

BLUE PRINT**PHYSICS (THEORY)****CLASS – XI**

S. No.	Unit	VSA	SA(I)	SA(II)	LA	Total
1.	Physical world and Measurement	1(1)	2(1)			03
2.	Kinematics		2(1)	3(1)	5(1)	10
3.	Laws of Motion	1(1)	2(1)	3(1)		10
4.	Work, Power and Energy	1(1)	2(1)	3(1)		06
5.	Motion of System of Particles and Rigid body	1(1)	2(1)	3(1)		06
6.	Gravitation		2(1)	3(1)		05
7.	Properties of Bulk Matter	1(2)		3(1)	5(1)	10
8.	Thermodynamics		2(1)	3(1)		05
9.	Behaviour of Perfect gas Kinetic Theory of Gases.	--	--	--	--	--
10.	Oscillations and waves	1(2)	2(1)	3(2)		10
	Total	8(8)	20(10)	27(9)	15(3)	70(30)

Sample Paper
XI – Physics

Time Three (03) hrs.

Max. Marks : 70

General Instructions:

1. All questions are compulsory.
2. There are 30 questions in total.
Question 1 to 8 carry one mark each.
Question 9 to 18 carry two marks each.
Questions 19 to 27 carry three marks each.
Questions 28 to 30 carry five marks each.
3. There is no overall choice. Internal choice is provided in one question of 2 mark, one question of 3 mark and all three questions of five marks. You have to attempt only one of the given choices in such questions.
4. Use of Calculators is not permitted.

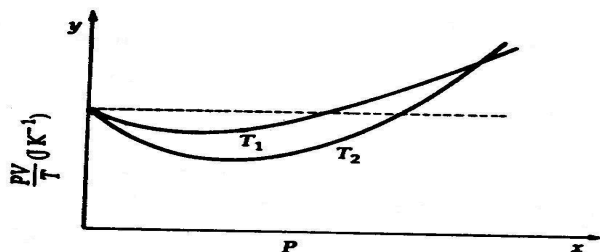
- Q.1. Give two example of one-dimensional variables?
- Q.2. Which Newton's law of motion is involved in rocket propulsion?
- Q.3. Name the constant whose dimensions are same as that of angular momentum?
- Q.4. What will be the nature of graph between the velocity of fluid flow (V) and area of cross-section (a) of the pipe.
- Q.5. Is temperature a macroscopic or microscopic concept.?
- Q.6. Does the average K.E. per molecule of the gas depend upon the mass of the molecule?
- Q.7. Write the relation between time period T , displacement x and acceleration a of a particle in S.H.M.
- Q.8. A wave transmits momentum. Can it transmit angular momentum?
- Q.9. Deduce the dimensional formulae for coefficient of viscosity?
- Q.10. a) Draw a displacement time graph for a body at rest.
b) Draw velocity time graph for uniformly accelerated motion.
- Q.11. If the kinetic energy of a body increases by 300%, by what % will the linear momentum of the body increase?
- Q.12. Name two factors which determine whether a planet would have an atmosphere or not.

OR

Two identical geostationary satellites are moving with equal speeds in the same orbit but their sense of rotation brings them a collision course. What will happen to their debris?

- Q.13. Two masses, 800 kg and 600 kg, are at a distance 0.25m apart. Compute the magnitude of the intensity of the gravitational field at a point distant .20m from the 800 kg mass and 0.15m from the 600 kg mass.
- Q.14. Two samples of a gas initially at the same temperature and pressure are compressed from volume V to $V/2$, one isothermally and the other adiabatically. In which sample is the final pressure greater.

- Q.15. Fig shows a plot of PV/T versus P for 1.00×10^{-3} kg of oxygen gas at two different temperatures
- What does the dotted plot signify?
 - Which is true $T_1 > T_2$ or $T_1 < T_2$?



- Q.16. Should the specific heat of monoatomic gas be less than, equal to or greater than that of a diatomic gas at room temperature? Justify your answers.
- Q.17. A vessel is placed below a water tap. We can estimate the height of water level reached in the vessel from a distance simply by listening the sound. How?
- Q.18. If $\vec{a}$ and $\vec{b}$, what can you say about the direction of their vector?
- Q.19. A projectile is fired with a velocity u making an angle Q with the horizontal. Show that its trajectory is a parabola.
- Q.20. A train has to negotiate a curve of 400m. By how much should the outer rail be raised with respect to the inner rail for a speed of 48 kmh^{-1} ? The distance between the rails is 1m?
- Q.21. Two springs have force constants K_1 and K_2 ($K_1 > K_2$). On which spring is more work done, if (i) they are stretched by the same force and (ii) they are stretched by the same amount?
- Q.22. (i) A child stands at the centre of turntable with his two arms outstretched. The turntable is set rotating with an angular speed of 40 rpm. How much is the angular speed of the child if he folds his hands back and thereby reduces his moment of inertia to $\frac{2}{3}$ times the initial value? Assume that turntable rotates without friction?

OR

Given below are examples of some potential energy functions in one dimension. The total energy of the particle is indicated by a cross on the ordinate axis. In each case, specify the regions if any, in which the particle cannot be found for the given energy. Also, indicate the minimum total energy the particle must have in each case. Think of a simple physical context for which these potential energy shapes are relevant.

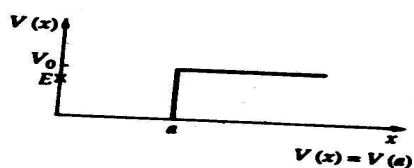
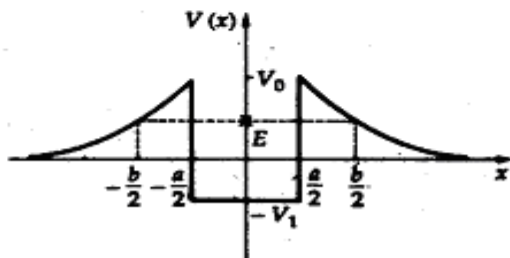
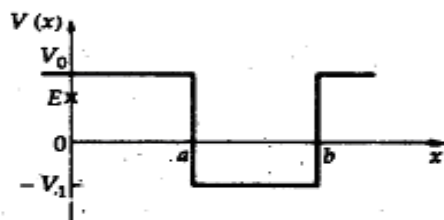
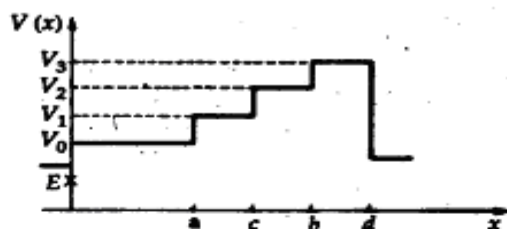


Fig.



- Q.23. (i) Draw graphs showing the variation of acceleration due to gravity with
(i) height above the earth's surface and (ii) depth below the earth's surface.
- (ii) The radii of two planets are R and $2R$ respectively and their densities ρ_1 and $\rho_2/2$ respectively. What is the ratio of acceleration due to gravity at their surfaces?
- Q. 24. (i) A piece of ice with a stone frozen in it floats on water taken in a beaker will the level of water increase or decrease or remain same when ice melts completely?
- (ii) Explain why surface tension of a liquid is independent of the area of the surface.
(1)
- Q. 25. What do you understand by reversible and irreversible processes? Give examples. What are the necessary conditions for a process of the reversible?
(1 + 1 + 1)
- Q. 26. For a simple harmonic wave, deduce expressions for (a) particle velocity (b) particle acceleration.

Deduce their phase relationship with displacement.

(1 + 1+ 1)

Q. 27. Derive expression for the kinetic and potential energies of a simple harmonic oscillator.
Hence show that total energy is conserved in S.H.M.

(1+1+1)

Q. 28. A man weighs 70 kg. He stands on a weighing machine in a lift. Which is moving:

- (i) upwards with a uniform speed of 10 m/s
- (ii) Downwards with a uniform acceleration of 5 m/s^2

i. upwards with a uniform acceleration of 5 m/s^2

What should be the readings on the scale in each case? What should be the reading, if the lift mechanism failed and it came down freely under gravity?

Or

A body of mass 1 kg initially at rest explodes and breaks into three fragments of masses in the ratio 1: 1: 3. the two pieces of equal mass fly off perpendicular to each other with a speed of 30 m/s each. What is the velocity of the heavier fragment?

Q. 29. (a) Two vectors and are inclined to each other at an angle Q . Using triangle law of vector addition. Find the magnitude and direction of their resultant.

(b) Stat the assumptions made in the study of projectile motion.

Or

(a) Draw and discuss the position-time graphs of two objects moving along a straight line, when their relative velocity is (i) zero (ii) Positive (iii) negative.

(b) Justify that a uniform circular motion is an accelerated motion.

Q. 30. (a) Explain how does a body attain a terminal velocity when it is dropped from rest in a viscous medium. Derive an expression for the terminal velocity of a small spherical body falling through a viscous medium. Also discuss the result.

(b) Explain the origin of viscous drag on a body falling through a liquid.

(3 + 2)

Or

(a) Show that the pressure difference exists between the two sides of a curved liquid surface.

(b)Derive an expression for the excess pressure inside a liquid drop.

(c) derive the ascent formulae .

1+2+2