

# Sahaj Adhyayan (सहज अध्ययन)

जर हे **Practice Question Papers** तुम्हाला खरंच फायदेशीर वाटत असतील तर तुमच्या सर्व मित्र मैत्रिणींना पाठवा.

त्यांना देखील ह्या सर्वांचा अभ्यासासाठी फायदा होऊ द्या.

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तर ते आम्हाला WhatsApp वर पाठवा,

इतर विद्यार्थी मित्रांना त्या सर्वांचा उपयोग होईल.

# FIRST SEMESTER EXAMINATION

Class : 11<sup>th</sup>

Time : 2.30 Hrs.]

Subject : PHYSICS

[Marks : 50

Note : (1) All questions are compulsory.

- (2) Section-A contains Q.1 to 3 of multiple choice type of questions carrying one mark each Q.4 to 6 are very short answer type of questions carrying one mark each.
- (3) Section-B Contains Q.7 to 11 of short answer type of questions carrying two marks each. Internal choice is provided to only one question.
- (4) Section-C contains Q.12 to 19 of short answer type of questions carrying three marks each. Internal choice is provided to only one question.
- (5) Section-D contains Q.20 to 21 of long answer type of questions carrying five marks each. Internal choice is provided to each questions.
- (6) Use the log table if necessary, use of calculator is not allowed.

## Section – A

- Q.1.  $[L^1 M^1 T^{-2}]$  is the dimensional formula for ..... (1)  
(a) Velocity (b) Acceleration  
(c) Force (d) Work
- Q.2. For two vectors to be equal, they should have the ..... (1)  
(a) Same magnitude (b) same direction  
(c) Same magnitude & direction ✓  
(d) Same magnitude but opposite direction
- Q.3. Speed of sound is maximum in ..... (1)  
(a) Air (b) Water  
(c) Vacuum ✓ (d) Solid

g4. a prism is diffraction grating equal to the  
 rate of change of the angle of deviation.  
 g.5. Doppler effect or Doppler shift is the change  
 in frequency of a wave in relation.

Q.4. Define angular dispersion for a prism. (1)

Q.5. What is Doppler effect of sound. (1)

Q.6. What is the magnitude of charge on an electron (1)

g.6-7 The charge of an electron is  $-1.602 \times 10^{-19} \text{ C}$

### Section - B

Q.7. Determine  $\vec{a} \times \vec{b}$  given  $\vec{a} = 2\hat{i} + 3\hat{j}$  &

$$\vec{b} = 3\hat{i} + 5\hat{j} \quad (2)$$

Q.8. Define average velocity and instantaneous velocity. (2)

Q.9. Distinguish between Real and Pseudo forces. (2)

Q.10. A tuning fork of frequency 170 Hz, produces sound waves of wavelength 2 m. Calculate speed of sound. (2)

(OR)

A certain sound wave in air has a speed 340 m/s and wavelength 1.7 m for this wave calculate

(a) the frequency

(b) the period

Q.11. Under what conditions is total internal reflection possible? (2)

### Section - C

Q.12. Distinguish between transverse waves and longitudinal waves. (3)

Q.13. Derive the formula for the range and maximum height achieved by a projectile thrown from the origin with initial velocity  $\vec{u}$  at angle  $\theta$  to be horizontal. (3)

Q.13. Define 0 vector, Negative vector, equal vector, resultant vector, position vector and Unique vector

11<sup>th</sup> PHYSICS (2)



80% The last 10-11

Q.14. A bullet of mass  $m_1$  travelling with a velocity  $v$  strikes a stationary wooden block of mass  $m_2$  and gets embedded into it. Determine the expression for loss in the kinetic energy of the system. Is this violating the principle of conservation of energy? If not, how can you account for this loss? (3)

Q.15. Define progressive wave. State any four properties. (3)

Q.16. Define angular dispersion for a prism obtain its expression for a thin prism. (3)

Q.17. Calculate and compare the electrostatic and gravitational forces between two protons which are  $10^{-15}$  m apart. Value of  $G = 6.674 \times 10^{-11} \text{ m}^3 \text{ kg}^{-1} \text{ s}^{-2}$  and mass of the proton is  $1.67 \times 10^{-27} \text{ kg}$ . (3)

Q.18. Derive the formula for kinetic energy of a particle having mass  $m$  & velocity  $v$  using dimensional analysis. (3)

Q.19. Obtain derivatives of the following functions : (3)

- (i)  $x \sin x$  (ii)  $x^4 + \cos x$  (iii)  $x/\sin x$

(OR)

Q.20. Evaluate the following integral :-

- (i)  $\int x^8 dx$  (ii)  $\int_2^3 x^2 dx$  (iii)  $\int (x + \sin x) dx$

### Section - D

Q.20. (A) If  $\vec{A} = 5\hat{i} + 6\hat{j} + 4\hat{k}$  &  $\vec{B} = 2\hat{i} - 2\hat{j} + 3\hat{k}$

determine the angle between  $\vec{A}$  &  $\vec{B}$

Q.14. To find the relation factor between SI To CGS IN Force using dimensional analysis

11th PHYSICS-2

Q.17 Define fundamental and derivative quantity with their suitable example.

(B) The angular momentum  $\vec{L} = \vec{r} \times \vec{p}$  where  $\vec{r}$  is a position vector and  $\vec{p}$  is Linear momentum of a body.

If  $\vec{r} = 4\hat{i} + 6\hat{j} - 3\hat{k}$ ,  $\vec{p} = 2\hat{i} + 4\hat{j} - 5\hat{k}$ .

Find  $\vec{L}$

(5)

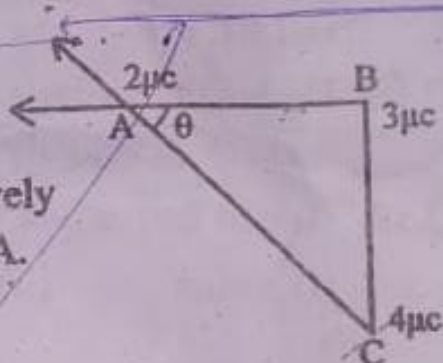
(OR)

Q.21. (A) Given  $\vec{V}_1 = 5\hat{i} + 2\hat{j}$  &  $\vec{V}_2 = a\hat{i} - 6\hat{j}$  are perpendicular to each other determine the value of  $a$ .

(B) Show that vectors  $\vec{a} = 2\hat{i} + 3\hat{j} + 6\hat{k}$

$\vec{b} = 3\hat{i} - 6\hat{j} + 2\hat{k}$  &  $\vec{c} = 6\hat{i} + 2\hat{j} - 3\hat{k}$  are mutually perpendicular.

Q.21. (A) Three charges of  $2\mu\text{C}$ ,  $3\mu\text{C}$  &  $4\mu\text{C}$  are placed at points A, B & C respectively. Determine the forces on A. Due to other charges.



(B) State the units of Linear charge density and dipole moment.

(5)

(OR)

(A) What is relative permittivity? State the law of conservation of charge.

(B) Three equal charges of  $10 \times 10^{-8} \text{ C}$  respectively each located at the corners of a right triangle whose sides are 15 cm, 20 cm & 25 cm respectively. Find the force exerted on the charge located at the  $90^\circ$  angle.