CBSE class 11 Rotational motion worksheet 1

One marks questions

Question 1 What is rigid body?

Question 2 State the relation between the torque and angular momentum?

Question 3 Under what conditions torque due to an applied force is zero?

Question 4 A body is rotating at a steady rate. Is a torque acting on the body?

Question 5 Find the angular velocity of *seconds'* hand of a watch.

Question 6 The wheel of a car is rotating at the rate of 1200 revolutions per *minute*. On pressing the accelerator for 10 *sec* it starts rotating at 4500 revolutions per *minute*. Find the angular acceleration of the wheel.

Question 7 Angular displacement θ of a flywheel varies with time as $\theta = at + bt^2 + ct^3$ find the relation for angular acceleration.

Two marks question

Question 8 What do you mean by translation equilibrium of a body?

Question 9 What do you mean by rotational equilibrium of the body?

Question 10 Explain the terms *external forces* and *internal forces*.

Question 11 What do you mean by moment of force? Define a couple.

Question 12

(a) A wheel completes 2000 rotations in covering a distance of 9.5 *km*. Find the diameter of the wheel.

(b) A wheel is at rest. Its angular velocity increases uniformly and becomes 60 *rad*/*sec* after 5 *sec*. Find the total angular displacement.

Three marks questions

Question 13

(x) Choose the correct alternative and explain the reason behind your choice

When a disc rotates with uniform angular velocity, which of the following is not true?

(i) The sense of rotation remains same

(ii) The orientation of axis of rotation remains same

(iii) The speed of rotation is non zero and remains same

(iv) The angular acceleration is non zero and remains same.

(y) Choose the correct alternatives and mention the reason behind your choices

The net external torque on a system of particles about an axis is zero. Which of the following are compatible with it

(a) The forces may be acting radially from a point on the axis

(b) The forces may be acting on the axis of rotation

(c) The forces may be acting parallel to the axis of rotation

(d) The torque caused by some forces may be equal and opposite to that caused by other forces.

Question 14

The vector sum of a system of non-collinear forces acting on a rigid body is given to be non-zero. If the vector sum of all the torques due to the system of forces about a certain point is found to be zero, does this mean that it is necessarily zero about any arbitrary point?

Five mark question

Question 15

Derive equations of rotational motion.

Answers to selected problems

Question 5

$\omega = \frac{\pi}{30}$ rad/sec

Question 6

1980 *degrees/sec*^{2}

Question 7

2*b* + 6*ct*

Question 12 (a) 1.5 meter (b) 150 rad