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## **XI – STD PHYSICS QUESTION BANK**

### **VOLUME-II**

### **6. OSICILATION**

#### **2 & 3 MARKS:**

1. Define simple harmonic motion.
2. What are the conditions of SHM?
3. Explain i) Displacement ii) velocity iii) acceleration in SHM using component method.
4. What is the phase difference?
5. Define the terms i) time period ii) frequency iii) angular velocity.
6. What are the examples of SHM?
7. Define force constant and with give units.
8. What is forced vibration?
9. What is a spring factor?
10. Difference between linear and angular harmonic oscillator?
11. Expression for the angular harmonic oscillator?
12. Explain the oscillations of the mass attached to a horizontal spring?
13. Explain the oscillations of the mass attached to a vertical spring?
14. If two springs are connected in parallel, what is equivalent spring constant?
15. If two springs are connected in series, what is equivalent spring constant?
16. What is called as damped oscillations?
17. What is known as resonance?

#### **5 MARKS:**

18. Drive an expression for the angular harmonic motion?
19. Show that the oscillations of the simple pendulum are simple harmonic. Hence deduce the expression for the time period and frequency?
20. Drive an expression for the total energy of the particle executing SHM.
21. Drive an expression for the oscillations of liquid column in a u-tube?
22. Drive an expression for the vertical oscillations of a spring. And give special cases.

## 7. WAVE MOTION

### 2 & 3 MARKS:

1. Define wave motion?
2. What are the important characteristics of wave motion?
3. Difference between transverse and longitudinal waves.
4. Define as i) wave length ii) frequency.
5. Derive Newton's formula for the velocity of sound in gases.
6. Sound travels faster on rainy days. Why?
7. What are the characteristics of progressive wave?
8. Define as intensity.
9. State the principle of superposition.
10. Difference between intensity and loudness of sound.
11. What is interference of waves?
12. What are beats?
13. How are stationary waves formed?
14. What are the characteristics of stationary waves?
15. State the laws transverse vibrations of stretched strings?
16. What is meant by end correction?
17. Define as Doppler effect?
18. What are the applications of Doppler effect?
19. Prove that in a pipe closed at one end, frequency of harmonics are in the ratio 1:3:5.

### 5 MARKS:

20. Obtain an expression for the velocity of transverse wave in a stretched string.
21. Expression for the following factors affecting velocity of sound in gases. i) effect of pressure ii) effect of temperature iii) effect of density.
22. Obtain the equation of a plane progressive wave.
23. Describe an experimental to explain the phenomenon of interference of waves.
24. Derive the equation of stationary wave and the condition for nodes and antinodes.
25. Derive the formula for the change in frequency,
  - i) when the source is approaching and receding from the observer.
  - ii) when the source is stationary and observer is moving towards and away from the source.

## 8. HEAT AND THERMODYNAMICS

### 2 & 3 MARKS:

1. What are the postulates of kinetic theory of gases?
2. Define as Avogadro number/

3. What are degrees of freedom?
4. State that law of equipartition of energy.
5. State that zeroth law of thermodynamics.
6. Define as temperature?
7. Define as specific heat capacity?
8. Define as molar specific heat capacity?
9. Define as molar specific heat capacity of gas at constant volume?
10. Define as molar specific heat capacity of gas at constant pressure?
11. Define as internal energy?
12. State that first law of thermodynamics.
13. What is called p-v diagram?
14. Define as isothermal process?
15. Define as adiabatic process?
16. Define Clausius statement?
17. Define Kelvin's statement?
18. Define as heat pump?
19. What are the properties of thermal radiations?
20. Define as i) Absorptive power ii) Emissive power?
21. State that Stefan's law.
22. Define solar constant?
23. Derive an expression for the average kinetic energy of the molecule of gas?
24. Derive an expression for the work done during the isothermal process?
25. Drive an expression for the efficiency of Carnot's engine.
26. What is coefficient of performance?
27. Define as COP?
28. Explain the coefficient of thermal conductivity?
29. Explain the surface temperature of the sun?
30. Define temperature gradient?

**5 MARKS:**

31. Derive an expression for the pressure exerted by a gas?
32. Expression for specific heat capacity of mono atomic, diatomic and tri atomic gases.
33. Derive Meyer's relation.
34. Drive an expression for the work done in an adiabatic expansion.
35. Explain the experimental verification of Newton's law of cooling.
36. Describe the working of Pyrheliometer.

## **9. RAY OPTICS**

**2 & 3 MARKS:**

1. State the laws of reflection?

2. Explain the image formation in a plane mirror.
3. Explain the deviation of light due to rotation of a mirror.
4. Define as i) virtual image ii) real image?
5. What are the characteristics of the image formed by a plane mirror?
6. Explain the image formed by a spherical mirror?
7. Explain the Cartesian sign convention?
8. Define as magnification?
9. Define as critical angle?
10. What is known as total internal reflection?
11. Write a note on optical fibres?
12. Give the importance of velocity of light?
13. What is called refraction?
14. What is Cartesian sign convention?
15. Define as i) principle focus ii) focal length?
16. Define as linear magnification?
17. Define power of a lens?
18. What is 1 dioptre?
19. What is angle of prism?
20. Write a note on formation of rainbows?
21. Define spectrum?
22. Define dispersive power?
23. Describe adjustments of the spectrometer?

**5 MARKS:**

24. What is the relation between concave mirror – real image?
25. What is the relation between convex mirror – virtual image?
26. Explain Michelson's method of determining velocity of light?
27. Explain the refraction at a spherical surface?
28. Derive Lens's maker's formula and lens formula?
29. Establish the relation  $\frac{1}{F} = \frac{1}{f_1} + \frac{1}{f_2}$  of thin lenses in contact?
30. Derive an equation for dispersive power of a prism?
31. Describe spectrometer.
32. Explain the refraction of light through a prism.
33. Explain how will you determine the angle of the minimum deviation of a prism using spectrometer?

## **10. MAGNETISM**

**2 & 3 MARKS:**

1. What is called magnetic elements of the earth?

2. What are the causes of the earth's magnetism?
3. What are the basic properties of bar magnets?
4. Define i) magnetic moment ii) magnetic induction?
5. Explain properties of magnetic lines of force?
6. Define i) magnetic flux ii) magnetic flux density?
7. Define coulomb's inverse square law?
8. Derive the Expression for coulomb's square law?
9. Explain the torque on a bar magnet placed in a uniform magnetic field?
10. Define tangent law?
11. Describe the end – on position?
12. Describe the Tan B position?
13. Define magnetic permeability?
14. Explain the relative permeability?
15. Define intensity of magnetisation?
16. Define magnetic susceptibility?
17. Write the properties of diamagnetic substances?
18. What are the properties of paramagnetic substances?
19. Write the properties ferromagnetic substances?
20. Define curie temperature?
21. Define Coercivity?
22. Define hysteresis?
23. Explain the Hysteresis loss?

**5 MARKS:**

24. What are the basic properties of magnets?
  25. Derive an expression for magnetic induction at a point along the axial line due to a magnetic dipole.
  26. Write an expression for magnetic induction at a point along equatorial line of a bar magnet.
  27. Give a brief explanation of tangent law.
  28. Write a comparison of magnetic moments of two bar magnets in Tan A position,
    - a) Derive deflection method.
    - b) Explain null deflection method.
  29. Write comparison of magnetic moments of two bar magnets in Tan B position,
    - a) Explain deflection method.
    - b) Explain null deflection method.
  30. Write the magnetic properties of materials?
  31. Write the uses of ferromagnetic materials?
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