

# Engg. physics

## Unit-1 Unit and Dimensional

1. Write dimensional formula <sup>and Unit</sup> of following physical quantities (i) Force, (ii) Work, (iii) Universal gravitational constant (G), (iv) Acceleration due to gravity (g), (v) Thermal conductivity, (vi) Heat Energy, (vii) Energy, (viii) Electric potential (V), (ix) Electric Field (E), (x) Capacitance of a conductor (C).

2. State principle of Homogeneity and check the correctness of following Relations.

(i)  $v = u + \frac{1}{2}at$ , (ii)  $s = ut + \frac{1}{2}at^2$ , (iii)  $v^2 - u^2 = 2as$

(iv)  $t = 2\pi\sqrt{\frac{l}{g}}$ , (v)  $\eta = \frac{1}{2l}\sqrt{\frac{T}{m}}$ , (vi)  $v = \sqrt{\frac{E}{\rho}}$ ,

(vii)  $v = \sqrt{\frac{T}{m}}$

## Unit-2 scalars and vectors

3. Define Triangle law of vector addition and parallelogram law of vector addition.

4. When  $\vec{A} = 3\hat{i} + 2\hat{j} + 5\hat{k}$  and  $\vec{B} = 4\hat{i} - 3\hat{j} + 6\hat{k}$  then find  $\vec{A} \cdot \vec{B}$  and  $\vec{A} \times \vec{B}$ ?

## Unit-3 Kinematics

5. A car starting from rest attains a velocity of 60 m/sec in 2 ~~min~~ minutes. Calculate the acceleration.

6. Derive expressions for (i) Equation of Trajectory, (ii) maximum height, (iii) Time of Ascent, (iv) Horizontal range of a projectile fired at an angle  $\theta$  with the Horizontal.

## Unit-4 WORK and Friction

7. State Laws of Limiting friction.
8. Write the methods of Reducing friction.

## Unit-5 Gravitation

9. State and Explain Newton's Law of Gravitation and define Universal Gravitational constant ( $G$ ).
10. Write comparison between mass and weight.
11. State Kepler's laws of planetary motion.

## Unit-6 Oscillations and waves

12. Define simple Harmonic motion and find expression for differential equation of simple Harmonic motion.
13. Write comparison between Transverse wave motion and Longitudinal wave motion.
14. Define Ultrasonics and write 5 properties of Ultrasonics and 5 Applications of Ultrasonics.

## Unit-7 Heat and Thermodynamics

15. Calculate the amount of heat required to convert 5 gm of ice at  $-10^{\circ}\text{C}$  to water  $60^{\circ}\text{C}$ .  
Given specific heat of ice =  $0.5 \text{ cal/gm}^{\circ}\text{C}$ , Latent heat of ice =  $80 \text{ cal/gm}$ .
16. Establish the relation between (i)  $\alpha$  and  $\beta$ ,  
~~and~~ (ii)  $\alpha$  and  $\gamma$
17. Define Joule's mechanical equivalent of heat
18. State and Explain First Law of Thermodynamic.

## Unit - 8      Optics

19. Write the Laws of Reflection and Refraction.
20. Define critical angle and Total Internal reflection with diagram.
21. Draw the ray diagram and write the formula of refraction through a prism.
22. Write applications of ~~ultrasonic~~ Optical Fibre.

## Unit - 9      Electrostatics and Magnetostatics

23. State and Explain Coulomb's Law in Electrostatics and define unit charge.
24. When 5 capacitors each of capacity  $4\mu\text{F}$  are connected in series then find the resultant capacity.
25. State and Explain Coulomb's Law in Magnetism and define unit pole.
26. Define and write the properties of magnetic lines of force.
27. Define magnetic flux and magnetic flux density.

## Unit - 10      Current and Electricity

28. When 4 resistors each of resistance  $5\Omega$  are connected in parallel then find the resultant resistance.
29. State and Explain Kirchhoff's laws with diagram.
30. Derive expression for balance condition of Wheatstone's Bridge.

## Unit - 11 Electromagnetism and Electromagnetic Induction

31. Derive the expression of force acting on a current carrying conductor placed in a Uniform magnetic field.
32. State Faraday's laws of Electromagnetic Induction.
33. Write the ~~definition~~ <sup>statement</sup> of Lenz's Law, Fleming's Left hand rule and Fleming's Right hand Rule.
34. Write the comparison between Fleming's Left hand rule and Fleming's right hand rule.

## Unit - 12 Modern physics

35. Write the properties and Applications of LASER.
36. Write the concept of wireless Transmission.

