CLASS -9 SUBJECT -PHYSICS DATE 24.05.2020 PAWAN KR.

LEARNING MATERIALS

CHAPTER (FORCE AND LAWS OF MOTION)

NUMERICAL PROBLEMS.

Q. N. 1.Two hockey players of opposite teams while trying to hit a hockey ball on the ground collide and immediately become entangled. one has a mass of 60 kilogram and was moving with a velocity of 5 metre per second while the other has a mass of 55 kilogram and was moving faster with a velocity 6 metre per second towards the first player. in which direction and with what velocity will they move after they become entangled ? Assume that the frictional force acting between the feet of the two players and ground is negligible.

Solution:

When you are solving this problem first of all we have to take the sign convention according to the sign convention with left to right is taken positive direction and right to left is taken as negative direction. Here the first player be moving from left to right and other player moving from right to left.

M1 is mass of the first Hockey player =60kg

M2 is the mass of the other Hockey player= 55kg

U1 is the initial velocity of the first Hockey player=5m/s

U2 is the initial velocity of second Hockey player= - 6m/s

The total momentum of the two players before the collision is equal to

60 kg× 5 metre per second + 55kg×-6 metre per second

=(300 -330) kgm/s = - 30 kg m/s

let V is the velocity of the two entangled players after the collision .

The total momentum =

mass of the first Hockey player × final velocity of the first Hockey player .

mass of the second Hockey player ×final velocity of the hockey player

=(60 ×v + 55 ×v) kg m/s

=115v kgm/s

According to the law of conservation of momentum

the total momentum of the system before the collision is equal to the total momenta of the system after collision.

then we get here

115v=- 30

V= -30/115

= -0.26m/s

Thus the two entangled players would move with a velocity of 0.26m/s .is In the direction of second player. (Right to Left)

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