

1. If  $V$  denotes the potential difference across the plates of a capacitor of capacitance  $C$ , the dimensions of  $CV^2$  are  
 a)  $MLT^{-2}$     b)  $M^2LT^{-1}$     c)  $ML^2T^{-2}$     d) not expressible in terms of  $M$ ,  $L$ ,  $T$
2. Unit of amplification factor is  
 a) ohm                      b) mho                      c)  $AV^{-1}$                       d) None of these
3. A physical quantity is represented by the relation  $Y = MLT$ . If the percentage errors in the measurement of  $M$ ,  $L$  and  $T$  are respectively  $\alpha\%$ ,  $\beta\%$  and  $\gamma\%$ , respectively then the total error will be  
 a)  $(\alpha a + \beta b - \gamma c)\%$                       b)  $(\alpha a - \beta b - \gamma c)\%$                       c)  $(\alpha a + \beta b + \gamma c)\%$   
 d)  $(\alpha a - \beta b + \gamma c)\%$
4. Given that  $T$  stands for time period and  $l$  stands for the length of simple pendulum. If  $g$  is the acceleration due to gravity, then which of the following statements about the relation  $T^2 = \left(\frac{l}{g}\right)$  is correct?  
 a) It is correct both dimensionally as well as numerically  
 b) It is neither dimensionally correct nor numerically  
 c) It is dimensionally correct but not numerically  
 d) It is numerically correct but not dimensionally
5. Select the incorrect statement(s).  
 a) If the zero of vernier scale does not coincide with the zero of the main scale, then the vernier caliper is said to be having zero error  
 b) Zero correction has a magnitude equal to zero error but sign is opposite to that of zero error  
 c) Zero error is positive when the zero of vernier scale lies to the left of the zero of the main scale  
 d) Options (B) and (C) are incorrect
6. 1 cm on the main scale of a vernier caliper is divided into 10 equal parts. If 10 divisions of vernier coincide with 8 small divisions of main scale, then the least count of the calliper is  
 a) 0.01 cm                      b) 0.02 cm                      c) 0.05 cm                      d) 0.005 cm
7. The vernier constant of a travelling microscope is 0.001 cm. If 49 main scale divisions coincide with 50 vernier scale divisions, then the value of 1 main scale division is  
 a) 0.1 mm    b) 0.5 mm    c) 0.4 mm    d) 1 mm
8. Which of the following has the largest least count?  
 a) Spherometer                      b) Vernier callipers  
 c) Screw gauge                      d) Metre scale

9. 1 cm of main scale of a vernier calliper is divided into 10 divisions. The least count of the calipers is 0.005 cm, then the vernier scale must have
- a) 10 divisions            b) 20 divisions            c) 25 divisions  
d) 50 divisions
10. Least count of a vernier calliper is  $\frac{1}{10N}$  cm. The value of one division on the main scale is 1 mm. Then the number of divisions of the main scale that coincide with N divisions of vernier scale is
- a) 10 N            b)  $\frac{N}{10}$             c) (N - 1)            d) N - 10
11. Each division on the main scale is 1 mm. Which of the following vernier scales give vernier constant equal to 0.01 mm?
- a) 9 mm divided into 10 divisions            b) 90 mm divided into 100 divisions  
c) 99 mm divided into 100 divisions            d) 9 mm divided into 100 divisions
12. The least count of vernier callipers is 0.01 cm. Then the error in the measurement is
- a) > 0.01 cm            b)  $\geq 0.01$  cm            c) < 0.01 cm  
d)  $\leq 0.01$  cm
13. A person performs an experiment with vernier callipers and takes 100 readings. He repeats the same experiment but now takes 400 readings. Then the probable error is
- a) the same            b) halved            c) doubled            d) reduced by one fourth
14. Vernier constant is the
- a) value of one MSD divided by total number of divisions on the main scale  
b) value of one VSD divided by total number of divisions on the vernier scale  
c) total number of divisions on the main scale divided by total number of divisions on the vernier scale  
d) difference between value of one main scale division and one vernier scale division
15. Which of the following uses angular vernier?
- a) Metre scale            b) Vernier callipers  
c) Spherometer            d) Both (a) and (b)
16. Screw gauge can measure the diameter of thin wires or similar objects with accuracy upto
- a) 1 cm            b) 0.1 cm            c) 0.01 cm            d) 0.001 cm
17. Pitch of screw of a screw gauge is the
- a)  $\frac{\text{distance moved by thimble on main scale}}{\text{number of rotation of thimble}}$

- b)  $\frac{\text{pitch}}{\text{number of circular scale divisions}}$
- c)  $\frac{\text{number of rotation thimble}}{\text{number of circular scale divisions}}$
- d) None of the above
18. Least count of screw gauge is defined as
- a)  $\frac{\text{distance moved by thimble on main scale}}{\text{number of rotation of thimble}}$
- b)  $\frac{\text{pitch of the screw}}{\text{number of circular scale divisions \& head scale}}$
- c)  $\frac{\text{number of rotation of thimble}}{\text{number of circular scale divisions}}$
- d) None of the above
19. Screw gauge can be used to determine
- a) Thickness of glass piece      b) Diameter of a wire
- c) To measure thickness of glass piece and to measure diameter of wire
- d) None of the above
20. Screw gauge contains following scales
- a) main scale, vernier scale      b) main scale, ordinary scale
- c) main scale, head scale      d) only main scale
21. Screw gauge is said to have negative error
- a) when head scale zeroth division coincides with base line of main scale
- b) when head scale zeroth division is above with base line of main scale
- c) when head scale zeroth division is below with base line of main scale
- d) None of the above
22. For negative error correction is
- a) positive    b) negative      c) no correction    d) None of the above
23. Screw gauge is said to have positive error
- a) when head scale zeroth division coincides with base line of main scale
- b) When head scale zeroth division is above with base line o main scale
- c) when head scale zeroth division is below with base line of main scale
- d) None of the above
24. For positive error, the correction is
- a) positive    b) negative      c) nil      d) None of the above
25. The diameter D of a wire is measured using screw gauge of zero error. Then

- a)  $D = \left( \begin{array}{c} \text{main} \\ \text{scale} \\ \text{reading} \end{array} \right) + \left( \begin{array}{c} \text{circular} \\ \text{scale} \\ \text{reading} \end{array} \right) \times \left( \begin{array}{c} \text{least} \\ \text{count} \end{array} \right)$
- b)  $D = \left( \begin{array}{c} \text{circular} \\ \text{scale} \\ \text{reading} \end{array} \right) + \left( \begin{array}{c} \text{main} \\ \text{scale} \\ \text{reading} \end{array} \right) \times \left( \begin{array}{c} \text{least} \\ \text{count} \end{array} \right)$
- c)  $D = \left( \begin{array}{c} \text{main} \\ \text{scale} \\ \text{reading} \end{array} \right) + \left( \begin{array}{c} \text{vernier} \\ \text{scale} \\ \text{reading} \end{array} \right) \times \left( \begin{array}{c} \text{least} \\ \text{count} \end{array} \right)$
- d) None of the above
26. The pitch of a screw gauge is 0.5 mm. Its head scale contains 50 divisions. The least count of the screw gauge is  
 a) 0.01 mm                      b) 0.001 mm                      c) 0.02 mm  
 d) 0.002 mm
27. Which of the following is correct?  
 a) When the zero of the circular scale advances beyond the reference line, then the zero correction is negative  
 b) When the zero of the circular scale has advanced beyond the reference line, then the zero correction is positive and when the zero of the circular scale is left behind the reference line, then the zero correction is negative  
 c) When the zero of the circular scale is left behind the reference line, then the zero correction is positive  
 d) Both (a) and (c)
28. The vernier of a circular scale has been divided into 30 divisions which coincide with 29 divisions of the main scale, having each division of  $\frac{1^\circ}{2}$ . The least count of the device is  
 a) 10'                      b) 30'                      c) 0.1'                      d) 1'
29. The velocity  $v$  of a particle at time  $t$  is given by  $v = \frac{a}{t} + \frac{bt}{t^2+c}$ . The dimensions of  $a$ ,  $b$ ,  $c$  are respectively  
 a)  $LT^{-2}$ ,  $L$ ,  $T$                       b)  $L$ ,  $L$ ,  $T^2$                       c)  $L$ ,  $LT$ ,  $T^2$                       d)  $L$ ,  $L$ ,  $LT^2$
30. What is the unit of  $k$  in the relation  $u = \frac{ky}{y^2 + a^2}$ , where  $u$  represents the potential energy,  $y$  represents the displacement and  $a$  represents the maximum displacement i.e., amplitude?  
 a)  $ms^{-1}$                       b)  $ms$                       c)  $Jm$                       d)  $Js^{-1}$
31. 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

a) speed    b) distance travelled    c) acceleration    d)  
None of these

32. If a quantity  $x$  is defined by the equation  $x = 3CB^2$  where  $C$  is capacitance in farad and  $B$  represents magnetic field in tesla. The dimensions of  $x$  are

a)  $ML^{-2}$     b)  $ML^{-2}T^{-2} A$     c)  $ML^{-2}T^{-2}A^2$     d)  $L^{-1} A^{-1}$

33. There are two different quantities  $A$  and  $B$  having different dimensions. Then which of the following operation is dimensionally correct?

a)  $A \div B$     b)  $A - B$     c)  $\frac{A}{B}$     d)  $e^{A/B}$

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