1. (2)

Moment of force $M = r \times F$

Dimensions of

$$M = [L][ML\,T^{-2}] = [ML^2T^{-2}]$$

2. (4)

$$10t = 48 + \frac{1}{2} \times 1 \times t^2$$

3. (1)

$$v = u + gt$$

For ball A, $V_A = u - gt$

For ball B, $V_B = o + gt$

$\therefore$ Relative speed, $\Delta V = V_A - V_B$

$$= (u - gt)\hat{j} - (-gt)\hat{j} = u\hat{j}$$

4. (2)

$$(KE)H = E\cos^2\theta = E\cos^2 45^0 = \frac{F}{2}$$

5. (4)

$$a_y = \frac{10N}{10kg} = 1\ ms^{-1},\ s_y = \frac{1}{2}a_y\ t^2$$

$$= \frac{1}{2} \times 1 \times (4)^2 = 8m$$

$$S_x = 1.5 \times 4 = 6m$$

$$S = \sqrt{S_x{}^2 + S_y{}^2} = \sqrt{6^2 + 8^2} = 10m$$

6. (2)

$$L = I\omega$$

$$L = \sqrt{2IK}$$

$$L^2 = 2IK$$

$$L^2 = 2K\frac{L}{\omega}\ ;\ L = \frac{2K}{\omega}$$

$$L^1 = \frac{2\left(\frac{K}{2}\right)}{2\omega} = \frac{L}{4}$$

7. (1)

As initially both the particles were at rest therefore velocity of centre of mass is zero and there is no external force on the system so speed of centre of mass remains constant i.e., it should be equal to zero.

8. (1) 4g He = N_4 atoms

9. (4)

10. (2)

$Cl_2 > Br_2 > F_2 > I_2$: Bond dissociation energy

242.6 192.8 158.8 151.1 (kJ mol^{-1})

11. (3)

12. (3)

No has 15 electrons (paramagnetic), B.O = 2.5

NO^+ has 14 electrons (Diamagnetic), B.O = 3

13. (4) $\frac{V_1}{T_1} = \frac{V_2}{T_2}$

14. (2)

15. (2) $q = mC_v\Delta T$

$$1000 = \frac{100}{18} \times 75 \times \Delta T$$

16 (4)

17. (3)

18. (4)

19. (2) 20. (4) 21. (3)

22. (1) 23. (2) 24. (1)

25. (3) 26. (2) 27. (3)

28. (3) 29. (1) 30. (1)