

Practice Questions

Q1

SI units of gas constant are:

A) watt $\text{K}^{-1}\text{mol}^{-1}$

B) joule $\text{K}^{-1}\text{mol}^{-1}$

C) newton $\text{K}^{-1}\text{mol}^{-1}$

D) erg $\text{K}^{-1}\text{mol}^{-1}$

Q2

The velocity of a particle is given by:

$$v = at^2 + bt + c$$

If v is measured in ms^{-1} and t is measured in s, the unit of c :

A) a is ms^{-1}

B) c is ms^{-1}

C) b is ms^{-1}

D) a and b are same but that of c is different

Q3

The least count of a stop watch is 0.1 sec. The time of 20 oscillations of the pendulum is found to be 20 sec. The percentage error in the time period is:

A) 0.25 %

B) 0.75%

C) 0.5 %

D) 1.0%

Q4

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

A) N m^2

B) N m^4

C) N m^{-3}

D) N m^{-2}

Q5

The radius of a ball is (5.2 ± 0.2) cm. The percentage error in the volume of the ball is:

A) 11%

B) 7%

C) 4%

D) 9%

Q6

The percentage errors 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?

A) 11%

B) 5%

C) 8%

D) 4%

Q7

A mass m has acceleration a . It moves through a distance s in time t . The power used in accelerating the mass is equal to the product of force and velocity. The percentage uncertainties are

0.1% in m ,

1.5% in s ,

1% in a ,

0.5% in t .

What is the percentage uncertainty in the average power?

A) 2.1%

B) 3.1%

C) 2.6%

D) 4.1%

Q8

In the expressions below a is acceleration, F is force, m is mass, t is time, v is velocity. Which expression represents energy?

A) Ft

B) $\frac{2mv}{t}$

C) Fvt

D) $\frac{at^2}{2}$

Q9

The resistance R of an unknown resistor is found by measuring the potential difference V across the resistor and the current I through it and using the equation $R = \frac{V}{I}$. The voltmeter reading has a 3% uncertainty and the ammeter reading has a 2% uncertainty. What is the uncertainty in the calculated resistance?

- A) 1.5%
- B) 5%
- C) 3%
- D) 6%

Q10

Which one of the following is not regarded as a fundamental quantity in physics?

- A) Weight
- B) Mass
- C) Length
- D) Time