

1st Year Physics

Taleem City Guess Paper

پنجاب کے تمام بورڈز (لاہور، راولپنڈی، فیصل آباد، سرگودھا، گوجرانوالہ، ساہیوال، ملتان، بہاولپور، اور ڈیرہ غازی خان) کے لئے۔

Unit# 1

1. How many years are there in 1 second/ one light year?
2. How many seconds/ nanoseconds are there in one year?
3. Name several repetitive phenomena occurring in nature which could serve as reasonable time standards?
4. Why do we find it useful to have two units for the amount of substance, the kilogram and the mole?
5. Define & explain supplementary units (Radian/Steradian).
6. The time period of simple pendulum is measured by stopwatch, what type of errors are possible?
7. Differentiate b/w precision & accuracy.
8. Give draw backs if time period of pendulum is used as time standard?
9. Write the dimensions of pressure & density.
10. Find the dimensions and S.I. units of co-efficient of viscosity.
11. Write down the units & dimensions of G from the equation $F=GmM/r^2$
12. Find the dimensions of coefficient of viscosity.
13. Differentiate b/w random error & systematic errors.
14. Show that the equation $E=mc^2$ is dimensionally correct.

Unit# 2

1. The vector sum of three vectors gives a zero resultant. What can be orientation of the vectors?

2. The vectors have unequal magnitude. Can their sum be zero? Explain.
3. Can you add zero to a null vector.
4. Differentiate b/w unit vector & position vector.
5. Can the magnitude of a vector have a negative value?
6. Define unit vector & position vector.
7. Can a body rotate about its center of gravity under the action of its weight?
8. Can a vector have a component greater than the vector's magnitude?
9. Is it possible to add a vector quantity to a scalar quantity? Explain.
10. Name different conditions that make $A_1+A_2=0$

Important LQs + Numerical

1. Define rectangular components of a vector. How two vectors can be added by rectangular components method?
2. Define scalar product with examples. Write down its any four characteristics.
3. **Example # 2.5,**
4. **Numerical # 2.7, 2.14, 2.15**

Unit# 3

1. Can the velocity of an object reverse the direction when acceleration is constant? If so, give an example.
2. Differentiate b/w uniform and variable velocity.
3. An object is thrown vertically upward. Discuss sign of acceleration due to gravity relative to velocity.
4. Explain the circumstances in which the velocity "v" and acceleration "a" of a car are:
 - ❖ Parallel
 - ❖ Perpendicular to one another

❖ Anti- parallel

5. Motion with constant velocity is a special case of motion with constant acceleration. Is this statement true? Discuss.
6. State Newton's second & third law of motion.
7. How second law of motion can be expressed in terms of linear momentum?
8. Define impulse and show that it is related to linear momentum.
9. What is the difference b/w elastic collision and inelastic collision?
10. When rocket re-enters the atmosphere, its nose becomes very hot, why?
11. At what point or points in the path does a projectile have its minimum speed, its maximum speed?
12. Show that range of projectile is maximum when projectile is thrown at an angle of 45° with horizontal.

Important LQs + Numerical

1. State and explain the law of conservation of momentum.
2. Define elastic collision. Explain elastic collision in one dimension to show the relative velocities before and after collision.
3. Find angle of projection of a projectile for which its maximum height and horizontal range are equal.
4. **Example** # 3.2, 3.5,
5. **Numerical** # 3.5, 3.8, 3.10, 3.11

Unit# 4

1. An object has one joule of potential energy. What does it mean? Explain.
2. Calculate the work done in kilojoules in lifting a mass of 10kg through a vertical height of 10m.
3. In which case is more work done? When a 50kg bag of books is lifted through 50cm or when a 50kg crate is pushed through 2m across the floor with a force of 50N.
4. Prove that $P=F.v$
5. Define escape velocity. Write its value.
6. A girl drops a cup from a certain height, which energy changes are involved?

7. A boy uses a catapult to throw a stone which accidentally smashes a greenhouse window. List the possible energy changes.
8. State work-energy principle.
9. What sort of energy is in the following (a) Compressed spring (b) A moving car.

Important LQs + Numerical

1. Define gravitational field & conservative field. Show that work done in gravitational field is independent of path followed.
2. Define absolute potential energy. Derive its mathematical expression.
3. **Example** # 4.2, 4.3, 4.5,
4. **Numerical** # 4.7, 4.8

Unit# 5

1. Differentiate b/w tangential velocity & angular velocity.
2. When mud flies off the tyre of a moving bicycle, in what direction does it fly?
3. Why does a diver change his body positions before and after diving in the pool?
4. Define moment of inertia & write its formula.
5. Show that angular momentum $L_0 = mvr$
6. Explain what is meant by centripetal force and why it must be furnished to an object if the object is to follow a circular path?
7. Explain how many minimum numbers of geostationary satellites are required for global coverage of T.V. transmission?
8. Find the rotational K.E of a disc if its $I = \frac{1}{2} mr^2$

Important LQs + Numerical

1. What is geo-stationary satellite? Calculate its orbital velocity and orbital radius.
2. Define rotational K.E. Also derive formula for rotational K.E. of a disc and a hoop coming down an inclined plane.
3. **Numerical** # 5.2, 5.3, 5.6, 5.9, 5.10

Unit# 6

1. Define viscosity & drag force.
2. Why fog droplets appear to be suspended in air?
3. Two row boats moving parallel in the same direction are pulled towards each other. Explain.

4. Differentiate b/w laminar flow and turbulent flow.
5. State Bernoulli's equation for liquid in motion.
6. Explain, how the swing is produced in a fast-moving cricket ball?

Important LQs + Numerical

1. Define terminal velocity. Show that terminal velocity is directly proportional to the square of radius.
2. State & explain Equation of Continuity.
3. Derive Bernoulli's equation for an ideal fluid.
4. **Numerical** # 6.2, 6.3, 6.5, 6.7, 6.9

Unit# 7

1. Name two characteristics of SHM.
2. Does the acceleration of a simple harmonic oscillator remain constant during its motion? Can the acceleration ever be zero?
3. Does frequency depend on amplitude for harmonic oscillators?
4. What is the total distance travelled by an object moving with SHM in a time equal to its period of its amplitude is x ?
5. What happens to the period of a simple pendulum if its length is doubled?
6. What is phase angle?
7. Can we realize an ideal simple pendulum?
8. Describe two common phenomena in which resonance plays an important role.
9. If a mass spring system is hung vertically and set into oscillations, why does the motion eventually stop?
10. Differentiate b/w free & forced vibrations.

Important LQs + Numerical

1. What is simple pendulum? Show that simple pendulum executes SHM. Find its time period. What is simple pendulum? Show that it performs simple harmonic motion. Hence derive formula for its time period
2. **Example** # 7.2, 7.3,
3. **Numerical** # 7.1, 7.4, 7.5,

Unit# 8

1. What features do longitudinal waves have in common with transverse waves?
2. Define crest, trough, node & antinode.
3. Why does sound travel faster in solids than in gases?
4. As a result of a distant explosion, an observer senses a ground tremor and then hears the explosion. Explain the time difference.
5. Explain why sound travels faster in warm air than in cold air.
6. Explain "Principles of superposition".
7. How are beats useful in tuning a musical instrument?
8. Is it possible for two identical waves traveling in the same direction along a string to give rise to a stationary wave?

Important LQs + Numerical

1. What is the effect of temperature on the speed of sound and derive the relation $V_t = V_0 + 0.61t$?
2. What is Doppler's effect? Discuss the cases when the source moves towards and away from a stationary observer.
3. **Example** # 8.1, 8.4
4. **Numerical** # 8.3, 8.4, 8.5, 8.6

Unit# 9

1. State Huygen's principle.
2. Under what conditions two or more sources of light behave as coherent sources.
3. Can visible light produce interference fringes?
4. Explain whether the Young's experiment is an experiment for studying interference or diffraction affects of light?
5. An oil film spreading over a wet footpath shows colours. Explain how does it happen?
6. Can you obtain Newton's rings with transmitted light, explain briefly.
7. How would you manage to get more orders of spectra using a diffraction grating?
8. Differentiate b/w unpolarized, polarized light and plane polarized light?
9. Why are Polaroid sunglasses better than ordinary sunglasses?

Important LQs + Numerical

1. What is Michelson's interferometer? Describe its principle, construction, working & application.

2. Explain Young's double slit experiment & determine the relation for linear distance on the screen b/w adjacent bright fringes.
3. Discuss diffraction of X-Rays by crystals. Also write down two applications of X-Rays diffraction.
4. **Numerical # 9.3, 9.6, 9.7, 9.8**

Unit# 10

1. What is linear magnification?
2. Explain the difference b/w angular magnification and resolving power of an optical instrument.
3. How a convex lens is used as a magnifier?
4. Why would it be advantageous to use blue light with a compound microscope?
5. If a person was looking through a telescope at the full moon, how would the appearance of the moon be changed by covering half of the objective lens?
6. What is spectrometer? Write its essential components & uses.
7. How the light is transmitted through the optical fiber?
8. Why losses of power occur in optical fiber?
9. Difference b/w angular magnification & resolving power of an optical instrument.

Important LQs + Numerical

1. Define simple microscope. Calculate magnification of a simple microscope by using rays diagrams.
2. What is compound microscope? Give its construction, working and derive the expression for angular expression.
3. What is astronomical telescope? Give its construction & working. Also find its magnifying power.
4. Discuss in detail Michelson's rotational mirror method for the measurement of speed of light.
5. **Numerical # 10.6, 10.8, 10.9**

Unit# 11

1. Why is the average velocity of the molecules in a gas zero, but the average of the square of the velocities is not zero?

2. Why does pressure of a gas in a car tyre increase when it is driven through some distance?
3. Derive Charles's law from kinetic theory of gases.
4. Write any two postulates of kinetic theory.
5. Can the mechanical energy be converted completely into heat energy? If so give example.
6. What happens to the temperature of the room when an air conditioner is left running on a table in the middle of the room?
7. Give three examples of adiabatic process.
8. A thermos flask containing milk as a system is shaken rapidly. Does the temperature of milk rise?
9. Why $C_P > C_V$?
10. Is it possible to convert internal energy into mechanical energy? Explain with an example.
11. Is it possible to construct a heat engine that will not expel heat into the atmosphere?
12. What is triple point of water?
13. Does entropy of a system increase or decrease due to friction? Explain.
14. State second law of thermodynamics in terms of entropy.
15. Give an example of a natural process that involves an increase in entropy.

Important LQs + Numerical

1. Define molar specific heat & prove that $C_P - C_V = R$
2. What is Carnot engine? Derive expression for the efficiency of Carnot engine.
3. What is the average translational kinetic energy of molecules in a gas at room temperature?
4. **Example # 11.2, 11.4**
5. **Numerical # 11.1, 11.8**

Note:

- This guess paper consists of the most important questions from exam's point of view.
 - This does not mean that the entire paper will come from it.
 - These guess papers can help you pass the exam if you didn't prepare well.
- Prepare the complete syllabus along with it if you wish to secure high marks.