Answer: D

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32. An important milestone in the evolution of the universe just after the Big Bang is the Planck time t_p, the value of which depends on three fundamental constants-speed of light in vacuum c, Gravitational constant G and Planck's constant h. Then, $t_p \propto$

A. Ghc^5

B. $\frac{C^5}{Gh}$

C. $\frac{Gh}{c^5}$

D. $\left(\frac{Gh}{c^5}\right)^{1/2}$

Answer: D

View Text Solution

33. If unit of mass is 1 kg, unit of time is 1 minute and unit of acceleration is $10ms^{-2}$, then unit of energy is

A. $36 \times 10^6 J$

B. $3.6 \times 10^6 J$

C. $0.36 \times 10^6 J$

D. $0.036 \times 10^6 J$

Answer: C

View Text Solution

34. Suppose speed of light (c), force (F) and kinetic energy (K) are taken as the fundamental units, then the dimensional formula for mass will be

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

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

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

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

Answer: A

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35. A stone is lying in a fluid stream. The force acting on it depends on the density of the fluid, the velocity of flow and the maximum area of cross-section perpendicular to the direction of flow. The force F and the velocity v of flow are related as

A. $F \propto \frac{1}{v}$

B. $F \propto v$

C. $F \propto v^2$

D. $F \propto \frac{1}{v^2}$

Answer: C

View Text Solution

36. The dimensional formula for acceleration, velocity and length are $\alpha\beta^{-2}$, $(\alpha\beta)^{-1}$ as and $\alpha\gamma$. What is the dimensional formula for the coefficient of friction?

A. $\alpha\beta\gamma$

B. $\alpha^{-1}\beta^{0}\gamma^{0}$

C. $\alpha^{0}\beta^{-1}\gamma^{0}$

D. $\alpha^{0}\beta^{0}\gamma^{-1}$

Answer: D

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37. In a new system of units, unit of mass is 10 kg, unit of length is 1 km and unit of time is 1 minute. The value of 1 joule in this new hypothetical system is

A. 3.6×10^{-4} new units

B. 6×10^{7} new units

C. 10^{11} new units

D. 1.67×10^{4} new units

Answer: A

View Text Solution

38. If F denotes force and t time, then in the equation $F = at^{-1} + bt^{2}$ dimensions of a and b respectively are

A. $\left[LT^{-4}\right]$ and $\left[LT^{-1}\right]$

B. $\left[LT^{-1}\right]$ and $\left[LT^{-4}\right]$

C. $\left[MLT^{-4}\right]$ and $\left[MLT^{-1}\right]$

D. $\left[MLT^{-1}\right]$ and $\left[MLT^{-4}\right]$

Answer: D

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Check Your Neet Vitals

1. Which of the following is the most accurate measurement ?

A. 20×10^{-3} m

B. 200×10^{-4} m

C. 2×10^{-2} m

D. 0.02m

Answer: B

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2. When a current of (5 ± 0.5) A flows through a wire, it developes a potential difference of $(40 \pm 1)V$. The resistance of wire is

A. $(8 \pm 1)\Omega$

B. $(8 \pm 1.6)\Omega$

C. $(8 \pm 1.5)\Omega$

D. $(8 \pm 3)\Omega$

Answer: A

View Text Solution

3. $\int \frac{dx}{\sqrt{2ax - x^2}} = a^n \sin^{-1}\left(\frac{x}{a} - 1\right)$ The value of n is

A. 0

B. -1

C. 1

D. none of these

Answer: A

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4. Crane is British unit of volume (one crane =170.4742 L). Convert crane into SI units.

A. $0.170474m^3$

B. $17.0474m^3$

C. $0.00170474m^3$

D. $1704.74m^3$

Answer: A

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5. The radius of the proton is about 10^{-15}m. The radius of the observable universe is 10^{26} m. Identify the distance which is half-way between, these two extremes on a logarithmic scale.

A. 10^{21}m

B. 10^{6}m

C. 10^{-6}m

D. 10^{0}m

Answer: B

View Text Solution

6. The pitch of a screw guage is 1 mm and there are 100 divisions on the circular scale. While measuring diameter of a thick wire, the pitch scale reads 1 mm and 63rd division on the circular scale coincides with the reference. The length of the wire is 5.6 cm. Then

A. The least count of screw guage is 0.001 mm

B. The volume of the wire is $0.117cm^3$

C. The diameter of the wire is 1.63 m

D. The cross-section area of the wire is $0.0209cm^3$

Answer: B

View Text Solution

7. There are atomic (Cesium) clocks capable of measuring time with an accuracy of 1 part in 10^{11}. If two such clocks are operated to precision, then after running for 5000 years, these will record a difference of

A. nearly 2 s

B. 1 day

C. 10^{11} s

D. 1 YR

Answer: A

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8. What is the S.I. unit of density ?

A. $Jm^{-2}s^{-2}$

B. $Jm^{-1}s^{-2}$

C. Wm^{-2}

D. Jm^{-2}

Answer: C

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9. The equation of stationary wave is $y = A \sin kt \cos \omega$,where y and x in second choose the correct option

A. The dimensions of A and k are same

B. The dimensions of A, k and ω are same

C. The dimensions of k and ω are same

D. The dimensions of (kx) and (ωt) are same

Answer: D

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10. A container contains 35 kg water and 0.2 kg water leaks from the container. Find the amount of water in container.

A. 34.8 kg

B. 35 kg

C. 34.80 kg

D. 35.0 kg

Answer: B

View Text Solution

11. In the relation: $P = \frac{\alpha}{\beta} e^{-\frac{\alpha Z}{k\theta}}$, P is pressure Z is distance k is Boltzmann constant and θ ils the temperature. The dimensional formula of β will bes

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

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

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

D. $\left[M^0L^2T^{-1}\right]$

Answer: A

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12. A student measures the thickness of a human hair by looking at it through a microscope of magnification 100. He makes 20 observations and finds that the average width of the hair in the field of view of the microscope is 3.5 mm. The thickness of hair is

A. 0.035 mm

B. 0.04 mm

C. 0.35 mm

D. 0.40 mm

Answer: A

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

A. 5%

B. 6%

C. 8%

D. 1%

Answer: B

View Text Solution

14. The dimensions of $\frac{b}{a}$ in the equation $P = \frac{a - t^2}{bx}$ where P is pressure, x is distance and t is time are

A. $\left[M^2LT^{-3}\right]$

B. $\left[M^{-1}L^0T^{-2}\right]$

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

D. $\left[MLT^{-3}\right]$

Answer: B

View Text Solution

15. In the following equation, x, t and Frepresent displacement, time and force respectively,

$$F = a + bt + \frac{1}{c + d.\ x} + A\sin(\omega t + \theta)$$

The dimensional formula for b/A is

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

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

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

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

Answer: B

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16. What is the number of significant figures in 0.230×10^5

A. 2

B. 3

C. 4

D. 5

Answer: B

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17. The study of the earth's surface is normally performed with

A. rectangular cartesian co-ordinates

B. gaussian system

C. cartesian co-ordinates, but spherical

D. none of these

Answer: C

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18. Which one of the following is dimensionally correct?

A. Capacitance $C = \left[M^{-2}L^{-2}T^{4}A^{1}\right]$

B. Magnetic field induction $B = \left[ML^{0}T^{-1}A^{-2}\right]$

C. Coefficient of self-induction

$$L = \left[ML^2T^{-2}A^{-1}\right]$$

D. Specific resistance $\rho = \left[ML^3T^{-3}A^{-2}\right]$

Answer: C

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19. A quantity X is given by $\varepsilon_0 u(\Delta V)$ where ε_0 is the permittivity of free space, ΔV is potential difference and u is speed. The dimensional formula for X is the same as that of

A. resistance

B. charge

C. voltage

D. current

Answer: D

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20. The momentum of inertia of a body rotating about a given axis is $12.0kgm^2$ in the SI system . What is the value of the moment of inertia in a

system of units in which the unit of lengths is $5cm$ and the unit of mass is $10g$?

A. 1.4×10^3

B. 6.0×10^4

C. 7.3×10^6

D. 8.7×10^5

Answer: D

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21. A wire has a mass (0.2 ± 0.002) g, radius (0.7 ± 0.007) mm and length (3 ± 0.09) cm. The maximum percentage error in the measurement of its density is

A. $10\ \%$

B. $6\ \%$

C. $14\ \%$

D. $1\ \%$

Answer: D

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22. If mass is measured in unit of α kg, length in β m and time in γ s, then calorie would be

A. $4.2\alpha\beta^2\gamma^{-2}$

B. $4.2\alpha^{-1}\beta^2\gamma^2$

C. $4.2\alpha^{-1}\beta^{-2}\gamma^2$

D. $4.2\alpha^{-2}\beta^{-1}\gamma^{-2}$

Answer: C

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23. Which of the following statement is incorrect regarding significant figures?

A. All the non-zero digits are significant.

B. All the zeros between two non-zero digits are significant

C. Greater the number of significant figures in a measurement, smaller is the percentage error

D. The power of 10 is counted while counting the number of significant figures.

Answer: D

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24. The length and breadth of a rectangular sheet are 16.2 cm and 10.1cm, respectively. The area of the sheet in appropriate significant figures and error is

A. $164 \pm 3cm^2$

B. $163.62 \pm 2.6cm^2$

C. $163.6 \pm 2.6cm^2$

D. $163.62 \pm 3cm^2$

Answer: A

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25. The density of a 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 g, the value of density of material will be

A. 0.04

B. 0.4

C. 40

D. 400

Answer: C

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Aipmt Neet Mcq

1. The dimensions of $\frac{1}{2} \in_0 E^2$, where $\in_0$ is permittivity of free space and E is electric field, is :-

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

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

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

D. $\left[MLT^{-1}\right]$

Answer: B

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2. A student measures that distance traversed in free fall of a body, initially at rest in given time. He uses this data to estimated g, the acceleration due to gravity. If the maximum percentage error in measurement of the distance and the time are e_1 and e_2, respectively, the percentage error in the estimation of g is

A. $e_2 - e_1$

B. $e_1 + 2e_2$

C. $e_1 + e_2$

D. $e_1 - 2e_2$

Answer: B

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3. The dimensions of $(\mu_0 \varepsilon_0)^{-1/2}$ are

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

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

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

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

Answer: C

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4. The density of a 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 g, the value of density of material will be

A. 0.04

B. 0.4

C. 40

D. 400

Answer: C

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5. The damping force on an oscillator is directly proportional to the velocity. The units of the constant to proportionality are

A. $kgms^{-1}$

B. $kgms^{-2}$

C. kgs^{-1}

D. kgs

Answer: C

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6. In an experiment four quantities a,b,c and d are measure with percentage error $1\%, 2\%, 3\%$,and 4% respectively quantity is P is calculate as follow

$P = \frac{a^3b^2}{cd}$ % error in P is

A. 7%

B. 4%

C. 14%

D. 10%

Answer: C

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

A. $\left[FVT^{-1}\right]$

B. $\left[FVT^{-2}\right]$

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

D. $\left[FV^{-1}T\right]$

Answer: D

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

A. $\left[EV^{-2}T^{-2}\right]$

B. $\left[E^{-2}V^{-1}T^{-3}\right]$

C. $\left[EV^{-2}T^{-1}\right]$

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

Answer: A

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9. In dimension of circal velocity v_0 liquid following through a take are expressed as $\left(\eta^x \rho^y r^z\right)$ where η, ρ and $r$are the coefficient of viscosity of liquid density of liquid and radius of the tube

respectively then the value 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: C

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10. Plank 's constant (h) speed of length in vacium (C) and newton 's gravitational constant (G) are three fundamental constant .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. $\sqrt{\frac{hG}{G}}$

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

Answer: A

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11. A physical quantity of the dimensions of length that can be formed out of c, G and e is [c is velocity of light, G is universal constant of gravitation and e is charge)

A. $c^2\left[G\frac{e^2}{4\pi\varepsilon_0}\right]^{1/2}$

B. $\frac{1}{c^2}\left[\frac{e^2}{G4\pi\varepsilon_0}\right]^{1/2}$

C. $\frac{1}{c^2}G\frac{e^2}{4\pi\varepsilon_0}$

D. $\frac{1}{c^2}\left[G\frac{e^2}{4\pi\varepsilon_0}\right]^{1/2}$

Answer: D

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12. A student measued the diameter of a small steel ball using a screw gauge of least count $1.001cm$. The main scale reading is $5mm$ and zero of circular scale division coincides with 25 divisions above the reference level. If screw gauge has a zero erroof $-0.004cm$, the correct diameter of the ball is

A. 0.521 cm

B. 0.525 cm

C. 0.053 cm

D. 0.529 cm

Answer: D

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13. The unit of thermal conductivity is :

A. $Wm^{-1}K^{-1}$

B. JmK^{-1}

C. $Jm^{-1}K^{-1}$

D. WmK^{-1}

Answer: A

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14. In an experiment, the percentage of error occurred in the 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 $X = \frac{A^2 B^{1/2}}{C^{1/3} D^3}$, will be

A. 10%

B. $\left(\frac{3}{13}\right)\%$

C. $16\ \%$

D. $-10\ \%$

Answer: C