<u>**Answers**</u>

MCQ

ABCBB ADBCD BDCDD AABBC

Structured Questions

21   (a)   (i)   The principle of conservation of momentum states that total momentum of a system remains constant if the resultant force (or net force) on the system is zero.

(ii)   Total kinetic energy is conserved in an elastic collision, but is not in an inelastic collision.

(b)   (i) 2.1 m s^{-1}

(ii)   Initial KE = 28 J, final KE = 16 J. Since initial KE is not the same as final KE, the collision is inelastic.

22    $3.5 \times 10^5 \text{ m s}^{-1}$

23   (a)   The ball is moving in the opposite direction after the collision.

(b)   (i)   5.8 N s

(ii)   72 N

(c) 1.6 m s^{-1}

24   (b)   (i)   2.0 N

(ii)   0.14 J

(c)   Yes. The total linear momentum of the ball and the plate as a system is conserved as there is no net force acting on both the ball and the plate.

25   (a)   before = 8.2×10^5 m

after = $mu \cos 60° + mv \cos \phi$

(b)   before = zero

after = $mu \sin 60° - mv \sin \phi$

(c) $\phi = 30°$

$u = 4.1 \times 10^5 \text{ m s}^{-1}$

$v = 7.1 \times 10^5 \text{ m s}^{-1}$

hwq