Arivaali

SCIENCE

Practice Book

10th Standard

Unit wise collection of Questions

The Answers of these Questions
are available in
10th Standard Arivaali Science Guide

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Easy way of Scoring More Marks in 10th Standard Science

Qn. No.	Topics	Marks	Total
1 - 12	Multiple Choice Questions	12	26 Only the simple practice is enough
	Identify the parts	2	
	Draw and label the parts (2 + 4)	6	
22, 32	Problems (2+4)	6	
	Questions on 'Uses' Questions on 'Properties' Questions on 'Applications / Functions' Questions on 'Differentiate' Questions on 'Define' Questions on 'Laws' The questions which were asked in previous public examinations and some more important questions		49 More practice is needed.
	Total Marks		75

1 : Laws Of Motion

Choose the most Suitable Answer

1. Inertia of a body depends on
   (a) weight of the object
   (b) acceleration due to gravity of the planet
   (c) mass of the object
   (d) Both a & b

2. Impulse is equals to
   (a) rate of change of momentum
   (b) rate of force and time
   (c) change of momentum
   (d) rate of change of mass

3. Newton's III law is applicable
   (a) for a body is at rest
   (b) for a body in motion
   (c) both a & b
   (d) only for bodies with equal masses

4. Plotting a graph for momentum on the Y-axis and time on X-axis, slope of momentum-time graph gives
   (a) Impulsive force (b) Acceleration
   (c) Force (d) Rate of force

5. In which of the following sport the turning of effect of force used?
   (a) swimming (b) tennis
   (c) cycling (d) hockey

6. The unit of 'g' is ms^{-2}. It can be also expressed as
   (a) $cm\ s^{-1}$ (b) $N\ kg^{-1}$
   (c) $N\ m^2\ kg^{-1}$ (d) $cm^2\ s^{-2}$

7. One kilogram force equals
   (a) 9.8 dyne (b) 9.8×10^4 N
   (c) 98×10^4 dyne (d) 980 dyne

8. The mass of a body is measured on planet Earth as M kg. When it is taken to a planet of radius half that of the Earth then its value will be _____ kg
   (a) 4 M (b) 2 M
   (c) M/4 (d) M

9. If the Earth shrinks to 50% of its real radius its mass remaining the same, the weight of a body on the Earth will
   (a) decrease by 50% (b) increase by 50%
   (c) decrease by 25% (d) increase by 300%

10. To project the rockets which of the following principle(s) is /(are) required?
    (a) Newton's third law of motion
    (b) Newton's law of gravitation
    (c) law of conservation of linear momentum
    (d) both a and c

Fill Ups

1. To produce a displacement _____ is required.
2. Passengers lean forward when sudden brake is applied in a moving vehicle. This can be explained by _____.
3. By convention, the clockwise moments are taken as _____ and the anticlockwise moments are taken as _____.
4. _____ is used to change the speed of car.
5. A man of mass 100 kg has a weight of _____ at the surface of the Earth.

TRUE OR FALSE (CORRECT IF FALSE)

1. The linear momentum of a system of particles is always conserved.
2. Apparent weight of a person is always equal to his actual weight.
3. Weight of a body is greater at the equator and less at the polar region.
4. Turning a nut with a spanner having a short handle is so easy than one with a long handle.
5. There is no gravity in the orbiting space station around the Earth. So the astronauts feel weightlessness.

MATCH

Column I	Column II
(a) Newton's I law	- propulsion of a rocket
(b) Newton's II law	- Stable equilibrium of a body
(c) Newton's III law	- Law of force
(d) Law of conservation of Linear momentum	- Flying nature of bird

ASSERTION AND REASON

(a) Both the assertion and the reason are true and the reason is the correct explanation of assertion.
(b) Both the assertion and the reason are true, but the reason is not the correct explanation of the assertion.
(c) Assertion is true, but the reason is false.
(d) Assertion is false, but the reason is true.

1. **Assertion :** The sum of the clockwise moments is equal to the sum of the anticlockwise moments.
   Reason : The principle of conservation of momentum is valid if the external force on the system is zero.
2. **Assertion :** The value of 'g' decreases as height and depth increases from the surface of the Earth.
   Reason : 'g' depends on the mass of the object and the Earth.

SHORT ANSWERS

1. Define inertia. Give its classification.
2. Classify the types of force based on their application.
3. Differentiate mass and weight.
4. Define moment of a couple.
5. State the principle of moments.
6. State Newton's second law.
7. Why a spanner with a long handle is preferred to tighten screws in heavy vehicles?
8. While catching a cricket ball the fielder lowers his hands backwards. Why?
9. How does an astronaut float in a space shuttle?
10. "Wearing helmet and fastening the seat belt is highly recommended for safe journey." Justify your answer using Newton's laws of motion.

Additional Questions:

11. Write short notes on gears.

LONG ANSWERS

1. What are the types of inertia? Give an example for each type.
2. State Newton's laws of motion?
3. Deduce the equation of a force using Newton's second law of motion.
4. State and prove the law of conservation of linear momentum.
5. Describe rocket propulsion.
6. State the universal law of gravitation and derive its mathematical expression.

7. Give the applications of Universal law of gravitation.

PROBLEMS

1. If a 5 N and a 15 N forces are acting opposite to one another. Find the resultant force and the direction of action of the resultant force.
2. Two bodies have a mass ratio of 3:4. The force applied on the bigger mass produces an acceleration of 12 ms^{-2}. What could be the acceleration of the other body, if the same force acts on it.
3. A ball of mass 1 kg moving with a speed of 10 ms^{-1} rebounds after a perfect elastic collision with the floor. Calculate the change in linear momentum of the ball.
4. A mechanic unscrew a nut by applying a force of 140 N with a spanner of length 40 cm. What should be the length of the spanner if a force of 40 N is applied to unscrew the same nut?
5. The ratio of masses of two planets is 2:3 and the ratio of their radii is 4:7. Find the ratio of their accelerations due to gravity.
6. Two blocks of masses 8 kg and 2 kg respectively lie on a smooth horizontal surface in contact with one other. They are pushed by a horizontally applied force of 15 N. Calculate the force exerted on the 2 kg mass.
7. A heavy truck and bike are moving with the same kinetic energy. If the mass of the truck is four times that of the bike, then calculate the ratio of their momenta.
   (Ratio of momenta = 1 : 2)

2 : OPTICS

CHOOSE THE MOST SUITABLE ANSWER

1. The refractive index of four substances A, B, C and D are 1.31, 1.43, 1.33, 2.4 respectively. The speed of light is maximum in
   (a) A (b) B
   (c) C (d) D

2. Where should an object be placed so that a real and inverted image of same size is obtained by a convex lens?
   (a) F (b) 2F
   (c) infinity (d) between F and 2F

3. A small bulb is placed at the principal focus of a convex lens. When the bulb is switched on, the lens will produce
   (a) a convergent beam of light
   (b) a divergent beam of light
   (c) a parallel beam of light
   (d) a coloured beam of light

4. Magnification of a convex lens is
   (a) Positive (b) negative
   (c) either positive or negative
   (d) zero

5. A convex lens forms a real, diminished point sized image at focus. Then the position of the object is at
   (a) focus (b) infinity
   (c) at 2f (d) between f and 2f

6. Power of a lens is –4D, then its focal length is
   (a) 4 m (b) –40 m
   (c) –0.25 m (d) –2.5 m