



# SHIKSHA CLASSES

Subject : Physics

Question Paper

Total Marks :25

Class : XI

4 : Law of Motion

Time : 1 Hour

## SECTION - A

**Q.1 : Choose the correct option :** 4

i) Forces acting for a short duration are called \_\_\_\_\_

- a) Short force      b) Interval force c )  
Impulsive forces      d) Interrupting force

ii) A bird is sitting in a wire cage hanging from the spring balance. Let the reading of the spring balance be  $W_1$ . If the bird flies about inside the cage, the reading of the spring balance becomes  $W_2$ . Which of the following is true?

- a)  $W_1 > W_2$       b)  $W_1 < W_2$   
c)  $W_1 = W_2$       (d) None of the above

iii) A body is placed on an inclined plane and has to be pushed down. The angle made by the normal reaction with the vertical will be

- a) equal to the angle of friction  
b) more than the angle of friction  
c) equal to the angle of repose  
d) less than the angle of repose

iv) A disc revolves in a horizontal plane at a steady rate of 3 revolutions per second. A coin just remains on the disc, when it is kept at a distance of 2 cm from the axis of rotation, then the coefficient of friction between the coin and the disc is

- a) 0.5      b) 0.65  
c) 0.7      d) 0.75

**Q.2 : Answer the following :** 2

- i) State Newton's first law of motion.  
ii) State Newton's third law of motion.

## SECTION B

**Q.3 : Answer the following : (ANY 3)** 6

State Newton's second law of motion and its importance.

Distinguish between inertial and non-inertial frames of reference.

Distinguish between Real and Pseudo force.

A lighter object A and a heavier object B are initially at rest. Both are imparted with the same linear momentum which will start with greater kinetic energy : A or B both will start with the same energy.

Explain balancing or mechanical equilibrium linear velocity of a rotating fan as a whole is generally zero. Is it mechanical equilibrium? Justify your answer.

## SECTION - C

**Q.4 : Answer the following : (ANY 3)** 9

One of the effects of force is to change the momentum. Define the quantity related to this and explain it for a variable force. Usually when do we define it instead of using the force.

Write a note on elastic collision and inelastic collision.

Why is the moment of a couple independent of the axis of rotation even if the axis is fixed.

**Q.11 :** Derive an expression for the position of centre of mass of a system of  $n$  particles and for continuous mass distribution.

**Q.12 :** Four uniform solid cubes of edges 10 cm, 20 cm, 30 cm and 40 cm are kept on the ground, touching each other in order. Locate centre of mass of their system.

**SECTION - D**

**: Answer the following : (ANY 1)      4**

**Q.13 :** In case of an elastic head on collision between two bodies derive an expression for the final velocities of the bodies in terms of their masses and velocities before collision.

**Q.14 :** State the formula for calculating work done by a force. Are there any conditions or limitations in using it directly? If so, state those clearly. Is there any mathematical way, Explain.

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