**Subject : Physics** **(Date :29-4-2016)** **Class : Two Year Batch**

**1.** When 97.52 is divided by 2.54, the correct result is :
(A) 38.3937 (B) 38.394 (C) 38.39 (D) 38.4

**2.** The least count of a stopwatch is 1/5 second. The time for 20 oscillations of a pendulum is measured to be 25 seconds. The percentage error in the measurement of time will be :
(A) 0.1% (B) 8% (C) 1.8% (D) 0.8%

**3.** The density of cube is measured by measuring its mass and the length of its sides. If the maximum errors in the measurement of mass and length are 3% and 2% respectively, then the maximum error in the measurement of density is :
(A) 9% (B) 7% (C) 5% (D) 1%

**4.** A physical quantity is represented by $X = M^aL^bT^{-c}$. If percentage error in the measurement of M, L and T are $\alpha\%, \beta\% \text{ and } \gamma\%$ respectively, then total percentage error is :
(A) $(\alpha a - \beta b + \gamma c)\%$ (B) $(\alpha a + \beta b + \gamma c)\%$ (C) $(\alpha a + \beta b - \gamma c)\%$ (D) none of the above

**5.** The measure of radius of a sphere is $(4.22 \pm 2\%)$ cm. The percentage error in volume of the sphere is
(A) $(315 \pm 6\%)$ (B) $(315 \pm 2\%)$ (C) $(315 \pm 4\%)$ (D) $(315 \pm 5\%)$

**6.** While measuring acceleration due to gravity by 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 actual percentage error in the measurement of the value of g will be :
(A) 2% (B) 4% (C) 7% (D) 10%

**7.** The volume of a sphere is 1.76 $cm^3$. The volume of 25 such spheres taking into account the significant figures is :
(A) $0.44 \times 10^2\ cm^3$ (B) 44.0 $cm^3$ (C) 44 $cm^3$ (D) 44.00 $cm^3$

**8.** When the number 6.03587 is rounded off up to the second place of decimals, it becomes :
(A) 6.035 (B) 6.04 (C) 6.03 (D) none of these

**9.** A body is moving from height x = 0.1 m to x = 1.2 m in 1 sec under constant acceleration of 0.5 $m/s^2$. What was the initial velocity with which it started.
(A) 0.85 m/s (B) 0.9 m/s (C) 1.0 m/s (D) 0.8 m/s

**10.** A ceratin body weighs 22.42 gm and has a measured volume of 4.7 c.c. The possible error in the measurement of mass and volume are 0.01 cm and 0.1 c.c. Then maximum error in the density will be
(A) 22% (B) 2% (C) 0.2% (D) 0.02%

**11.** A wire is of mass (0.3 ± 0.003) gm. The radius is (0.5 ± 0.005) mm and length is (6.0 ± 0.06) cm. Then error in density is :
(A) 3% (B) 4% (C) 8% (D) 16%

**12.** If the velocity of light C, acceleration due to gravity g, and the atmospheric pressure P are taken as the fundamental units, then the unit of mass will be :
(A) $1/(81 \times 10^{34})$kg (B) 81 kg (C) $9 \times 10^{18}$ kg (D) $81 \times 10^{34}$ kg

**13.** In the experiment of ohm's law the voltmeter used is having a least count 0.2 volt and the ammeter used in measuring the current through wire is having a least count 0.1 ampere . At some instant the readings to voltmeter and ammeter are 6.4 volt and 2.0 ampere . The value of resistance with maximum permissible error is :

(A) $3.2 \pm 0.2\ \Omega$ (B) $3.2 \pm 0.26\ \Omega$ (C) $3.2 \pm 0.3\ \Omega$ (D) $3.2 \pm 0.4\ \Omega$

**14.** The amount of heat (H) produced in an electric circuit depends upon the current (I), resistance (R) and time (T). If the errors created in the measurements of the above quantities are 2%, 1% and 1% respectively then the maximum possible error in heat produced will be : [ $R = M^1 L^2 T^{-3} A^{-2}$]

(A) 1% (B) 2% (C) 3% (D) 6%

**15.** Two resistances are measured in Ohm.

$R_1 = 3\Omega \pm 1\%$

$R_2 = 6\Omega \pm 2\%$

When they are connected in parallel, the percentage error in equivalent resistance is

(A) 3% (B) 4.5% (C) 0.67% (D) 4.67%.

**16.** A physical quantity P is related to four observably a, b, c and d as follows :

$P = \frac{a^3 b^2}{\sqrt{c}\, d}$ 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? If the value of P calculated using the above relation turns out to be 3.763, to what value should you round off the result ?

**17.** The period of oscillation of a simple pendulum is $T = 2\pi\sqrt{\frac{L}{g}}$. L is about 10 cm and is known to 1 mm accuracy. The period of oscillation is about 0.5 second. The time of 100 oscillations is measured with a wrist watch of 1 s resolution. What is the accuracy in the determination of g?

**18.** In an experiment on the determination of Young's Modulus of a wire by Searle's method, following data is available :

Normal length of the wire L = 110 cm

Diameter of the wire d = 0.01 cm

Elongation in the wire $\ell$ = 0.125 cm

This elongation is for a tension of 50 N. The least counts for corresponding quantities are 0.01 cm, 0.00005 cm and 0.001 cm respectively. Calculate the maximum error in calculating the value of Young's modulus (Y).

Given that Young's modulus $Y = \frac{\text{Stress}}{\text{Strain}} = \frac{T/A}{\ell/L}$, $T$ = *tension* , $A$ = *area* = $\frac{\pi d^2}{4}$

**19.** Calculate focal length of a spherical mirror form the following observations : object distance u = (50.1 ± 0.5) cm and image distance v = (20.1 ± 0.2) cm.

Given mirror formula $\frac{1}{f} = \frac{1}{u} + \frac{1}{v} = \frac{v+u}{uv}$