



Indian School Al Wadi Al Kabir

Final Examination (2025-2026)

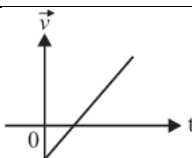
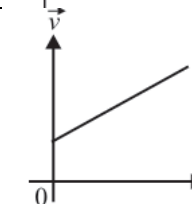
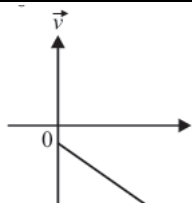
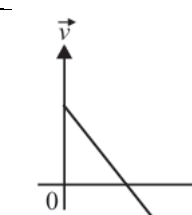
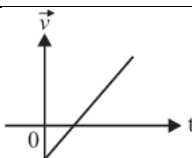
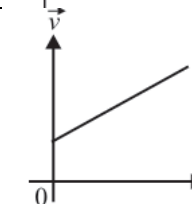
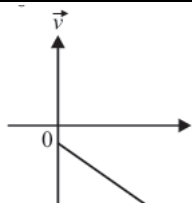
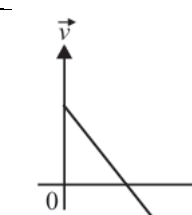
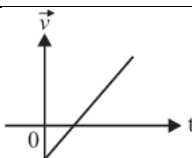
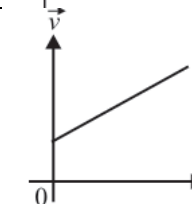
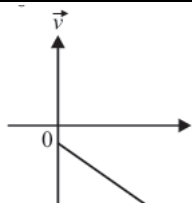
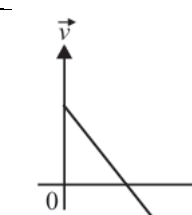
Class: XI
Date: 15/02/2026

Subject: Physics (042)
Set- II





Max. marks: 70
Time: 3 Hours

General Instructions:

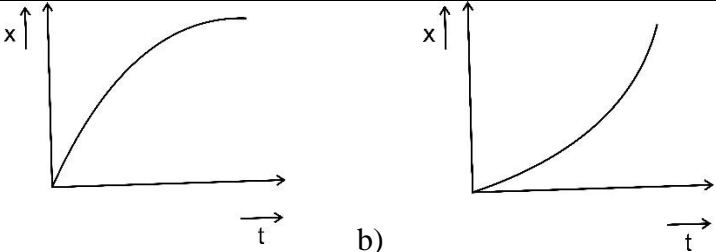
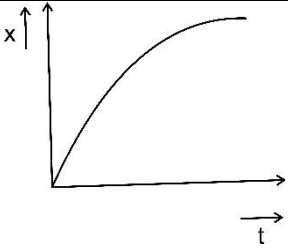
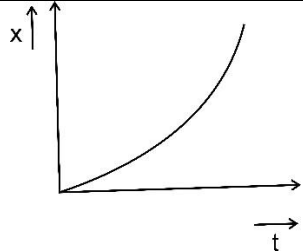
- (1) There are 33 questions in all. All questions are compulsory.
- (2) This question paper has five sections: Section A, Section B, Section C, Section D, and Section E.
- (3) All the sections are compulsory.
- (4) **Section A** contains **sixteen questions, twelve MCQ and four assertion reasoning based on 1 mark each, Section B** contains **five questions of two marks each, Section C** contains seven questions of three marks each, **Section D** contains **two case study-based questions of four marks each, and Section E** contains **three long answer questions of five marks each.**
- (5) There is no overall choice. However, an internal choice has been provided in two questions in Section B, one question in Section C, and all three questions in Section E. You have to attempt only one of the choices in such questions.
- (6) Use of calculators is not allowed.

SECTION A												
Q. No.	Question	Marks										
1.	<p>A particle is going along a straight line with constant acceleration 'a', having an initial velocity 'u'. Then match the columns:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">COLUMN I</th> <th style="width: 50%;">COLUMN II</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">i) $u = +ve$ and $a = +ve$</td> <td style="text-align: center;">a) </td> </tr> <tr> <td style="text-align: center;">ii) $u = -ve$ and $a = +ve$</td> <td style="text-align: center;">b) </td> </tr> <tr> <td style="text-align: center;">iii) $u = +ve$ and $a = -ve$</td> <td style="text-align: center;">c) </td> </tr> <tr> <td style="text-align: center;">iv) $u = -ve$ and $a = -ve$</td> <td style="text-align: center;">d) </td> </tr> </tbody> </table>	COLUMN I	COLUMN II	i) $u = +ve$ and $a = +ve$	a) 	ii) $u = -ve$ and $a = +ve$	b) 	iii) $u = +ve$ and $a = -ve$	c) 	iv) $u = -ve$ and $a = -ve$	d) 	1
COLUMN I	COLUMN II											
i) $u = +ve$ and $a = +ve$	a) 											
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iii) $u = +ve$ and $a = -ve$	c) 											
iv) $u = -ve$ and $a = -ve$	d) 											

	<p>(A) i) → b), ii) → a), iii) → d), iv) → c)</p> <p>(B) i) → c), ii) → a), iii) → d), iv) → b)</p> <p>(C) i) → b), ii) → c), iii) → d), iv) → a)</p> <p>(D) i) → d), ii) → c), iii) → a), iv) → b)</p>	
2.	<p>The range of a projectile which is launched at an angle of 15° with the horizontal is 1.5 km. What is the range of the projectile if it is projected at an angle of 45° to the horizontal?</p> <p>(A) 1.5 km</p> <p>(B) 3 km</p> <p>(C) 6 km</p> <p>(D) 0.75 km</p>	1
3.	<p>Choose the correct alternative among the following:</p> <p>(A) A conservative force depends on the path followed by the particle.</p> <p>(B) Work done by friction is always positive.</p> <p>(C) Power and energy have the same dimensions.</p> <p>(D) The area under a force–displacement graph represents work done.</p>	1
4.	<p>Two springs A and B are identical, but A is harder than B ($k_A > k_B$). Let W_A and W_B represent the work done when the springs are stretched through the same distance, and W'_A and W'_B are the work done when these are stretched by equal forces. Which of the following is true?</p> <p>(A) $W_A > W_B$ and $W'_A = W'_B$</p> <p>(B) $W_A > W_B$ and $W'_A < W'_B$</p> <p>(C) $W_A > W_B$ and $W'_A > W'_B$</p> <p>(D) $W_A < W_B$ and $W'_A < W'_B$</p>	1
5.	<p>A particle performing uniform circular motion has angular momentum L. If its angular frequency is doubled and its kinetic energy halved, then the new angular momentum is:</p> <p>(A) $L/2$</p> <p>(B) $L/4$</p> <p>(C) $2L$</p> <p>(D) $4L$</p>	1
6.	<p>Which of the following statements is FALSE for a particle moving in a circle with a constant angular speed?</p> <p>(A) The velocity vector is tangent to the circle.</p> <p>(B) The acceleration vector is tangent to the circle.</p> <p>(C) The acceleration vector points to the centre of the circle.</p> <p>(D) The velocity and acceleration vectors are perpendicular to each other.</p>	1
7.	<p>The weight of the body at Earth's surface is W. At a depth halfway to the centre of earth its weight will be (Density of Earth is uniform):</p> <p>(A) W</p> <p>(B) $W/2$</p> <p>(C) $W/8$</p> <p>(D) $W/4$</p>	1

8.	<p>A capillary tube (A) is dipped in water. Another identical tube (B) is dipped in a soap-water solution. Which of the following shows the relative nature of the liquid columns in the two tubes?</p> <p>(A) </p> <p>(B) </p> <p>(C) </p> <p>(D) </p>	1
9.	<p>Steam at 100 °C causes more burns than boiling water at 100°C because</p> <p>(A) Low specific heat of steam (B) Steam is in the gaseous phase (C) Steam at 100°C carries more heat than water at 100°C (D) Steam has low viscosity</p>	1
10.	<p>In a given process on an ideal gas, $dW = 0$ and $dQ < 0$. Then for the gas</p> <p>(A) the temperature will decrease (B) the volume will increase (C) the pressure will remain constant (D) the temperature will increase</p>	1
11.	<p>The average thermal energy for a monatomic gas is:</p> <p>(A) $\frac{1}{2} k_B T$ (B) $\frac{7}{2} k_B T$ (C) $\frac{3}{2} k_B T$ (D) $\frac{5}{2} k_B T$</p>	1
12.	<p>During the propagation of a plane progressive mechanical wave, which of the following statements is incorrect: -</p> <p>(A) All the particles are vibrating in the same phase (B) Amplitude of all the particles is equal (C) Particles of the medium execute SHM</p>	1

	(D) Wave velocity wavelength depends upon the nature of the medium	
	<p>For Questions 13 to 16, two statements are given, one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the options as given below.</p> <p>(A) Both Assertion and Reason are true, and Reason is the correct explanation of Assertion.</p> <p>(B) Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion.</p> <p>(C) Assertion is true, but Reason is false.</p> <p>(D) Both Assertion and Reason are false.</p>	
13.	<p>Assertion (A): The position of the centre of mass of a body depends upon the shape and size of the body.</p> <p>Reason (R): The centre of mass of a body lies always at the centre of the body.</p>	1
14.	<p>Assertion (A): The time period of revolution of a satellite moving closer to Earth is smaller than that of a satellite revolving far away from Earth.</p> <p>Reason (R): The square of the time period (T) is directly proportional to the cube of its semi-major axis.</p>	1
15.	<p>Assertion (A): In desert areas, the earth's surface warms up quickly during the day and cools slowly during the night.</p> <p>Reason (R): Water has the lowest specific heat capacity.</p>	1
16.	<p>Assertion (A): A thinner column of liquid shows the same pressure at a given depth as a wider column of the same liquid.</p> <p>Reason(R): Pressure depends only on depth, density, and on the shape of the container.</p>	1
SECTION B		
17.	Write the dimensions of a and b in the relation $P = \frac{b-x^2}{at}$ where P is power, x is distance, and t is time.	2
18.	<p>i) Draw a labelled graph of temperature versus heat energy supplied for a quantity of ice converted into steam.</p> <p>ii) Define the latent heat of fusion and write its SI unit.</p>	2
19.	The equation of a transverse wave travelling along a coil spring is given by $y = 4.0 \sin \pi(0.010x - 2.0t)$ where 'x' and 'y' are in centimetres and 't' is in seconds. Find: (i) wavelength and (ii) speed of the wave.	2
20(I)	<p>i) If the displacement of a body is directly proportional to the square of time, what conclusion can you draw?</p> <p>ii) A car starts from rest and accelerates uniformly for 10 s to a velocity of 10 m/s. It then runs at constant velocity for 20 s and is finally brought to rest in 10 s. Draw a velocity–time graph representing this situation.</p> <p style="text-align: center;">OR</p>	2
20(II)	i) Below is the displacement – time graph of two particles moving along the x–axis. What can you say about their acceleration?	2

	 <p>a)  b) </p>	
	<p>ii) In one-dimensional motion, can a particle have zero speed at an instant but non-zero acceleration at that instant? Justify your answer with an example.</p>	
21(I)	<p>i) A circular platform is rotating with a uniform angular velocity. What will be the change in the motion of the platform if a person sits near the edge and then starts moving towards the centre of the platform?</p> <p>ii) If no external torque acts on a body, which among angular momentum and angular velocity will remain constant? Explain.</p> <p style="text-align: center;">OR</p>	2
21(II)	<p>The moments of inertia of two rotating bodies A and B about the same axis are I_A and I_B ($I_A > I_B$), and their angular momentum are equal. Which has greater rotational kinetic energy? Justify your answer with necessary proof.</p>	2
SECTION C		
22.	<p>An 80 kg man stands in a lift. Calculate the force he exerts on the floor of the lift when the lift is (i) stationary, (ii) accelerating upward at 2 ms^{-2} (iii) moving with constant velocity (upward) at 4 m/s.</p>	3
23.	<p>i) Prove the law of conservation of mechanical energy for a freely falling body (Any two cases).</p> <p>ii) Draw the variation of potential energy and kinetic energy with height for the above-mentioned case.</p>	3
24.	<p>i) State Pascal's law.</p> <p>ii) Explain one application of Pascal's law with the help of a neat diagram.</p>	3
25.	<p>Two exactly similar wires of steel and copper are stretched by equal forces. If the total elongation is 1 cm, find how much each wire is elongated. Given Y for steel = $20 \times 10^{10} \text{ Nm}^{-2}$ and Y for copper = $12 \times 10^{10} \text{ Nm}^{-2}$.</p>	3
26.	<p>i) State the law of equipartition of energy.</p> <p>ii) Calculate the ratio of specific heat capacities (C_p / C_v) for a diatomic gas.</p>	3
27(I)	<p>A rocket is fired from the Earth towards the sun. At what distance from the Earth's centre is the gravitational force on the rocket zero?</p> <p>Mass of sun = $2 \times 10^{30} \text{ kg}$; Mass of Earth = $6 \times 10^{24} \text{ kg}$. Neglect the effect of other planets. Orbital radius of Earth, $r = 1.5 \times 10^{11} \text{ m}$.</p> <p style="text-align: center;">OR</p>	3
27(II)	<p>The radius of Earth is about 6370 km, and that of Mars is about 3440 km. If an object weighs 200 N on Earth, what would it weigh and what would be the acceleration due to gravity on Mars? Mars has a mass of 0.11 times that of Earth.</p>	3
28.	<p>A particle moves in a straight line, with simple harmonic motion, making seven complete oscillations in 14 s. The velocity of the particle is 1.26 m/s when its distance from the centre of oscillation is 3 m. Find the amplitude of motion and maximum acceleration.</p>	3
SECTION D		

29	<p>The property of a body, by virtue of which it tends to regain its original size and shape when the applied force is removed, is known as elasticity, and the deformation caused is known as elastic deformation. However, if we apply force to a lump of putty or mud, they have no gross tendency to regain its previous shape, and it gets permanently deformed. Such substances are called plastic, and this property is called plasticity. Putty and mud are close to ideal plastics. The elastic behaviour of materials plays an important role in engineering design. For example, while designing a building, knowledge of the elastic properties of materials like steel, concrete, etc., is essential. The same is true in the design of bridges, automobiles, ropeways, etc. When a body is subjected to a deforming force, a restoring force is developed in the body. This restoring force is equal in magnitude but opposite in direction to the applied force. The restoring force per unit area is known as stress. If F is the force applied normal to the cross-section and A is the area of cross-section of the body, the magnitude of the stress is given by F/A.</p> <p>(I) A and B are two wires of different materials but of the same size, subjected to equal tensile force. The bars have elongation in the ratio of 4:7, then what is the ratio of modulus of elasticity of the two materials?</p> <p>(II) State Hooke's law and write the SI unit of modulus of elasticity.</p> <p>(III) Draw a neat – labelled Stress – Strain Curve.</p>	1 1 2
30.	<p>Consider an isolated system of n interacting particles. The mutual forces between pairs of particles in the system cause changes in the momenta of the individual particles. By the third law, the mutual forces between any pair of particles are equal and opposite. By the second law, the change in momenta for any pair of particles is Ft and $-Ft$. Thus, the momentum changes cancel in pairs, and the total momentum of the system remains constant. This leads to a fundamental principle of physics called the law of conservation of linear momentum. This law states that the total linear momentum of an isolated system of interacting particles is conserved. The recoil of a gun on firing, the explosion of a bomb into different fragments due to internal forces, the working of rockets and jet planes, etc., can be explained on the basis of conservation of momentum.</p> <p>(I) A bullet is fired from a rifle. If the rifle recoils freely, then the kinetic energy of the rifle is</p> <p>(A) less than that of the bullet. (B) more than that of the bullet. (C) same as that of the bullet. (D) equal to or less than that of the bullet.</p> <p>(II) A ball strikes a bat with velocity v. The ball has mass m and, after striking it retraces its path. What is the magnitude of the impulse imparted by the bat?</p> <p>(A) $3mv$ (B) $2mv$ (C) mv (D) zero</p> <p>(III) The law of conservation of linear momentum is a direct consequence of:</p> <p>(A) Newton's first law only (B) Newton's second law only (C) Newton's third law only (D) Newton's second and third laws together</p>	1 Mark each

	<p>(IV) A man standing on a frictionless surface fires a bullet horizontally. If the bullet has momentum p, then the man</p> <p>(A) remains at rest.</p> <p>(B) moves with momentum p in the same direction.</p> <p>(C) moves with momentum p in the opposite direction.</p> <p>(D) moves with momentum less than p.</p>	
SECTION E		
31(I)	<p>(A) Deduce the expression for the time of flight and horizontal range of a projectile, in terms of initial velocity and angle of projection.</p> <p>(B) A shell is fired at an angle of 30° to the horizontal with a velocity of 196 m/s. Find the total time of flight and horizontal range attained.</p> <p style="text-align: center;">OR</p>	3+2
31 (II)	<p>(A) Define centripetal acceleration and hence derive an expression for the centripetal acceleration of a body moving in a circular path of radius 'r' with uniform speed 'v'.</p> <p>(B) A jet plane is manoeuvring in a circular path with a radius of 5.5 km at a constant speed of 2160 km/h. What is the acceleration of the plane in terms of acceleration due to gravity?</p>	3+2
32(I)	<p>(A) State and prove Bernoulli's theorem.</p> <p>(B) The reading of a pressure meter attached to a closed pipe is $3.5 \times 10^5 \text{ Nm}^{-2}$. On opening the valve of the pipe, the reading of the pressure meter reduces to $3 \times 10^5 \text{ Nm}^{-2}$. Calculate the speed of water flowing through the pipe.</p> <p style="text-align: center;">OR</p>	3+2
32(II)	<p>(A) Define terminal velocity. Hence, derive an expression for the same with the help of a suitable diagram.</p> <p>(B) A drop of water of radius 0.01 mm is falling through a medium whose density is 1.21 kg/m^3 and coefficient of viscosity is $1.8 \times 10^{-5} \text{ Nsm}^{-2}$. Find the terminal velocity of the drop and the viscous force on the drop.</p>	3+2
33(I)	<p>(A) Derive an expression for the time period of a simple pendulum.</p> <p>(B) The acceleration due to gravity on the surface of the moon is 1.7 m/s^2. What is the time period of the simple pendulum on the moon if its time period on Earth is 3.5 s? (Take $g = 9.8 \text{ m/s}^2$)</p> <p style="text-align: center;">OR</p>	3+2
33(II)	<p>(A) Derive the expressions for velocity and total energy of a particle executing a simple harmonic motion.</p> <p>(B) A particle executing simple harmonic motion has a maximum displacement of 4 cm and its acceleration at a distance of 1 cm from its mean position is 3 cms^{-2}. What will be its velocity when it is at a distance of 2 cm from its mean position?</p>	3+2