

Model Question Paper
Laws of Motion and Gravitation (P) - Part I

10th Standard

Science

Reg.No. :

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I. Answer all the questions.

II. Use blue pen only.

III. Question number 15 is compulsory.

Time : 01:00:00 Hrs

Total Marks : 40

5 x 1 = 5

Part-A

- 1) The acceleration in a body is due to _____.
(a) balanced force (b) unbalanced force (c) electro static force
- 2) The physical quantity which is equal to the rate of change of momentum is
(a) displacement (b) acceleration (c) force (d) impulse
- 3) The momentum of a massive object at rest is _____.
(a) very large (b) very small (c) zero (d) infinity
- 4) The weight of a person is 50 kg. The weight of that person on the surface of the earth will be _____.
(a) 50N (b) 35N (c) 380N (d) 490N
- 5) The freezing of biotechnology products like vaccines require _____ freezing system.
(a) Helium (b) Nitrogen (c) Ammonia (d) Chlorine

Part-B

7 x 2 = 14

- 6) Correct the mistakes, if any, in the following statements. i) One newton is the force that produces an acceleration of 1 ms^{-2} in an object of 1 gram mass. ii) Action and reaction always act on the same body.
- 7) The important use of cryogenics is cryogenic fuels. What do you mean by cryogenic fuels?
- 8) A bullet of mass 20 g moving with a speed of 75 ms^{-1} hits a fixed wooden plank and comes to rest after penetrating a distance of 5 cm. What is the average resistive force exerted by the wooden plank on the bullet?
- 9) A shopping cart has a mass of 65 kg. In order to accelerate the cart by 0.3 ms^{-2} what force would you exert on it?
- 10) Why does a spanner have a long handle?
- 11) Why does a boxer always move along the direction of the punch of the opponent?
- 12) The mats used in gyms and the padding used in sports uniforms are made up of soft substances. Why are rigid materials not used?

Part-C

4 x 5 = 20

- 13) i) Space Stations are used to study the effects of long-space flight on the human body. justify. ii) $F = G \frac{m_1 m_2}{d^2}$ is the mathematical form of Newton's law of gravitation, G - gravitational constant, $m_1 m_2$, are the masses of two bodies separated by a distance d, then give the statement of Newton's law of gravitation.
- 14) i) Newton's first law of motion gives a qualitative definition of force. Justify. ii) The figure represents two bodies of masses 10 kg and 15 kg, moving with an initial velocity of 10 ms^{-1} and 5 ms^{-1} respectively. They collide with each other. After collision, they move with velocities 4 ms^{-1} and 9 ms^{-1} respectively. The time of collision is 2 s. Now calculate F_1 and F_2 .



- 15) a) A 5 N force acts on a 2.5 kg mass at rest, making it accelerate in a straight line. i) What is the acceleration of the mass? ii) How long will it take to move the mass through 20m? iii) Find its velocity after 3 seconds.

(OR)

- b) State the law of conservation of momentum. Two billion people jump above the earth's surface with a speed of 4m/s from the same spot. The mass of the earth is $6 \times 10^{24} \text{ kg}$. The average mass of one person is 60 kg. i) What is the total momentum of all the people? ii) What will be the effect of this action on the earth?
