

Model Question Paper

Class-XI (Regular)

Subject-Physics (Session : 2020-21)

Time Allowed : 3 hrs

Maximum Marks : 60

Special Instructions:

- (i) All questions are compulsory.
- (ii) Candidates are required to give answers in their own words as far as practicable.
- (iii) 30% extra internal choice is being given in the questions.
- (iv) Question number 1 to 8 are multiple choice questions carrying one mark each. Question number 9 to 16 are very short answer type questions carrying 2 marks each.
Question number 17 to 24 are short answer type questions carrying 3 marks each and question number 25 to 27 are long answer type carrying 4 marks each.
- (v) Star (*) marked questions are based on PISA format.

*1. How many significant digits are in 0.07m^2 ?

- | | | |
|-------|-------|---|
| (a) 1 | (b) 2 | |
| (c) 3 | (d) 4 | 1 |

*2. Which of the following physical quantities is a vector quantity?

- | | | |
|-----------------|----------------------|----------|
| (a) Speed | (b) Electric current | |
| (c) Temperature | (d) Momentum | <u>1</u> |

- *3. A batsman hits back a ball straight in the direction of bowler without changing its initial speed of 12ms^{-1} . If the mass of ball is 0.5kg , determine the impulse imparted to the ball.
- (a) 1Ns (b) 3.6Ns
 (c) zero (d) 1.8Ns 1
- *4. Which of the following is an example of negative work ?
- (a) Work done by winning team in a tug of war.
 (b) Work done by losing team in a tug of war.
 (c) Work done by gravity while lifting a body above the surface of earth.
 (d) Both (b) and (c) 1
- *5. The value of acceleration due to gravity at depth 'd' is g_d . At what height (H) above the surface of Earth its value is same i.e. g_d .
- (a) $H = d$ (b) $H = 2d$
 (c) $H = \frac{d}{2}$ (d) None of these 1
- *6. Kepler's second law of planetary motion is the consequence of
- (a) Law of conservation of energy
 (b) Law of conservation of momentum
 (c) Law of conservation of angular momentum
 (d) Law of conservation of mass. 1
- *7. Number of degrees of freedom of a triatomic non linear molecule is
- (a) 4 (b) 5
 (c) 6 (d) 7 1

*8. Time period of a simple pendulum at the centre of earth is

- (a) Infinite
- (b) Zero
- (c) Half as on the surface of Earth
- (d) None of these

1

9. Convert-10 newton into dyne using dimensional analysis.

2

OR

A body of mass 'm' is moving with velocity 'v'. Using dimensional analysis derive physical relation for kinetic energy of the body.

- 10. Why does a cricket player lowers his hands while catching a ball ? 2
- 11. State laws of limiting friction. 2

OR

State and prove impulse-momentum theorem.

- 12. Derive relation between torque and angular momentum. 2
- 13. Define centre of mass. Give expression for centre of mass of a two particle system. 2
- 14. Define Young's modulus of elasticity. Give its S.I units and dimensional formula.
- 15. State Zeroth law in thermodynamics. 2
- 16. Give the kinetic interpretation of temperature on the basis of kinetic theory of gases. 2

17. Derive relation $s=ut + \frac{1}{2} at^2$ using graphical method, where symbols have their usual meanings. 3

OR

Find the angle between the vectors $\vec{A} = \hat{i} + 2\hat{j} - \hat{k}$ and $\vec{B} = \hat{i} + \hat{j} - 2\hat{k}$

18. State law of conservation of linear momentum. Derive expression for recoil velocity of the gun. 3
19. Prove that total mechanical energy of the freely falling body remains conserved. 3
20. Derive a relation for the variation of acceleration due to gravity with depth.

OR

Define Kepler's laws of planetary motion.

21. Define escape velocity. Derive expression for it. 3

OR

What are geostationary satellites. Give the necessary conditions for a satellite to be geostationary.

22. Define terminal velocity. Derive expression for it. 3
23. Define isothermal process. Derive expression for work done during an isothermal process.

OR

Define specific heat at constant volume and constant pressure. Derive relation between them. 3

24. Differentiate between transverse and longitudinal waves. (at least three points) 3

OR

Prove that oscillations executed by simple pendulum are S.H.M in nature.

25. State parallelogram law of vector addition and give analytical treatment to find the magnitude and direction of the resultant vector. 4

OR

What is a projectile? Prove that path followed by a projectile fired making an angle ' θ ' with horizontal is parabolic.

26. State and prove Bernoulli's theorem. 4

OR

Derive an expression for height of liquid column in a capillary tube (Ascent formula).

27. Derive formula for speed of sound in air by applying laplace correction. What is effect of temperature on the speed of sound in air.

Subject-Physics

Class - 10+1

Max Marks - 60

S.No.	Name of the unit	Weightage
1.	Physical world & Measurement	03
2.	Kinematics	08
3.	Laws of Motion	08
4.	Work, Energy & Power	04
5.	Motion of System of particles & Rigid bodies	05

6.	Gravitation	07
7.	Properties of Bulk Matter	09
8.	Thermodynamics	05
9.	Behaviour of Perfect Gas & Kinetic theory of gases	03
10.	Oscillation and Waves	08
		Total = 60