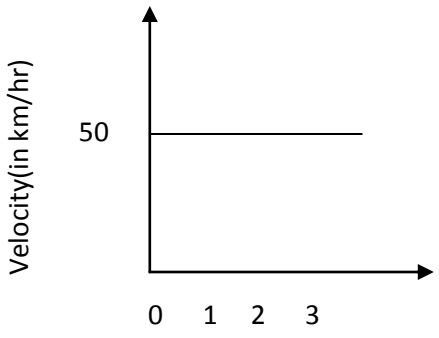
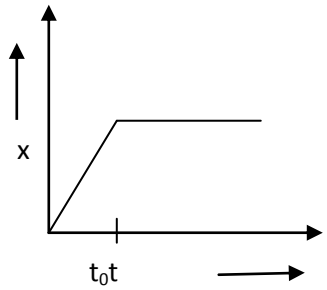
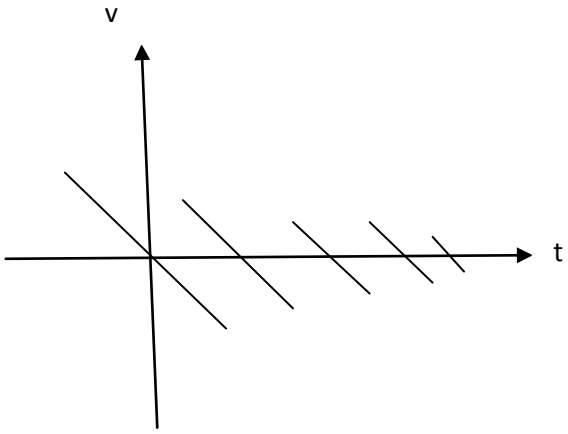
INDIAN SCHOOL MUSCAT – SENIOR SECTION – DEPARTMENT OF SCIENCE

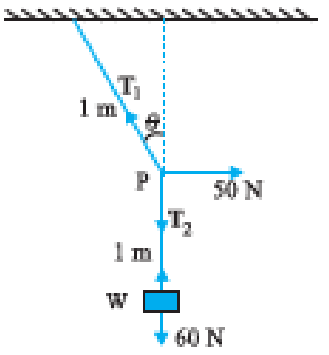
QUESTION BANK PHYSICS – CLASS XI (2019 – 20)

S.NO	SECTION-A
1	Which is the fundamental force of nature that operates among all objects in the universe? (a) Weak nuclear force (b) Strong nuclear force (c) Gravitational force (d) Electromagnetic force
2	Parsec is the unit of (a) Time (b) distance (c) frequency (d) angular acceleration
3	Which one of the following does not have the same dimensions? (a) Tension and surface tension (b) Impulse and momentum (b) Work and torque (d) velocity and speed
4	A physical quantity P is given $P = \frac{a^3 b^2}{\sqrt{c}\, d}$ .The percentage errors in a, b, c and d are 1%, 3%, 4% and 3% respectively. Find the percentage error in P. (a) 13% (b) 12% (c) 14% (d) 11%
5	The number of significant figures in the distance of one light year 9.4605×10^{15} m is (a) Three (b) four (c) five (d) fifteen
6	The mean length of an object is 5cm. Which of the following measurements is most accurate? (a) 4.9cm (b) 4.805 (c) 5.25cm (d) 5.4cm
7	Velocity-time graph for the uniform motion of a car is shown in figure. The displacement of the car in the first 2 hours is  (a) 150km (b) 100l (c) 50km (d) 25km
8	An object is released from rest and falls in the absence of air resistance. Which of the following is true about its motion? (a) Its acceleration is zero (b) Its acceleration is constant

	(c) Its velocity is decreasing (d) Its acceleration is increasing
9	A particle moves in a circular path of radius 'r'. In half the period of revolution, its displacement and distance covered are a) $2r,\ 2\pi r$ (b) $r/\sqrt{2},\ \pi r$ (c) $2r,\ \pi r$ (d) $r,\ \pi r$
10	Figure shows the displacement-time graph of a particle moving along X-axis. Which of the following statement is correct?  (a) The particle is continuously g direction. (b) The particle is at rest. (c) The velocity increases up to time t_0 and then becomes constant. (d) The particle moves at a constant velocity up to a time t_0 and then stops.
11	Two bodies are moving in opposite direction with speed 'v'. What is the magnitude of their relative velocity? (a) 0 (b) v (c) v/2 (d) 2v
12	The angle between $\vec{A} = \hat{i} + \hat{j}$ and $\vec{B} = \hat{i} - \hat{j}$ is (a) 45^0 (b) -45^0 (c) 90^0 (d) 180^0
13	Which of the following does not confirm to a projectile? (a) A bullet fired from a gun. (b) A stone thrown horizontally from the top of a tower. (c) Taking of an aircraft. (d) Throwing a cricket ball from one player to another.
14	A body is projected at an angle of projection 35^0. To get the same range with the same velocity of projection, the body should be projected at an angle (a) 70^0 (b) 55^0 (c) 65^0 (d)53^0
15	An aeroplane is flying horizontally at a velocity 'u'. It drops a packet from a height 'h'. The time taken by the packet to reach the ground will be (a) $\sqrt{2hg}$ b) $\sqrt{\frac{2h}{g}}$ (c) $\sqrt{\frac{h}{2g}}$ (d) $\sqrt{\frac{u}{h}}$
16	When a horse pulls a wagon, the force that causes the horse to move forward is the force (a) That ground exerts on the horse b) That horse exerts on the ground (c) That wagon exerts on the horse d) That horse exerts on the wagon.
17	An athlete runs some distance before taking a long jump, because (a) He gains energy to take him through long distance.

	(b) It helps to apply large force. (c) By running, he gives himself larger inertia of motion. (d) By running, action and reaction forces increase.
18	While walking once, one should take small steps to avoid slipping. This is because, smaller steps ensure (a) Larger friction (b) smaller friction (c) larger normal force (d) smaller normal force.
19	A man of mass 75kg is standing on a spring balance inside a lift. If the lift falls freely downwards, then, the reading of the spring balance will be (a) Zero (b) 75kgf (c) >75kgf (d) <75kgf
20	A graph is drawn with force along Y-axis and time along X-axis. The area under the graph represents Impulse of the force (b) displacement (c) power (d) energy
	SECTION-B
21	Check whether equation $F\,S = \frac{1}{2}mv^2 - \frac{1}{2}mu^2$ is dimensionally correct, where 'm' is the mass of the body, 'u' its initial velocity, 'v' its final velocity, 'F' is the force applied and 'S' is the distance moved.
22	(i) State polygon law of vector addition. (ii) Define displacement vector and unit vector. **OR** (i) State parallelogram law of vector addition. (ii) Define equal vector and null vector.
23	Write any two differences between accuracy and precision.
24	(i) The v-t graphs of two objects make angles of 30^0 and 60^0 with the time axis. Find the ratio of their acceleration. (ii) Suggest a suitable physical situation for the given graph. 
25	(i) Give any two properties of strong nuclear force. (ii) Give the relative strength of various forces in nature.
26	Explain why (i) A horse cannot pull a cart and run in empty space. (ii) A cricketer moves his hands backwards while holding a catch.

	OR Explain why (i) It is easier to maintain the motion of a body than to start it. (ii) Proper inflation reduces fuel consumption.
27	State laws of kinetic friction. (any two)
	SECTION-C
28	Define linear momentum and impulse. Obtain a relation between impulse and linear momentum.
29	Draw a neat labelled diagram showing different forces and their components acting on a vehicle moving on a banked road and thereby obtain an equation for maximum velocity required for a vehicle on a banked circular road taking into account the force of friction for safe turn.
30	(i) State any two advantages of SI system over other systems of units. (ii) Find the dimensions of $'a'$ and $'b'$ in the equation $F = a\sqrt{x} + bt^2$, where $'F'$ is force, $'x'$ is distance and $'t'$ is time. **OR** (i) Write any two limitations of the method of dimensional analysis. (ii) If $x = a + bt + ct^2$, where' x 'is in metre and $'t'$ in seconds, find the units of $'b'$ and $'c'$.
31	A projectile is fired horizontally with a velocity of 98m/s from a cliff 490m high. Calculate (i) the time taken to reach the ground (ii) distance of the target from the cliff. (iii) the velocity with which the projectile hits the ground. **OR** A body is projected such that its kinetic energy at the top is $3/4^{th}$ of its kinetic energy. What is the initial angle of the projectile with the horizontal?
32	(i) What is the angular velocity of the hour hand of a clock? (ii) Prove that the vector addition is associative.
33	Define instantaneous velocity. Derive an expression for the distance travelled by a uniformly accelerated body in the n^{th} second.
34	Show that the path followed by a projectile is a parabola, when it is projected at an angle θ with the horizontal.
	SECTION-D
35	(i) Draw the position-time graphs for uniform motion of two objects initially occupying different positions but having zero relative velocity. (ii) Two balls of different masses (one lighter and other heavier) are thrown vertically upward with same initial speed. Which one will rise to the greater height? Explain. (iii) Draw velocity-time graph for an object in uniform motion and prove that the displacement of an object in a time interval is equal to the area under velocity-time graph in that time interval. **OR** (i) Draw the position-time graphs for uniform motion of two objects initially occupying

		different positions but having non-zero relative velocity. (ii) Is it possible for a body to be accelerated without speeding up or slowing down? Give an example for the situation. (iii) Derive the relation $v^2 = u^2 + 2as$ for uniformly accelerated motion of an object along a straight line.
36		(i) Derive an expression for centripetal acceleration of an object in uniform circular motion in a plane. (ii) Find the angle of projection at which the horizontal range and maximum height of a projectile are equal. **OR** (i) A body is projected at an angle θ with the horizontal. Derive an expression for time of flight, horizontal range and maximum height attained. (ii) An aeroplane takes off at an angle of 30^0 to the horizontal. If the component of its velocity along the horizontal is 250km/hr, what is its actual velocity? Also find the vertical component of its velocity.
37		(i) State Newton's second law of motion. Prove that the second law is the real law of motion. (ii) A car of mass 1000 kg is moving with a velocity of 10 m/s and is acted upon by a forward force of 1000 N due to engine and retarding force of 500 N due to friction. What will be the velocity after 10 seconds? **OR** (i) State and prove law of conservation of linear momentum. (ii) A mass of 6kg is suspended by a rope of length 2m from a ceiling. A force of 50N in the horizontal direction is applied at the midpoint of the rope as shown in the diagram. What is the angle the rope makes with the vertical in equilibrium? Neglect the mass of the rope. 
	End of the Question Paper	