



PHYSICS

BOOKS - JEEVITH PUBLICATIONS

PHYSICS (KANNADA ENGLISH)

UNITS AND MEASUREMENTS

One Mark Questions And Answers

1. What is a unit?



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2. What is measurement ?



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3. Why fundamental units are called so ?



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4. What are derived units ?



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5. What is SIU ?



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6. How many fundamental physical quantities are used for standard measurement ?



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7. Name the two supplementary physical quantities.



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8. Mention the SI units of length, mass, time, temperature, luminous intensity, electric current and amount of substance present.



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9. Expand CGS unit.



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10. What is MKS unit ?



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11. Mention any one fundamental physical quantity.



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12. Mention any one derived physical quantity.



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13. Write the dimensional formula for planck's constant.



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14. What are inferior planets ?



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15. What is meant by planet's elongation ?



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Two Marks Questions With Answers

1. What are dimensions ? Give an example.



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2. What is a dimensional formula ? Give an example for a physical quantity.



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3. What is meant by dimensional equation ?
Give an example.



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4. Give any two examples for a dimensional constant.



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5. Give any two examples for a dimensionless physical quantity.



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6. Explain what is meant by dimensional analysis.



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7. Define the term significant figures with an example.



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8. What is meant by error in measurements ?

Give an example.



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9. Find the fractional error in the measurement of $x = A^m B^n$



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10. Suggest any two methods of minimizing the errors.



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11. Distinguish between random error and constant error.



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12. What is meant by absolute error ?



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13. Mention the number of significant figures in the following.

(i) 2.64×10^{24} kg

(ii) 64800 m

(iii) 6.320 J

(iv) $0.00076m^2$



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14. Each side is measured to be 7.203 m. What are the total surface area and the volume of the cube to appropriate significant figures ?



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15. If $A = (12.0 \pm 0.1)$ cm and $B = (8.5 \pm 0.5)$ cm find (i) $A + B$ (ii) $A - B$



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16. If the size of a nucleus (in the range of 10^{-15} to 10^{-14}) is scaled up to the tip of a sharp pin, what roughly is the size of an atom? Assume tip of the pin to be in the range 10^{-5} m to 10^{-4} m.



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17. Convert 48 kmph in terms $m.s^{-1}$.



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18. Convert 32.2 ft s^{-2} in terms of ms^{-2} .



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19. $\left(P + \frac{a}{V^2}\right)(V - b) = RT$ is the real gas equation. Find the dimensions of a & b .



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20. Write the dimensional formula for (1) voltage and (2) resistance.





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Numericals With Solutions

1. The period of oscillation (T) of a simple pendulum depends on the probable quantities such as mass ' m ' of a bob, length ' l ' of the pendulum and acceleration due to gravity ' g ' at the place. Derive an equation using dimensional analysis.



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2. The frequency ' n ' of a stretched string depends on length ' l ' of a string, mass per unit length or linear density (m) and tension (T) or (F) acting on the string. Derive an equation connecting these quantities using Dimensional Analysis.



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3. If the surface tension (T) of a soap bubble depends upon excess of pressure radius ' r ' of

the bubble, then obtain an equation for the surface tension.



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4. Convert N in terms of dynes



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5. Convert 1 J of energy in terms of ergs.



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6. Check the correctness of the equations,

(i) $s = ut + 1/2at^2$ and (ii)

$$s_{nth} = u + \frac{a}{2}(2n - 1)$$



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7. The sun's angular diameter is measured as 1920". The distance 'D' of the sun from the 'Earth' is 1.496×10^{11} m. what is the diameter of the sun ?



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8. A physical quantity 'Q' is given by $Q = \frac{A^2 B^{3/2}}{C^4 D^{1/2}}$. The percentage error in A, B, C, D, E are 1 %, 2 %, 4% , 2 % respectively . Calculate the minimum and maximum percentage errors in 'Q'



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9. If two resistances of value $R_1 = (2.0 \pm 0.1)\Omega$ and $R_2 = (12.3 \pm 0.2)$ are connected in (i) parallel and (ii) series then

find the error in the estimation of equivalent resistance.



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10. The radius of a concave mirror measured

by spherometer is given by $R = \left(\frac{l^2}{6h} + \frac{h}{2} \right)$

The values of 'l' and 'h' are 4 cm and 0.065 cm respectively. Compute the error measurement of radius of curvature.



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11. The density ' ρ ' of a piece of metal of mass 'm' and volume 'V' is given by the formula $\rho = m/V$. If $m = 375.32 \pm 0.01g$, $V = 136.41 \pm 0.01cm^3$. Find the percentage error in the measurement of density ' ρ '.



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12. What is the distance in km of a quasar from which light takes 3.0 billion years to reach us.



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13. During a total solar eclipse the disk of the moon almost covers the disk of the sun. If the angle measured is $1920''$ and distance of the moon from the Earth is 3.84×10^5 km then calculate the diameter of the moon.



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